

**School of Population Health
Faculty of Health Sciences**

**Examining a research and evaluation capacity building partnership: A systems
approach**

**Rochelle Amy Tobin
0000-0003-4502-2548**

**This thesis is presented for the Degree of
Doctor of Philosophy
of
Curtin University**

July 2022

Acknowledgement of Country

I acknowledge that Curtin University works across hundreds of traditional lands and custodial groups in Australia and with First Nations people around the globe. This research was undertaken on the land of the Wadjak people of the Nyungar Nation. I wish to acknowledge and pay my respects to the past, present and future Traditional Custodians and Elders of Australia. Across Wadjak land and Australia, Aboriginal and Torres Strait Islander people experience higher rates of sexually transmitted infections and blood-borne viruses than non-Aboriginal and Torres Strait Islander Australians. An effective public health response to these issues requires a connected public health workforce with the capacity to generate and apply evidence to decision-making. I hope that this research goes some way to strengthening public health action on these issues in Australia.

Abstract

Background

Globally, public health systems are viewed as complex. This complexity is evident within the sexual health and blood-borne virus (SHBBV) sector, where policymakers and service providers are adapting to unprecedented advances in the prevention and treatment in human immunodeficiency virus (HIV) and hepatitis C. The Australian Government has stated that an effective public health response to sexually transmissible infections (STIs) and blood-borne viruses (BBVs) requires a collaborative and evidence-informed approach. There is growing interest in research and evaluation capacity building (RECB) strategies to support evidence-informed decision-making by public health professionals. Despite this interest, there is little empirical evidence of how approaches to building RECB may be designed, implemented and evaluated. Examination of capacity building in different contexts is required to inform action.

The Western Australian (WA) Sexual Health and Blood-borne Virus Applied Research and Evaluation Network (SiREN), established in 2009, is a long-term partnership between sexual health and blood-borne virus (SHBBV) researchers, service providers and policymakers. SiREN is situated within a system of universities, clinical and medical services, and government and non-government organisations working toward the shared goal of preventing and managing STIs and BBVs in WA (the system). SiREN aims to strengthen evidence-informed policy and practice by developing research and evaluation capacity within this system.

Evaluating RECB is challenging as it is a dynamic learning and knowledge creation process influenced by intersecting contextual factors. Systems concepts and methods are suited to examining complex capacity building programs, like SiREN. A systems approach can be used to understand a program by examining how it interacts within the system it operates and identifying the causal relationships that lead to change. These insights can then be used to develop indicators for monitoring and evaluation purposes. The use of systems approaches

in evaluation is increasing, yet the evidence base for this methodology is in its infancy and requires further evidence on application to advance understanding

This research explored how SiREN contributes to research and evaluation capacity within the system. Following this, an evaluation framework and questionnaires were developed to support the ongoing monitoring and evaluation of SiREN.

Methods

A systems approach was used to examine SiREN. A scoping review of research partnerships between universities and community-based organisations was undertaken. Causal loop diagrams (CLDs) were developed to examine critical factors and causal relationships that affected the functioning of SiREN and the impacts and outcomes it has achieved. The diagrams were developed using data collected from SiREN organisational documents ($n = 47$), an online survey tool with the SHBBV sector ($n = 104$), and in-depth interviews with SiREN partners, service users and staff ($n = 21$). The diagrams were validated through workshops ($n = 3$) and meetings ($n = 9$) with SiREN partners, service users, staff and management team members ($n = 15$).

Subsequently, an evaluation framework and two evaluation questionnaires were developed. These were informed by insights gained from the CLDs and systems thinking concepts. The evaluation framework was created using consultation and consensus-building processes with SiREN management team members ($n = 5$). The questionnaires were informed by a literature review, consultation with members of the SiREN management team and SiREN steering group ($n = 12$) and pilot tested with SiREN partner organisations and service users ($n = 16$).

Results

Three CLDs were developed. The first CLD identified critical factors that affected the functioning of SiREN within the SHBBV system. SiREN's capacity to adapt within a dynamic system was critical to achieving its aims. Adaptation was facilitated by the exchange of knowledge between SiREN and system stakeholders. SiREN demonstrated credibility and

capability, which supported the development of partnerships. The strength of SiREN's partnerships enhanced its sustainability and growth. The second CLD depicted factors that influence engagement with SiREN. Engagement with SiREN changed in response to elements both within SiREN's control (e.g., developing trusting relationships) and outside the control of SiREN (e.g., organisational evaluation culture). The final diagram illustrates the impacts and outcomes achieved by SiREN's needs-based and responsive approach to RECB. The diagram shows that SiREN has contributed to building and sustaining the capacity of system stakeholders to engage in research, evaluation and evidence-informed decision-making.

The evaluation framework includes 138 unique indicators that will support the comprehensive evaluation of SiREN. The two questionnaires contain a combination of quantitative and qualitative items that assess the RECB support provided by SiREN. The framework and questionnaires reflect the complexity of SiREN through contextualising its activities, capturing causal relationships that influence its ability to achieve its aims and encouraging a reflexive approach to evaluation.

Conclusion

This study developed and validated a series of CLDs that provided traceable links between factors affecting the functioning of SiREN and how it contributes to building research and evaluation capacity within the WA SHBBV system. The insights gained from the CLDs were used to develop a complexity sensitive and theory-based evaluation framework and questionnaires.

This study found a partnership-based approach that builds trusting relationships and adapts to meet the needs of stakeholders is effective in creating sustained improvements to research and evaluation capacity. These findings expand current understanding of how capacity building programs work and the impacts and outcomes they can achieve.

The framework and questionnaires were developed to support the ongoing monitoring and evaluation of SiREN. Broader application of the framework and questionnaires is possible for

other capacity building partnerships, acknowledging that they will need to be adapted to meet their unique requirements and that further testing will improve inter-contextual reliability.

This study contributes to meeting a demand for practical insight into how systems approaches can be used in evaluation. It found that utilising a systems approach to examine SiREN was useful and led to new insights into the impacts and outcomes SiREN has achieved as well as factors that facilitated these changes.

Findings from this study demonstrate the value of a partnership-based approach to RECB within a complex system. A partnership-based approach can foster the development of trusting and responsive relationships, which increase the impacts and outcomes of research and evaluation capacity building and supports a more efficient response to emerging public health evidence needs.

Acknowledgements

Firstly, I'd like to acknowledge my brilliant team of supervisors for being so supportive, each in their unique way. Bruce, your ability to get to the crux of the matter was invaluable and has encouraged me to look at problems the same way. Jonathan, I was always grateful for your calm and pragmatic presence in our meetings. Roanna, thank you for having the confidence in me from the start, your eye for detail and for sharing your wealth of evaluation knowledge with me. Lastly, Gemma, I will always be grateful for the day you plucked me out of one of your undergraduate classes and brought me into the Collaboration for Evidence, Research and Impact in Public Health (CERIPH) fold. Since then, you have been a kind and generous mentor. Roanna and Gemma, I appreciate all the opportunities you have provided me to put what I have learned into practice. When I lost sight of why I had begun this process, these experiences brought my motivation back into focus.

Thank you to the team at CERIPH for always taking the time to check-in and see how I was progressing. Your words of encouragement and sharing your own PhD experiences with me made me feel like I could make it to the finish line. A special mention to Krysten and Krissy for being my friends who most got it. You are always there to listen to me ramble, provide advice and make me smile.

I am grateful to all the SiREN stakeholders and staff for giving me your time and support. The research findings are much richer because you took the time to share your knowledge and experiences of SiREN. I hope the results help strengthen public health action to address sexual health and blood-borne viruses.

To my family, for always being united in your support for me. Dad, for never letting me say I can't and for your steadfast belief in my abilities. Mum, for always being there, often with food in hand. You cared for Xavier and Coen with the same love and dedication that I would. Knowing you were there for them took an immense weight from my shoulders. Words cannot describe how grateful I am for all the time you have both given to support me. The boys love you all the more for it. To Fiona and Carmen, thank you for all the phone calls

where we shared funny stories of life and motherhood. I hope submitting this means we can spend more time talking over wine instead of on the phone.

To Xavier and Coen, my two delightful distractions. For dragging me away from my desk to play, cracking me up with your crazy ways and never letting me forget that there is more to life than finishing a PhD. You probably won't remember much from this time. But I want you to know that I missed you every minute I was away from you. This thesis is a testament that you can do hard things when you set your mind to them. I cannot wait to see what hard things you choose to take on.

Finally, to John, for your boundless love and support and for making me laugh every day. I dedicate this to you. Now can you please rewrap that tiny suitcase and give it back to me. I am ready to open the next envelope.

Funding Acknowledgements

Thank you to Curtin University for awarding a Research Training Program Scholarship and Research Top-up Scholarship. The Commonwealth of Australia provides these scholarships to assist with students' living costs while undertaking Research Doctorate studies. Towards the end of my studies Curtin University also awarded me Completion and Publication Grant Scholarships which provided me with funds to cover basic living expenses and publish in open-access journals. I would like to acknowledge SiREN for its contribution to a scholarship in the first year of my studies and a partial scholarship after I was awarded the Curtin University Research Training Program Scholarship. Finally, thank you to CERIPH and the School of Population Health at Curtin for providing me with a desk and computer so I could work amongst my colleagues.

List of Peer-Reviewed Publications as Part of this Thesis

The following publications form part of this thesis. Copies of these publications are provided in the relevant chapters.

1. **Tobin, R.**, Hallett, J., Maycock, B., Lobo, R. (2019). Taking a systems approach to explore the impacts and outcomes of a research and evaluation capacity building partnership: A protocol. *BMJ Open*, 9, Article e026706. <https://doi:10.1136/bmjopen-2018026706> (Impact factor: 2.692)
2. **Tobin, R.**, Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2022). Critical factors that affect the functioning of a research and evaluation capacity building partnership: A causal loop diagram. *PLoS ONE*, 17(1), Article e0262125. <https://doi:10.1371/journal.pone.0262125> (Impact factor: 3.04)
3. **Tobin, R.**, Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2022). Utilizing causal loop diagramming to understand a research and evaluation capacity building partnership. *Frontiers in Public Health*, 10, 857918. <https://doi:10.3389/fpubh.2022.857918> (Impact factor: 3.709)
4. **Tobin, R.**, Hallett, J., Crawford, G., Maycock, B., Lobo, R. (2022). Development of a questionnaire to assess the processes, outcomes and impacts of a research and evaluation capacity building partnership for public health professionals. Manuscript submitted for publication.
5. **Tobin, R.**, Hallett, J., Crawford, G., Maycock, B., Lobo, R. (2022). Frameworks to guide research partnerships between community-based organisations and universities: A scoping review. Manuscript submitted for publication.

I warrant that I have obtained, where necessary, permission from the copyright owners to use any of my published work (e.g., journal articles) in which the copyright is held by another party (e.g., a publisher). Copyright permissions are detailed in [Appendix A](#).

Statement of Contributions

This study was conducted through the CERIPH within the Curtin School of Population Health. The PhD scholar managed the project, which involved designing the study and collecting, analysing, and interpreting the data. The PhD scholar led the writing and submission of all publications presented as part of this thesis. The following individuals were directly involved as supervisors and co-authors for publications arising from this study.

Dr Roanna Lobo, Curtin School of Population Health: contributed as a co-supervisor from 2016 to early 2020. Dr Lobo was then the primary supervisor from 2020 to 2022. She had ongoing close involvement with the research, including conceptualising study design and data collection methods, providing feedback on research findings, and providing input on publication structure, proofing of drafts and suggestions for improvements.

Dr Bruce Maycock, Curtin School of Population Health (2016 to early 2020) and College of Medicine and Health, University of Exeter (2020 and 2021): contributed as primary supervisor from 2016 to early 2020. He had ongoing close involvement with the research, including contributing to the project proposal, providing feedback on analysis and findings, reading of drafts and making suggestions for improvements to all publications.

Dr Jonathan Hallett, Curtin School of Population Health: contributed as a co-supervisor and provided ongoing close involvement with the research, including conceptualising study design and data collection methods, providing feedback on research findings, providing input on the structure of publications, reading of drafts and making suggestions for improvements to all publications.

Dr Gemma Crawford, Curtin School of Population Health: contributed as a co-supervisor from early 2020. She had ongoing close involvement with the research, including data collection methods, providing feedback on research findings, providing input on the structure of publications, reading of drafts and making suggestions for improvements to publications 1 and 3-5.

Signed statements of contribution are included in [Appendix B](#).

List of Conference and Seminar Presentations

1. **Tobin, R.** (2017, April 10). *Systems thinking overview and description of PhD methods* [Invited guest lecturer]. Curtin University, Public Health Masters Students, Perth, Western Australia.
2. **Tobin, R.** (2018, March 9). *Systems thinking overview. PhD methods and findings to date.* [Invited guest lecturer]. Curtin University, Public Health Masters Students, Perth, Western Australia.
3. **Tobin, R.,** R. Lobo, B. Maycock, and J. Hallett. (2018, May 17-19). *Using systems thinking to understand the influence of a research and capacity building partnership.* [Conference presentation]. Presented at the SiREN Symposium, Perth, Western Australia.
4. **Tobin, R.,** R. Lobo, B. Maycock, and J. Hallett. (2018, September 19-21). *Using systems thinking to understand the influence of a research and capacity building partnership.* [Conference presentation]. Presented at the Australasian Evaluation Society Conference, Hobart, Tasmania.

Related Works

The following works are relevant to the thesis as they are related to SiREN. The PhD scholar undertook data collection and analysis and wrote the first draft with proofing and editing support from SiREN management team members.

Reports

1. SiREN. (2017). *Knowledge Translation Strategy*. <https://siren.org.au/wp-content/uploads/2017/04/Knowledge-Translation-Strategy.pdf>
2. SiREN. (2019). *2018 SiREN Sexual Health and Blood-borne Virus Sector Needs Assessment Survey Report*. <https://siren.org.au/wp-content/uploads/2019/07/2018-SiREN-SHBBV-Sector-Needs-Assessment-Survey-Report.pdf>

Table of Contents

1. Introduction	1
1.1. Supporting evidence-informed public health	1
1.1.1. The challenges and approaches to research and evaluation capacity building ..	2
1.1.2. Strategies used to build research and evaluation capacity	3
1.2. The Western Australian sexual health and blood-borne virus sector	5
1.3. SiREN	6
1.4. The complexity of the SHBBV sector and SiREN	11
1.5. Systems approaches to evaluation	12
1.6. Research aim and objectives.....	13
1.7. Significance of the research	13
1.8. Thesis organisation.....	15
2. Review of the literature	19
2.1. Capacity building programs.....	19
2.1.1. How research and evaluation capacity is built	19
2.1.2. How relational factors support effective RECB	21
2.1.3. The impacts and outcomes RECB can lead to.....	22
2.2. Evaluating capacity building programs	23
2.2.1. How systems approaches have been applied to examine RECB programs.....	23
2.2.2. Section summary	24
2.3. Publication 1: Scoping review	25
2.3.1. Scoping review: Introduction.....	25
2.3.2. Scoping review: Methods	28
2.3.3. Scoping review: Results	29
2.3.4. Scoping review: Discussion	41
2.4. Summary	46
3. Research methods	47
3.1. Publication 2: Research protocol	48
3.2. Research designs	55
3.2.1. Supervisory team	55
3.2.2. Steering group.....	55

3.2.3.	Theoretical perspective	56
3.2.4.	How systems approaches were utilised	58
3.2.5.	Participants	62
3.2.6.	Data collection	65
3.2.7.	Analysis of causal loop diagram data.....	87
3.2.8.	Reflexivity.....	91
3.2.9.	Rigour.....	93
3.2.10.	Ethical considerations.....	99
3.3.	Summary	100
4.	Critical factors affecting the functioning of SiREN.....	101
4.1.	Publication 3: Factors affecting the functioning of SiREN	102
4.2.	Summary	125
5.	Examination of the impacts and outcomes of SiREN	126
5.1.	Publication 4: Impacts and outcomes of SiREN	127
5.2.	Summary	143
6.	Development and validation of the evaluation framework.....	144
6.1.	Background.....	144
6.1.1.	Complexity sensitive evaluation frameworks.....	144
6.1.2.	Frameworks developed to evaluate RECB programs	147
6.1.3.	Transforming systems diagrams into evaluation frameworks	148
6.2.	Results	148
6.2.1.	The framework.....	149
6.3.	Summary	156
7.	Questionnaires to assess SiREN research and evaluation support	157
7.1.	Background.....	157
7.2.	Publication 5: Questionnaire to assess synergistic engagement.....	159
7.2.1.	Introduction	159
7.2.2.	Methods.....	162
7.2.3.	The final questionnaire	171
7.2.4.	Discussion.....	173
7.3.	Questionnaire to assess transactional engagement.....	180
7.3.1.	Methods	180

7.3.2. Results.....	181
7.3.3. Summary	182
8. Discussion	184
8.1. Research summary.....	184
8.2. Findings related to study objectives	186
8.2.1. Objective 1	186
8.2.2. Objective 2	188
8.2.3. Objective 3	195
8.2.4. Objective 4	199
8.3. Strengths and limitations	200
8.3.1. Overall strengths and limitations.....	200
8.3.2. Strengths and limitations related to the scoping review	202
8.3.3. Strengths and limitations related to the CLDs.....	202
8.3.4. Strengths and limitations related to the evaluation framework.....	205
8.3.5. Strengths and limitations related to the RECB-Q	206
8.4. Implications and Opportunities.....	207
8.4.1. Implications and opportunities for research	207
8.4.2. Implications and opportunities for SiREN and the WA SHBBV system	210
8.4.3. Implications and opportunities for policy and practice.....	212
8.5. Concluding remarks.....	213
Appendices	216
Appendix A: Copyright permissions	216
Appendix B: Signed statements of contribution	218
Appendix C: SiREN organisational chart.....	222
Appendix D: Example search strategy Proquest	223
Appendix E: Online survey with SHBBV sector	224
Appendix F: Interview schedule for SiREN partners and service users	229
Appendix G: Recruitment email staff.....	230
Appendix H: Interview schedule for SiREN staff	231
Appendix I: Recruitment email SiREN staff and management team workshop	232
Appendix J: An overview of SiREN activities and outputs from 2012 to 2020	233
Appendix K: List of organisational documents reviewed.....	235

Appendix L: Recruitment email SiREN needs assessment	237
Appendix M: Recruitment email interview with SiREN partners and service users	239
Appendix N: Invitation to attend a workshop for SiREN partners, service users and management team members.....	240
Appendix O: Workshop slides	241
Appendix P: Evaluation framework.....	249
Appendix Q: Framework consultation recruitment and reminder emails	271
Appendix R: Framework consensus-building surveys.....	274
Appendix S: Invitation to participate in pilot testing	287
Appendix T: SiREN service users and partners questionnaire pilot testing.....	290
Appendix U: Information sheets and consent form	293
Appendix V: Ethics approval.....	304
Appendix W: Description of CLD variables.....	306
Appendix X: Example search strategy	314
Appendix Y: RECB-Q and instructions	315
Appendix Z: Questionnaire implementation processes.....	318
Bibliography	322

List of Figures

Figure 1. SiREN website	8
Figure 2. Curtin University, Bentley Campus	9
Figure 3. Examples of SiREN publications	10
Figure 4. Learning processes of evaluative inquiry.....	20
Figure 5 PRISMA flow diagram	30
Figure 6. Poverty-related influences on women’s participation in prevention of mother-to-child transmission services	59
Figure 7. One of the three sections of the draft CLD.....	71
Figure 8. The development and validation of the evaluation framework.....	79
Figure 9. Example illustrating framework components	80
Figure 10. Overview of processes to develop framework components.....	81
Figure 11. Variable description example	89
Figure 12. An early version of the causal loop diagram illustrating factors that affect the operation of SiREN.....	90
Figure 13. Example fieldnote	96
Figure 14. Components of a traditional logic model	145
Figure 15. Example of a non-linear theory of change for participatory research programs.	146
Figure 16. Evaluation questions and corresponding domains.....	151
Figure 17. Evaluation questions aligned to categories	152
Figure 18. Questionnaire development.....	164
Figure 19. PRISMA flow diagram for article selection	168
Figure 20. Questionnaire development processes	180
Figure 21. Transactional engagement questionnaire	182

List of Tables

Table 1. Overview of frameworks.....	31
Table 2. Scope of frameworks	36
Table 3. Potential uses of each framework	40
Table 4. Data collection methods used in each study component	66
Table 5. Additional questions included in the needs assessment.....	73
Table 6. Extract from spreadsheet documenting diagram condensing process	82

Table 7. Coding table example.....	88
Table 8. Results from the consensus-building rounds.....	148
Table 9. Process, outcome and impact domains used to inform the development of the questionnaire items	166

Acronyms

Abbreviation	Meaning
AIDS	Acquired immunodeficiency syndrome
ART	Antiretroviral therapy
BBV	Blood-borne virus
CBO	Community-based organisation
CBPR	Community-based participatory research
CEnR	Community engaged research
CERIPH	Collaboration for Evidence Research and Impact in Public Health
CLD	Causal loop diagram
COREQ	Consolidated criteria for reporting qualitative research
ECB	Evaluation capacity building
EIDM	Evidence-informed decision making
FTE	Full time equivalent
HIV	Human immunodeficiency virus
MSM	Men who have sex with men
NGO	Non-government organisation
PMTCT	Participation in prevention of mother-to-child transmission (services)
PrEP	Pre-exposure prophylaxis
RECB	Research and evaluation capacity building
RECB-Q	Research and evaluation capacity building questionnaire
RCB	Research capacity building
SHBBV	Sexual health and blood-borne virus
SHBBVP	Sexual health and blood-borne virus program
SiREN	Sexual Health and Blood-borne Virus Applied Research and Evaluation Network
STI	Sexually transmissible infection
WA	Western Australia

Definitions

The following terms are used throughout this thesis and are defined here.

Term	Definition
Balancing loop	A cyclical process within a causal loop diagram that inhibits change, leading to stability (Peters, 2014).
Boundaries	In systems thinking, boundaries determine what lies inside and outside a system (Hummelbrunner, 2011) and are used to focus the inquiry (Cabrera et al., 2008; Hummelbrunner, 2011).
Causal loop diagram (CLD)	A type of qualitative systems modelling method used to create visual depictions of a system or situation (Sterman, 2000). CLDs are composed of words and arrows that illustrate system elements and the relationships between them (Kenzie, 2021).
Causal mechanism/mechanism of action	The ‘generative force’ that affects a program’s impacts and outcomes (Jagosh et al., 2014). Mechanisms can describe how and why a program led to change (Jagosh et al., 2014)
Co-creation	Collaborative knowledge creation between researchers and other stakeholders (e.g., service providers, policymakers, community members) (Nguyen et al., 2020).
Community-based organisation	Health and social service organisations acting in the interest of their local community, not for profit and separate from government (Wilson et al., 2010).
Community-engaged research	Community-engaged research encompasses a range of partnerships that share the central feature of meaningfully engaging the community in research (e.g., research-practice partnerships) (Haapanen & Christens, 2021; Ortiz et al., 2020).
Complex system	A system with many actors (e.g., individuals, organisations), who are constantly interacting, learning and evolving in

Term	Definition
	response to change, often in unpredictable ways (BeLue et al., 2012; Rwashana et al., 2014).
Complexity	The generation of dynamic behaviour from simple interactions among a substantial number of parts (Ricklefs et al., 2007). These interactions cannot be reduced to the component parts (Ricklefs et al., 2007).
Complex adaptive systems	Special cases of complex systems that <i>have “the ability to adapt to changes in the external environment as a result of experience via conditional action and anticipation”</i> (Kim & Mackey, 2014, p 6).
Consultancy	Consultancy is the practice of an expert providing advice (Hornby, 1995).
Context	Circumstances in which something (i.e. a program) occurs that aid in understanding it (Hornby, 1995).
Contextual factors	Elements that influence the functioning and effects of a program (e.g., cultural norms, history and policies) (Jagosh et al., 2014).
Evaluation framework	A written product that provides structure and guidance on the monitoring and evaluation of a program (Markiewicz & Patrick, 2016). An evaluation framework can establish program progress and results, inform decision-making and support accountability (Markiewicz & Patrick, 2016).
Evidence	In public health, evidence can come from various sources, including research, evaluation, surveillance data, community perspectives, and experiential knowledge (Armstrong et al., 2014; National Collaborating Centre for Methods and Tools, n.d.).
Evidence-informed decision-making	In public health, this is the process of combining the best available research evidence with evidence from various sources (e.g., evaluation, community perspectives and

Term	Definition
	applying it to policy or practice-based decisions) (Armstrong et al., 2014; National Collaborating Centre for Methods and Tools, n.d.).
Evidence portal	Websites that present evidence in a way that is accessible to users (e.g., service providers and policymakers) (Campbell Collaboration, 2022).
Framework	<i>"...a structure, overview, outline, system or plan consisting of various descriptive categories, e.g. concepts, constructs or variables, and the relations between them that are presumed to account for a phenomenon."</i> (Nilsen, 2015, p. 2)
Feedback loops	Circular relationships between variables that can either reinforce (amplify) or balance (dampen) change (Williams & Hummelbrunner, 2010).
Impacts¹	Short term changes that occur as a direct result of a program (Funnell & Rogers, 2011). Generally occur prior to outcomes. In research and evaluation capacity building, outcomes can include increased research and evaluation confidence, knowledge and skills.
Indicator	Measurable information used to determine program progress and attainment of impacts and outcomes (Centers for Disease Control and Prevention, 2021).
Inputs	The human, monetary and material resources of a program (Funnell & Rogers, 2011).
Insider research	A type of research where a researcher undertakes research within a group or setting that they are also a member of (Asselin, 2003).

¹ In Publication 5, Chapter 8 the terms impact and outcome are interchanged to reflect the use of terms commonly used in America as the article was published with an American journal.

Term	Definition
Knowledge translation	A dynamic and iterative process involving the creation, exchange and application of evidence (Murunga et al., 2020).
Leverage points	Points within a complex system that have an important effect on system behaviour (Vandenbroeck et al., 2007). They are characterised by a relatively small change that leads to a much larger change (Meadows, 1999).
Mentoring	A learning relationship where a person with more experience (mentor) shares their wisdom, knowledge and experience with a less experienced person (mentee) (Mullen & Klimaitis, 2021). Types of mentoring relationships vary and can include formal, informal and peer-based (Mullen & Klimaitis, 2021).
Model	A simplified description of a phenomenon used to enhance understanding (Nilsen, 2015). Models are similar to theories and do not need to be complete representations of a phenomenon to have value (Nilsen, 2015).
Non-government organisation	A non-profit group operating independently of government and focuses on an issue, usually related to health or social justice (Laverack, 2017).
Outcomes¹	Long term changes that occur as a direct result of a program (Funnell & Rogers, 2011). Outcomes usually occur after impacts. In research and evaluation capacity building, outcomes can include sustainable research and evaluation practice and evidence-informed decision making.
Outputs	A program's completed activities or tangible products or services (e.g., publications) (Funnell & Rogers, 2011).
Partnership	Any relationship that involves mutual cooperation and a shared responsibility to achieve a specific research or

Term	Definition
	evaluation goal (Canadian Institutes of Health Research, 2022).
Perspectives	Perspectives reflect a view or ‘mental model’ of the system (Cabrera et al., 2008). Perspectives can be held by a person or can be conceptual (e.g., a point in time or a physical place) (Cabrera & Cabrera, 2019).
Program	An organised activity, or set of activities, with a specific aim (Funnell & Rogers, 2011). For example, a public health program comprised of education and peer-support based strategies aimed at reducing HIV transmission.
Realist methodology	A realist methodology is a complexity sensitive approach that seeks to explain the contexts and mechanisms that influence program outcomes (Pawson & Tilley, 1997).
Reinforcing loop	A cyclical process within a CLD that amplifies (increases) change (Peters, 2014).
Reflexivity	A process where the researcher becomes aware of the contextual relationships (e.g., culture, gender) between themselves, the research topic and participants with the purpose of increasing the credibility of findings and understanding of the research process (Dodgson, 2019).
Relationships	In systems thinking, relationships are causal connections between parts of a system (Cabrera et al., 2008). Relationships determine how system variables interact and influence each other to achieve a purpose (Renger et al., 2019). In a CLD, relationships are illustrated using arrows (Kenzie, 2021).
Research and evaluation capacity	The motivation, knowledge, skills and structures to engage in sustainable research and evaluation practice and apply research and evaluation evidence to decision-making (Cooke, 2005; Labin et al., 2012; Preskill & Boyle, 2008).

Term	Definition
Research and evaluation capacity building	The intentional process of enabling individuals, organisations or systems to undertake research and evaluation and apply the evidence generated to decision-making (Cooke, 2005; Labin et al., 2012; Preskill & Boyle, 2008).
Service providers	An individual or organisation that provides funded services (National Disability Insurance Agency, 2020). In this study, the service providers address issues related to sexually transmissible infections and blood-borne viruses.
Sexual health and blood-borne virus sector	A collective term used to describe all individuals and organisations working to address sexual health and blood-borne virus issues in Western Australia. The sexual health and blood-borne virus sector is the system described within this study.
SiREN management team/management team	Five university-based staff that provide input into shaping SiREN's activities and strategic direction, recruiting and training staff, supervising SiREN research and evaluation projects, including supervising postgraduate research students.
SiREN Network	Individuals who have signed up to receive regular electronic communications from SiREN, including evidence summaries, upcoming events, and funding and employment opportunities.
SiREN partner	Individuals or organisations who have cooperated and shared responsibility with SiREN to undertake research or evaluation activities and/or are a member of the steering group.
SiREN project manager	The staff member responsible for achieving SiREN's objectives. Duties include staff supervision, managing

Term	Definition
	budgets and contracts, managing stakeholder relationships and applying for additional research and evaluation funding.
SiREN service user	Individuals or organisations who have received tailored project planning, evaluation or research support from SiREN (e.g., developing an evaluation framework).
Stakeholder	Individuals, groups or organisations with an interest in SiREN or who may be affected by SiREN’s activities (Canadian Institutes of Health Research, 2022).
Steering group	A group of representatives from key sexual health and blood-borne virus organisations who meet biennially to provide input into the strategic direction of SiREN and ensure it meets its funded outputs and outcomes.
System	<i>“An interconnected set of elements that is coherently organised in a way that achieves something ... a system must consist of three kinds of things: elements, interconnections and a function or purpose.”</i> (Meadows, 2008, p. 11). In this study, the system is composed of universities, clinical and medical services, and government and non-government organisations working towards the shared aim of preventing and managing sexually transmissible infections and blood-borne viruses in Western Australia.
Systems dynamics	An approach that <i>“combines the theory, methods, and philosophy needed to analyse the behaviour of systems”</i> (Forrester, 1993, p. 199). System dynamics can predict how situations may change over time (Forrester, 1993).
Systems thinking/Systems approach	<i>“Consciously organised thinking using systems ideas”</i> (Checkland, 1999 p, 45). Systems thinking draws on various systems-based concepts and methods to explore complex phenomena (Cabrera et al., 2008). When used to examine

Term	Definition
	public health programs, a systems approach takes a holistic approach that pays attention to how the program, its component parts and the system interact to affect change (Chen, 2016).
Theory of change	An explanation of the central processes that drive change within a program (Funnell & Rogers, 2011).
Variables	In CLDs, variables are components of a system connected through relationships (arrows) to illustrate behaviour (Kenzie, 2021).

1. Introduction

Globally, public health issues are viewed as complex (Bagnall et al., 2019). This complexity is evident within the Australian sexual health and blood-borne virus (SHBBV) sector, where policymakers and service providers are adapting to unprecedented advances in prevention and treatment in human immunodeficiency virus (HIV) and hepatitis C (Brown et al., 2018). For example, the introduction of pre-exposure prophylaxis (PrEP), a drug used by people to prevent HIV acquisition (Fonner et al., 2016), has led to a dramatic decline in HIV diagnoses within men who have sex with men (MSM), (Kirby Institute, 2021); however, the use of PrEP has also changed safe sex practices, leading to an increase in sexually transmissible infections (STIs) (Traeger et al., 2021). Public health action to address STIs and blood-borne viruses (BBV) is strengthened by a collaborative and evidence-informed response (Australian Government, 2021b). This thesis examines the Western Australian (WA) Sexual Health and BBV Applied Research and Evaluation Network (SiREN) to understand research and evaluation capacity building within an Australian public health sector. SiREN takes a partnership-based approach to strengthen an evidence-informed response to SHBBV issues within WA.

1.1. Supporting evidence-informed public health

To inform effective public health policy and practice, relevant evidence must be available, accessed, synthesised and applied to decision-making (World Health Organization, 2021). This process is called evidence-informed decision-making (EIDM) (Armstrong et al., 2014; National Collaborating Centre for Methods and Tools, n.d.). In public health, evidence comes from a range of sources, including research and evaluation findings, professional experience, surveillance data, and community perspectives (Armstrong et al., 2014; Dobbins et al., 2007; World Health Organization, 2021). EIDM can increase the appropriateness and effectiveness of programs and policies (Brownson et al., 2009; Langlois et al., 2016) and lead to more efficient and impactful use of limited public health and research resources (Brownson et al., 2009). Despite the promise of EIDM to enhance public health practice, the World Health Organization (World Health Organization, 2021, p. 10) recently stated that *“Irrespective of how relevant, applicable or convincing a piece of evidence appears to be to address a given*

policy issue, it virtually never automatically drives tangible policy and practice change.”

Therefore, to support public health action, efforts to increase the generation, accessibility and usefulness of evidence are required (Cooke, 2020; Dubois & Lévesque, 2020).

Research suggests that approaches to increase EIDM should consider the intersecting roles of research and evaluation capacity building (RECB) and knowledge translation (KT). Seminal definitions of research capacity building (RCB) have been provided in a debate article by Cooke (2005) and for evaluation capacity building (ECB) in an article by Preskill and Boyle (2008) that presents a model of ECB. Drawing on these definitions, RECB can be defined as the purposeful process of increasing capabilities (e.g., skills, knowledge, structures) to undertake and use research and evaluation. KT supports the generation, exchange and application of evidence to decision-making (Murunga et al., 2020). As explained in a review of research capacity building (RCB) by Cooke et al. (2018), the focus of RCB (and ECB) is upstream, building the foundational capabilities, while KT occurs further downstream once capacity has been developed. However, they both involve the creation, sharing and use of evidence and must co-exist to achieve the aim of EIDM. In this doctoral research, the term KT is used when referring to activities that specifically focus on the exchange of evidence. Furthermore, the term capacity building is used instead of capacity strengthening to maintain consistency with the literature. It is acknowledged that everybody has different levels of capacity; therefore, capacity is strengthened, not built.

1.1.1. The challenges and approaches to research and evaluation capacity building

There are multiple challenges associated with the creation, exchange and application of evidence in public health. From the perspective of service providers and policymakers, those barriers can include: gaps in skills and knowledge (Huckel Schneider et al., 2016; Schwarzman et al., 2021), lack of resources (e.g., time, funding, software) (Schwarzman et al., 2019a), availability and acceptability of evidence (Armstrong et al., 2007), workplace culture and policies (Schwarzman et al., 2021), the political environment (Huckel Schneider et al., 2016) and an absence of contact with researchers and evaluators (Langlois et al., 2016). Common motivators to engage in research and evaluation include a desire to address

community needs (Sarkies et al., 2017), maximise funding support (Borkowski et al., 2016), maintain accountability (Pager et al., 2012; Schwarzman et al., 2019a) and develop professionally (Taylor-Powell & Boyd, 2008). These factors occur across the practice of evaluation, research and EIDM. Despite reported challenges, there is substantial demand within the Australian public health context for RECB and EIDM (Australian Government, 2021b; Schwarzman et al., 2019a).

1.1.2. Strategies used to build research and evaluation capacity

As understanding of the value of research and evaluation capacity increases, further examination of how to build this capacity is warranted (Cooke et al., 2018; Lindeman et al., 2018). There are numerous examples of research and evaluation capacity building programs in the public health literature, both globally (Akintobi et al., 2016; Bourgeois et al., 2018; Cooke et al., 2015; Levine et al., 2013) and within the Australian context (Edwards et al., 2016; Haynes et al., 2020; Hulcombe et al., 2014; Lindeman et al., 2018; Nichols et al., 2018). Strategies employed have included tailored support (e.g., mentoring or consultancy) (Armstrong et al., 2013; Edwards et al., 2016; LaRocca et al., 2012; Norton et al., 2016; Punton, 2016), workshops and training (Bourgeois et al., 2018; Pettman et al., 2013), access to funding opportunities (Hulcombe et al., 2014), the provision or development of tools that support research and evaluation (e.g., evidence portals or developing evaluation frameworks) (Edwards et al., 2016; LaRocca et al., 2012; Norton et al., 2016) and partnerships (Cooke et al., 2018; Haynes et al., 2020; Nguyen et al., 2020). Despite this substantial evidence base, there is no consensus on the most effective capacity building strategies and further exploration is needed (Cooke et al., 2018; Lamarre et al., 2020; Norton et al., 2016). Nevertheless, reviews of the research (Cooke et al., 2018) and evaluation (Lamarre et al., 2020) capacity building literature suggest that multi-strategic and context specific approaches that promote sustained engagement between researchers, service providers and policymakers are likely the most successful.

Partnerships between researchers, service providers and/or policy makers are gaining momentum as an approach to increasing EIDM (Cooke et al., 2018; Haynes et al., 2020;

Nguyen et al., 2020; Oliver et al., 2014). This increased interest is likely due to the acknowledgment of the value of a sustained learning by doing approach to capacity building (Cooke, 2020; Lamarre et al., 2020). Partnerships and networks are frequently described as a strategy in KT (Nguyen et al., 2020) and RCB (Cooke et al., 2018), but less so in ECB (Grack Nelson et al., 2018; Schwarzman et al., 2019a). Partnership-based approaches can exceed the sum of their parts by achieving impacts they would unlikely achieve individually (Cooke et al., 2018). Within the Australian public health (Haynes et al., 2020) and broader capacity building literature (Cooke et al., 2018), a need has been identified for empirical evidence of how partnership-based capacity building programs may be designed, operationalised and evaluated.

Sustaining partnerships is challenging and requires consideration of partner needs and dynamics (Nguyen et al., 2020). Partners from service-delivery, government and research have unique strengths and needs that they bring into the partnerships. For example, community-based organisations (CBOs) have experiential knowledge and community connections and value evidence that can support them to improve outcomes for the communities they serve (Adebayo et al., 2018). In contrast, governments provide access to resources (e.g., funding) and require timely evidence to inform decision-making to improve outcomes within their communities (Williamson et al., 2019). Within a university context, researchers bring research and evaluation knowledge (Ross et al., 2010) and value tangible measures of research impact (e.g., citations) (Douglas et al., 2020). However, the value universities place on community engagement is changing as frameworks and ranking systems have been developed to assess how well universities engage with communities (Australian Government, 2019; Times Higher Education, 2022). These divergent interests can negatively impact partnership functioning. For example, a study by Lokot and Wake (2021) explained that CBOs have grown tired of the revolving door of researchers seeking data and not providing anything of value in return. Sustained partnerships built on reciprocity, mutual respect and trust can overcome these challenges (Cooke, 2020; Frerichs et al., 2016). Examining the dynamics of partnership-based approaches to building research and evaluation capacity could inform action strengthen their impact.

1.2. The Western Australian sexual health and blood-borne virus sector

The context of this study is the WA SHBBV sector. The sector comprises individuals and organisations working towards the shared aim of preventing and managing STIs and BBVs in WA. WA is Australia's largest state, covering over a third of the country with a population of approximately 2.6 million people (Australian Bureau of Statistics, 2021a, 2022). It is also one of Australia's most diverse jurisdictions with the highest proportion of people born overseas (35% compared to the national average of 29%) (Australian Bureau of Statistics, 2021b) and over three per cent of its population identifies as Aboriginal and/or Torres Strait Islander (Australian Bureau of Statistics, 2021c). This diversity affects the prevalence of STIs and BBVs in WA. For example, overseas-born migrants and Aboriginal and Torres Strait Islander people are more likely to be affected by HIV, STIs and other BBVs when compared to other Australians (Kirby Institute, 2020). Additionally, the large majority of the WA population (80%) live in the Perth area (Australian Bureau of Statistics, 2022), with the remaining areas of the state sparsely populated. A geographically dispersed population brings with it unique challenges, including difficulties for community members living in regional and remote areas to access appropriate health services (Henderson et al., 2018), challenges to providing workforce capacity building to regional and remote staff (Ohr et al., 2021), high staff turnover in regional and remote health services (Humphreys et al., 2017) and difficulties establishing and maintaining partnerships for research and evaluation (Mador et al., 2019).

It is challenging to quantify and describe the SHBBV sector's characteristics because the work of many organisations whose core activities target other health issues (e.g., mental health) or population groups (e.g., young people) intersects with STIs and BBVs. A 2018 survey of the WA sector reported that the workforce composition of the sector is diverse (SiREN, 2018). The sector includes staff working in state government organisations (47%), non-government organisations (35%) and university or research-based organisations (7%) (SiREN, 2018). These staff were employed in a range of clinical, health promotion, peer-support, education, policymaking and research-based positions (SiREN, 2018). The non-government organisations are predominantly funded through the Sexual Health and BBV Program (SHBBVP) within the Communicable Disease Control Directorate in the WA

Department of Health. However, they may also receive funding from other organisations, such as the federal government, state government organisations such as the Mental Health Commission, Department for Communities, or the WA Primary Health Alliance and funding organisations such as Healthway and Lotterywest.

Four research centres located in the eastern states of Australia generate most of the research evidence related to SHBBV issues in Australia:

- Kirby Institute (UNSW, New South Wales),
- Centre for Social Research in Health (UNSW, New South Wales),
- Australian Research Centre in Sex, Health and Society (La Trobe University, Victoria),
and
- Burnett Institute (Victoria).

National and state-based government strategies guide the SHBBV sector response to addressing the impact of STIs and BBVs on the community (Australian Government, 2021a; Government of Western Australia, 2020). The WA state strategies closely align with the national strategies and focus on STIs, hepatitis B, hepatitis C, HIV and Aboriginal SHBBVs (Government of Western Australia, 2020). The Department of Health WA SHBBV Program coordinates the government's response to the prevention and control of STIs and BBVs in WA (Communicable Disease Control Directorate, 2009).

1.3. SiREN

The following section provides a historical account of SiREN, which is the partnership examined in this study. This content was sourced from an interview with one of the SiREN founders undertaken as part of this research and presented in [Publication 4](#) as well as general discussions over the course of the research with the SiREN management team (the management team are described in [Section 1.3](#)), some of whom have been involved since SiREN's conception. It was reviewed for accuracy by another founder; a public health manager in the WA Department of Health (L. Bastian, personal communication, March 9, 2022). Further background of SiREN can be found in a publication that explored SiREN partners' perspectives of SiREN two years after it was formally funded (Lobo et al., 2016).

In 2009, an informal partnership was developed to address a lack of evidence to inform action on SHBBV issues in WA. This partnership was led by a public health manager in the WA Department of Health, non-government organisation leaders, senior researchers and clinicians. This group had a history of working together on research and evaluation projects and between them, had several decades of experience in the SHBBV sector. They had experienced challenges with limited locally relevant evidence to inform decision-making. This lack of evidence could be attributed to three main factors. Firstly, most SHBBV research was and still is, generated by national centres located in New South Wales and Victoria. Therefore, the research produced by these centres did not always address SHBBV issues particular to the WA context. This is because the epidemiology of STIs and BBVs in WA differs from other Australian states and territories (Crawford et al., 2016; Kirby Institute, 2020), in part due to the large land area, geographical isolation and differences in demographics. Secondly, WA data were not captured and used to inform national SHBBV policy. Thirdly, this group perceived that those working to address SHBBV issues in WA (e.g., peer educators, clinicians) lacked research and evaluation capacity to inform EIDM. The factors affecting this capacity largely reflected those identified in the literature that were described in [Section 1.1](#) and included limited knowledge and skills, access to expertise (e.g., researchers), and available tools and resources (SiREN, 2018). Additionally, SHBBV programs and policies often address highly contested and politicised issues (e.g., injecting drug use). Therefore, they demand a solid evidence base to justify specific actions (Zampini, 2018). Yet gathering evidence in these challenging contexts is difficult due to difficulties in reaching marginalised groups (e.g., sex workers) (Lobo et al., 2021). Collectively, these factors have affected the availability of local evidence to inform action to address SHBBV issues.

This partnership undertook several activities without dedicated funding, including hosting a full-day workshop with approximately 25 key SHBBV stakeholders and several ongoing meetings with smaller groups to establish the partnership's purpose, scope and role. In these meetings, the partnership's scope was determined as supporting the preventative health response to STIs and BBVs. Therefore, the focus was not on clinical services. Furthermore, issues such as gendered violence and reproductive health were not included within the scope of the partnership as these issues are addressed in other sectors. The team then organised and delivered a symposium to shared findings from local research and

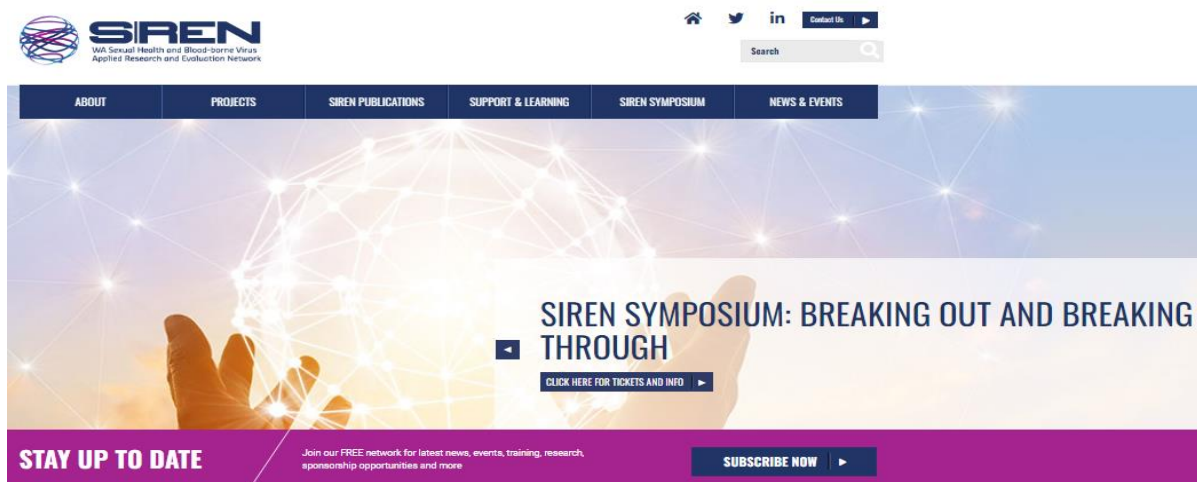
evaluation projects. The partnership was limited in what it could achieve due to limited financial resources. In 2012, Curtin University (Curtin) was awarded a two-year pilot project via a tender process to further develop the partnership’s potential. Curtin was selected as the host institution for several reasons that included:

- Curtin staff members had been involved in the establishment of the partnership,
- there was a preference for university involvement to deepen the research focus, and
- Curtin had a long history of research collaboration with WA SHBBV organisations.

An example of Curtin’s history of research collaboration is its support of data collection for the Gay Community Periodic Survey (CERIPH, 2010) for over a decade. This annual survey of gay and bisexual men in seven Australian metropolitan areas continues to be implemented and has been undertaken since 1998 (Centre for Social Research in Health, 2022; CERIPH, 2010).

The resulting partnership was the Sexual Health and BBV Applied Research and Evaluation Network (SiREN), funded to build research and evaluation capacity with and within the WA SHBBV sector. SiREN aims to promote and stimulate opportunities for collaboration between service providers, policymakers and researchers working in the WA SHBBV sector, translate research findings for EIDM, and foster links with the related national research centres. Figure 1 illustrates the home page of the SiREN website.

Figure 1. SiREN website



Source: [SiREN](#) (2022)

SiREN is situated within CERIPH, in the Curtin School of Population. Curtin is a global and highly ranked university (Times Higher Education, 2021). It is located in Perth, and it is the largest university in WA (Curtin University, 2022). Figure 2 is an image of Curtin's Bentley campus in Perth.

Figure 2. Curtin University, Bentley Campus



Source: Curtin University (2021a)

SiREN is managed by a team of five research and teaching academics from CERIPH (the management team). This team hold extensive experience in health promotion and public health research, evaluation and practice to address SHBBV issues. The management team meet monthly to provide input into SiREN's activities, human resourcing and strategic directions. In addition to the management team, SiREN is governed by a project steering group (hereafter, the steering group). This group meets bi-annually to provide input into the strategic direction of SiREN and ensures it meets its funded outputs and outcomes. The steering group includes representatives from key SHBBV stakeholder organisations. SiREN staffing levels are variable depending on current projects. At the time of writing, SiREN employed 1.4 full-time equivalent (FTE) staff as part of core funding and a further 4.0 FTE

staff through additional grants (see organisational chart in [Appendix C](#)). Staff undertake various activities, including project management, research, evaluation, knowledge translation and administration. Examples of the projects that SiREN oversees (Figure 3) include an evidence review to inform the WA Aboriginal SHBBV Strategy (Rosenberg et al., 2019), an evaluation of a project that aims to increase the uptake of testing and treatment for STIs and BBVs among young Aboriginal and Torres Strait Islander people (Lobo et al., 2020) and a research project exploring the feasibility of a periodic national survey of culturally and linguistically diverse people's STI and BBV knowledge, attitudes, and practices (Vujcich et al., 2021).

Figure 3. Examples of SiREN publications



Source: SiREN (2022)

The approach taken by SiREN differs from many capacity building programs that primarily focus on training courses and the provision of resources (Khan et al., 2021). While SiREN provides RECB training, tools and resources, it also provides opportunities for the sector to ‘learn by doing’ by providing tailored support (e.g., developing an evaluation tool or preparing an ethics application) and supporting the sector to undertake applied research and evaluation projects. In addition, SiREN builds capacity in the following ways:

- hosting a biennial research symposium,
- undertaking collaborative applied research and evaluation grants and projects,
- facilitating and participating in research collaborations, and

- sharing the latest evidence, news and events with its member network of over 450 individuals across Australia.

Additional descriptions of SiREN are available within publications undertaken as part of this thesis (Publications [2](#), [3](#), [4](#) and [5](#)), a previous publication authored by the management team (Lobo et al., 2016) and on the SiREN website (<https://siren.org.au>).

1.4. The complexity of the SHBBV sector and SiREN

The SHBBV sector (hereafter referred to as the SHBBV system or the system) can be considered a complex system. A complex system is one with many interacting elements (individuals, organisations, relationships) that are constantly changing and adapting, often in unpredictable ways (Paina & Peters, 2011). The structure, activities and stakeholders of the SHBBV system constantly change in response to the social and political climate (Brown et al., 2013). These shifts can include policy reform, staff turnover or changes to program funding. In addition, the epidemiology of STIs and BBVs changes in response to the social and political climate and developments in prevention and treatments (Grulich et al., 2018; Hellard et al., 2016). For example, the transmission of STIs is influenced by a range of complex and context specific factors (e.g., COVID-19, online social networking, global travel) (Hammoud et al., 2020; Williamson & Chen, 2020). Furthermore, socioeconomic and structural factors act as barriers to testing and treatment for STIs and BBVs (Hellard et al., 2016; Williamson & Chen, 2020). For example, the introduction of more effective treatments for hepatitis C has seen challenges to uptake amongst people who inject drugs, due in part to a lack of access to appropriate health services (Hellard et al., 2016). These examples highlight why action to address STIs and BBVs must be able to respond and adapt to rapidly changing contexts (Brown et al., 2018; Government of Western Australia, 2019).

If the SHBBV system is complex, then SiREN can be viewed as an event within this complex system. This perspective differs from conventional perspectives that view programs as a group of activities with direct causal links to impacts and outcomes (Hawe, Shiell, et al., 2009). This study positions SiREN as an event within a complex system. Hawe et al. (2009), suggested that viewing a program as an event within a system can improve understanding

of how the program interacts within the system in which it is embedded and how it contributes to change.

1.5. Systems approaches to evaluation

Applying systems thinking can address some of the challenges associated with evaluating programs in complex systems. Systems thinking is “*consciously organised thinking using systems ideas*” (Checkland, 1999 p, 45). Systems thinking began gaining traction as a way to understand and evaluate programs over 15 years ago with the publication of several seminal writings (Cabrera & Trochim, 2006; Foster-Fishman et al., 2007; Meadows, 2008; Midgley, 2003; Rogers, 2008; Williams & Imam, 2006).

Systems approaches have been used to examine issues of significance to the public’s health for example, obesity (Finegood, 2011), predict system behaviour, for example, the impact of tobacco control policies (Mills et al., 2021), and evaluate programs, for example, violence prevention (Kearney et al., 2016). When used to examine a program, a systems approach takes a holistic perspective that pays attention to how aspects of a program and the system interact to affect change (Chen, 2016). This perspective contrasts with reductionist methods that break down programs into their component parts to draw direct links between program strategies and effects (Chen, 2016). However, in practice evaluators may use a combination of systems approaches and reductionist methods depending on the situation (Chen, 2016). Applying systems thinking concepts and methods can create a comprehensive shared understanding of programs to inform implementation and evaluation (Hassmiller Lich et al., 2016; McGill et al., 2021). A literature review examining systems thinking in evaluation by Gates (2016) found that systems approaches have been used across all evaluation stages, from framing programs and their contexts, undertaking process and impact evaluation, to predicting system behaviour. The use of systems thinking in evaluation is increasing (Gates, 2016), yet the evidence base for this methodology is in its infancy and requires further evidence on application to advance understanding (McGill et al., 2021; McGill et al., 2020; Torres-Cuello et al., 2018).

1.6. Research aim and objectives

This research aimed to examine research and evaluation capacity building within a public health context. SiREN had been operating for four years when this research was initiated. At this point in time, SiREN had a limited understanding of how it was contributing to building capacity within the SHBBV system. Evaluations of SiREN, undertaken after two (Lobo et al., 2016) and three (John Scougall Consulting Services, 2015) years of operating, identified improvements to research and evaluation attitudes, knowledge, skills and confidence. However, there was no understanding of longer-term changes or how these changes were achieved. Furthermore, SiREN required monitoring and evaluation tools to demonstrate its impacts and outcomes. As SiREN is a unique capacity building partnership, there was a lack of tools in the literature that could be adapted for use.

To achieve the research aim, the objectives were to:

1. Identify key constructs from frameworks used to explain or evaluate research partnerships between community-based organisations and universities. ([Publication 1](#)) ([Chapter 2](#))
2. Explore the application of systems approaches to examine the functioning, impacts and outcomes of SiREN. (Publications [2](#), [3](#) and [4](#)) ([Chapters 4](#) and [5](#))
3. Develop and validate a framework to inform the ongoing monitoring and evaluation of SiREN. ([Chapter 6](#))
4. Develop evaluation tools for use by SiREN to measure identified key indicators. (Publications [2](#) and [5](#)) ([Chapter 7](#))

1.7. Significance of the research

The first National BBV and STI Research Strategy 2021-2025 (Australian Government, 2021b, p. 1) states that effective action to address STIs and BBVs “...relies on continuing to build a strong evidence base to better inform our responses, evaluating our approaches to identify what is most effective, and further strengthening our workforce, partnerships and connections to priority populations.” Despite increasing interest in capacity building (Cooke et al., 2018; Punton, 2016), little is known about how capacity building programs can be operationalised, how they work in different contexts and the impacts and outcomes that

can be achieved (Bowen et al., 2021; Cooke et al., 2018; Labin et al., 2012). This research aimed to strengthen understanding of capacity building programs by examining how contextual and process factors interacted and influenced SiREN's ability to create change within the SHBBV system. This knowledge can be used by public health service providers, researchers, or policymakers seeking to establish or evaluate partnership-based approaches to building research and evaluation capacity.

This research used systems concepts and methods (described in detail in [Sections 2.2, 3.2.3](#) and [3.2.4](#)) to examine SiREN and to develop the evaluation framework and tools (questionnaires). A recent review highlighted a need for evaluators to test systems methods and share their findings to guide others interested in applying systems approaches to evaluation (McGill et al., 2021). This research will contribute to the literature describing how systems concepts and methods can be applied to examine a program. Taking a systems approach can support understanding of how SiREN contributed to change by providing traceable links between contextual and process factors and changes to research and evaluation capacity within the SHBBV system. In addition, the use of systems concepts in the design of the evaluation framework and questionnaires may increase sensitivity to the complexities of capacity building programs. These complexities included the influence of contextual and process factors on impacts and outcomes and the long lag time between intervention and effects (Bourgeois & Cousins, 2013; Cooke et al., 2018; Labin, 2014).

This research focused on identifying key points SiREN can focus on to increase success (e.g., developing trusting relationships) or measure for evaluation purposes. The process of actively engaging SiREN stakeholders in the development of the framework and questionnaires aligns with the utilisation focused evaluation approach developed by Patton (1997), thus increasing the likelihood the framework and questionnaires meet the evaluation needs of SiREN. The evaluation framework and questionnaires developed because of this research study are intended to enable SiREN to evaluate its effectiveness using evidence-informed pragmatic methods.

1.8. Thesis organisation

This thesis contains three peer-reviewed publications, two publications under review and supporting works and activities. These publications are included within the five study components:

1. a scoping review,
2. examination of factors that affect the operation of SiREN,
3. exploration of factors affecting engagement with SiREN and impacts and outcomes achieved,
4. development of an evaluation framework to support the ongoing monitoring and evaluation of SiREN, and
5. development of questionnaires to evaluate the program planning, research and evaluation support provided by SiREN.

The thesis content is organised into eight chapters. The content and chapters are described below.

Front Matter

Front matter comprises the author declaration, acknowledgement of country, abstract, acknowledgements, list of related peer-reviewed publications, statement of contribution, list of presentations and related works, table of contents, list of figures and tables, and list of abbreviations and definitions.

Chapter One: Introduction

The content of the introduction (this chapter) provides an overview of the study. This chapter provides a background to the study, including an overview of EIDM, RECB, the SHBBV system and SiREN, the research aim and objectives, a description of the significance of the research and thesis organisation.

Chapter Two: Review of the literature

The chapter provides a brief background of the current understanding of how research and evaluation capacity is built, and the approaches used to evaluate research and evaluation

capacity. The chapter incorporates a scoping review of frameworks used to describe or evaluate community-based organisation research partnerships ([Publication 1](#)):

Tobin, R., Hallett, J., Crawford, G., Maycock, B., Lobo, R. (2022). Frameworks to guide research partnerships between community-based organisations and universities: A scoping review. Manuscript submitted for publication.

This chapter relates to the following objective:

1. Identify key constructs from frameworks used to explain or evaluate research partnerships between community-based organisations and universities.

Chapter Three: Research methods

This chapter presents the study protocol ([Publication 2](#)) and provides additional detail on study processes, including theoretical perspective, how a systems approach was used, participants, data collection and analysis, engagement with the steering group, reflexivity, rigour and ethical considerations:

Tobin, R., Hallett, J., Maycock, B., Lobo, R. (2019). Taking a systems approach to explore the impacts and outcomes of a research and evaluation capacity building partnership: A protocol. *BMJ Open*, 9, Article e026706. <https://doi:10.1136/bmjopen-2018026706> (Impact factor: 2.692)

Chapter Four: Critical factors affecting the functioning of SiREN

Results are presented in four chapters. This is the first results chapter, and it presents the CLD that describes critical factors that affect the functioning of SiREN ([Publication 3](#)):

Tobin, R., Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2022). Critical factors that affect the functioning of a research and evaluation capacity building partnership: A causal loop diagram. *PLoS ONE*, 17(1), Article e0262125. <https://doi:10.1371/journal.pone.0262125> (Impact factor: 3.04)

This chapter relates to the following objective:

2. Explore the application of systems approaches to examine the functioning, impacts and outcomes of SiREN.

Chapter Five: Examination of the impacts and outcomes of SiREN

This is the second results chapter. This chapter presents the CLDs, examining factors that affect engagement with SiREN and the subsequent impacts and outcomes that occur

([Publication 4](#)):

Tobin, R., Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2022). Utilizing causal loop diagramming to understand a research and evaluation capacity building partnership. *Frontiers in Public Health*, 10, 857918. <https://doi:10.3389/fpubh.2022.857918>
(Impact factor: 3.709)

This chapter relates to the following objective:

2. Explore the application of systems approaches to examine the functioning, impacts and outcomes of SiREN.

Chapter Six: Development and validation of the evaluation framework

Chapter six is the third results chapter, which describes how the evaluation framework was developed and discusses the final framework.

This chapter relates to the following objective:

3. Develop and validate a framework to inform the ongoing monitoring and evaluation of SiREN.

Chapter Seven: Questionnaires to assess SiREN research and evaluation support

This is the final results chapter, which discusses the development of two questionnaires to assess the processes, impacts and outcomes of SiREN research and evaluation support and presents the two questionnaires. One questionnaire is described in the chapter and the second in Publication 5:

Tobin, R., Hallett, J., Crawford, G., Maycock, B., Lobo, R. (2022). *Development of a questionnaire to assess the processes, outcomes and impacts of a research and evaluation capacity building partnership for public health professionals*. Manuscript submitted for publication.

This chapter relates to the following objective:

4. Develop evaluation tools for use by SiREN to measure identified key indicators.

Chapter Eight: Discussion, conclusion and recommendations

Within this chapter, there is a discussion of study findings, strengths and limitations aligned to each of the four study objectives. Finally, this chapter closes with a discussion of the implications and opportunities arising from this research and concluding remarks.

2. Review of the literature

This chapter provides a brief overview of the RECB literature and describes current approaches to evaluating capacity building programs. The purpose of this overview is to situate this research within the current literature. The wider literature relevant to the thesis is also included within the backgrounds and discussions of the published papers (Publications 1-5) and the thesis discussion ([Chapter 8](#)). Following this, a scoping review manuscript exploring frameworks used to describe or evaluate partnerships between universities and community-based organisations is presented ([Publication 1](#)):

Tobin, R., Hallett, J., Crawford, G., Maycock, B., Lobo, R. (2022). *Frameworks to guide research partnerships between community-based organisations and universities: A scoping review*. Manuscript submitted for publication.

The scoping review within this chapter relates to the following objective:

1. Identify key constructs from frameworks used to explain or evaluate research partnerships between community-based organisations and universities.

2.1. Capacity building programs

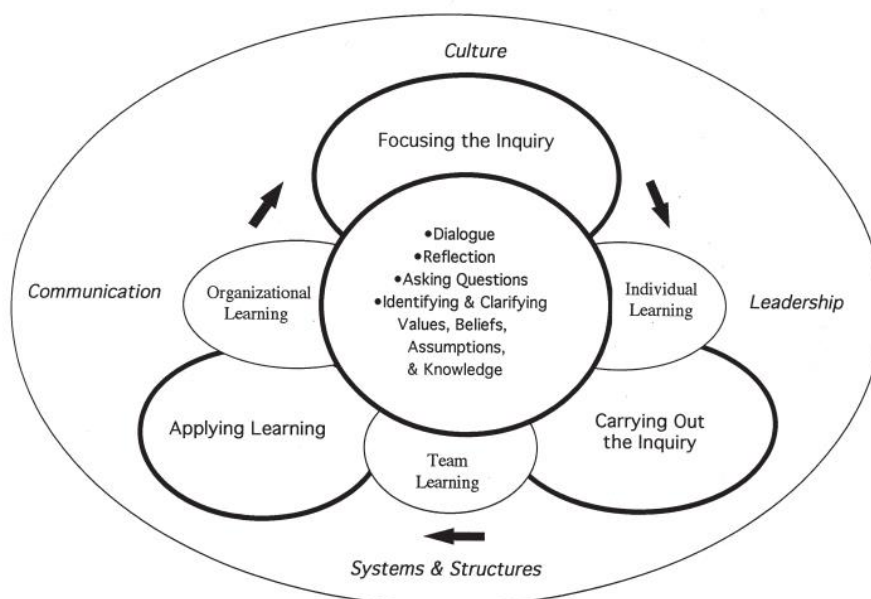
A rich literature base established over more than two decades describes RECB contextual influences and strategies (Bourgeois & Cousins, 2013; Cooke, 2005; Cousins et al., 2004; Kahwa et al., 2016; Levine et al., 2013; Matus et al., 2018; Preskill & Boyle, 2008). These were described in [Section 1.1](#). This section focuses on what is known about how RECB programs contribute to change and the impacts and outcomes they can achieve.

2.1.1. How research and evaluation capacity is built

Previous studies have described the processes used to build research and evaluation capacity. These include providing opportunities to increase knowledge, skills and confidence, aligning learning to stakeholder needs and interests, nurturing a culture of inquiry, developing systems and structures (e.g., data collection and reporting software), supporting evaluation leadership, accessing resources (e.g., financial), and supporting the

exchange of knowledge and resources (Cooke, 2005; Cooke et al., 2015; Cousins et al., 2004; King, 2007; Levine et al., 2013; Mayne, 2017; Preskill & Boyle, 2008; Wade & Kallemeyn, 2020). The impact of capacity building is maximised when it occurs through a continuous, dynamic and experiential learning process (Cooke et al., 2018; King, 2007; Preskill, 2008; Preskill & Torres, 1999). The experiential learning process involves tailoring learning to the context it is being applied within and providing opportunities for the recipients of capacity building to apply what they are learning to their work (Chauveron et al., 2021). Preskill and Torres' (1999) model of evaluative inquiry (Figure 4) depicts three phases of the learning process. These are: focusing the inquiry, carrying out the inquiry and applying learning. Within this model, the learning process is collaborative and involves dialogue, reflection, asking questions, and identifying and clarifying values, beliefs, assumptions and knowledge. A recent example of a learning-by-doing approach was an innovative partnership-based ECB program in youth development (Chauveron et al., 2021). This ECB program involved evaluators working in partnership with program staff to apply learnings from workshops and webinars to design, develop and implement evaluation plans and tools. This process led to increased evaluation capacity, including evaluation being embedded as part of everyday practice (e.g., workflows) (Chauveron et al., 2021).

Figure 4. Learning processes of evaluative inquiry



Source: Preskill and Torres (1999)

2.1.2. How relational factors support effective RECB

While the model developed by Preskill and Torres (1999) depicts the learning process, it does not consider the relationship between evaluators and program staff. This is because it considers evaluative inquiry to be a process undertaken primarily by the organisation, with limited involvement from internal or external evaluators (Cousins et al., 2013). Within the RCB and KT literature, the relationship between researchers and service providers and/or policymakers is frequently described as central to success (Cooke et al., 2018; Jagosh et al., 2015; Nguyen et al., 2020). Relational factors that underpin successful RCB and KT efforts include valuing each individual's contribution, shared decision-making, respectful communication and trust (Cooke et al., 2018; Nguyen et al., 2020). However, these relational factors are less well explored in the ECB literature (Wade & Kallemeyn, 2020). Earlier ECB studies have touched on the relational aspect of ECB, such as inclusiveness and open communication (King, 2007; Patton, 2008; Preskill et al., 2003). More recently, collaborative ECB was described in depth in a book by Cousins et al. (2020), which builds on his previous work (Cousins et al., 2013). Cousins et al. (2020) defines collaborative ECB as authentic engagement between evaluators and non-evaluators to produce evaluative knowledge. Cousins et al. (2020) concludes that successful collaborative ECB is based on respectful, trusting and transparent relationships that are developed from 'close and constant contact' over time.

A recent study undertaken with youth organisations is an example of collaborative ECB (Buckley et al., 2021) and the approach taken aligns with the Preskill and Torres (1999) model. Buckley et al. (2021) describes how evaluation is not a 'one size fits all' approach. The ECB process requires the program team to articulate their program and evaluation needs to the evaluator, who responds by providing tailored evaluation insights and options. The program team decide on, apply and refine these options in consultation with the evaluator. The conclusions of Buckley et al. (2021) align with Cousins et al. (2020); they found that the ECB process is more likely to succeed when the relationship between evaluators and program staff is responsive, trusting and respectful. This is because a solid relationship facilitates learning through the free exchange of knowledge (Gibson & Robichaud, 2020).

2.1.3. The impacts and outcomes RECB can lead to

Building research and evaluation capacity can lead to various impacts and outcomes through the strategies described in [Section 1.1.2](#) and the processes described in [Section 2.1](#). A synthesis of the literature found RCB can lead to increased knowledge and skills and co-created knowledge (Cooke et al., 2018). Co-created knowledge is collaboratively generated between researchers and other stakeholders (e.g., service providers and policymakers) and is more likely to be applied to decision-making (Nguyen et al., 2020). Another review by (Pulford et al., 2020), identified indicators to measure RCB and reported that it can lead to enhanced research processes (e.g., involvement of knowledge users) and quality, sustained collaborations, increased research funding, evidence sharing and EIDM. An influential model of ECB developed by Preskill et al. (2008) depicts ECB as leading to continuous learning about evaluation, evaluation being embedded in organisational processes and systems, increased resources for evaluation and the use of evaluation findings in decision-making. More recently, a study of an ECB program by Hargraves et al. (2021) found that ECB can lead to higher quality evaluation, improved ability to make programming decisions and developing grant proposals.

To date, most capacity building studies have focused on change at the individual and organisational level. Only a few studies have focused on changes occurring at the system level. Individual level changes may include changes to knowledge, skills and attitudes (Schwarzman et al., 2021). Organisational level changes can include changes such as organisational policies, processes, resourcing and culture (Schwarzman et al., 2021). Systems level changes may include changes to policies, practices, perspectives or norms across the system (Schwarzman et al., 2021). The boundaries between these levels are fluid (Schwarzman et al., 2019b) and the incremental changes seen at an individual level can evolve into system level changes. Lawrenz et al. (2018) and Grack Nelson et al. (2018) examined ECB in a network and found there was collaborative learning across the network and development of ECB. There is an opportunity to expand understanding of the impacts and outcomes of capacity building programs, particularly of those operating at the system level (Bowen et al., 2021; Cooke et al., 2018; Labin et al., 2012; Pulford et al., 2020).

2.2. Evaluating capacity building programs

The process of evaluating RECB is challenging (Vang et al., 2021). RECB does not occur through a linear transfer of knowledge and skills; instead, it is a dynamic learning and knowledge creation process, as described previously in [Section 2.1](#). Furthermore, multiple intersecting factors (e.g., organisational culture, existing knowledge and skills) influence the ability of capacity building programs to bring about change (Brownson et al., 2018; Gadsby, 2011; Labin et al., 2012). Compounding these factors is that the impacts of capacity building programs can take a long time to occur (Gadsby, 2011) and may need to be tracked across multiple levels (e.g., individual, organisational and system) (Cooke et al., 2018; Norton et al., 2016). This makes attributing change to the RECB program difficult. Finally, evaluation of RECB is limited by a lack of examples of evaluations within the literature (Bowen et al., 2021). Innovative methods and tools are required to enable evaluators to effectively respond to the complexities of evaluating capacity building programs.

2.2.1. How systems approaches have been applied to examine RECB programs

Most evaluations of capacity building or knowledge translation programs have applied traditional evaluation methods, such as traditional case studies (Bourgeois et al., 2018; Brownson et al., 2018; Edwards et al., 2016; Lindeman et al., 2018). However, recently, several studies have incorporated systems approaches into evaluation. For example, Vang et al. (2021) examined an agricultural RCB program using a systems lens. This involved applying systems concepts (e.g., interrelationships) to analysis. The authors reported that this method enabled the evaluation to capture unintended outcomes and understand outcomes in new ways. For example, the program staff no longer viewed an evaluative culture as an end goal but as a dynamic process. Furthermore, this method encouraged the authors to include multiple perspectives in evaluation discussion, which increased the usability of the evaluation for program stakeholders. Lawrenz et al. (2018) and Grack Nelson et al. (2018) explored RCB within a science education network using concepts from complex adaptive systems theory (e.g., adaptation). A complex adaptive system is a connected group of individual parts that interact and adapt, often in unexpected ways (Eoyang & Berkas, 1998). Grack Nelson et al. (2018) reported that using these concepts provided a holistic understanding of how capacity was built, gave a structure to look for phenomena they

would not have looked for using other methods and provided new insight into how capacity is built.

A realist methodology is a complexity sensitive approach that seeks to explain the contexts and mechanisms that influence program outcomes (Pawson & Tilley, 1997). Cooke et al. (2018) took a realist approach to review studies examining RCB in health and social care, and Rycroft-Malone et al. (2016) used it to examine a knowledge mobilisation program in health care. Cooke et al. (2018) and Rycroft-Malone et al. (2016) concluded that a realist methodology provided a nuanced understanding of how capacity building and KT programs lead to change. However, the realist methodology has been criticised for the difficulty in reflecting complex change processes within linear context-mechanism-outcome configurations (Feather, 2018). Together, the studies discussed in this section demonstrate the recent growth in the application of complexity sensitive evaluation methods and the value and challenges they bring to generating useful and unique evaluative insights.

2.2.2. Section summary

The literature presented in the first section of this chapter describes the context and rationale for the research contained within this thesis. This chapter began by describing the experiential learning process that underpins capacity building and highlighting recent studies examining the importance of relational factors (e.g., responsiveness, trust). The types of impacts RECB can lead to were described. Crucially, RECB can increase EIDM, which has the potential to strengthen the programs and policies that support and promote health.

Employing complexity sensitive approaches to examine capacity building programs may provide researchers and evaluators with a deeper understanding of how capacity building contributes to change and the full breadth of impacts and outcomes that can be achieved. The value of experimenting with complexity sensitive evaluation measures extends beyond the field of capacity building, with a recent review calling for greater “*methodological innovation in systems evaluation*” to strengthen the public health response (McGill et al. 2021, p. 1).

2.3. Publication 1: Scoping review

In this section, frameworks developed for research partnerships between community-based organisations (CBOs) and universities were examined using a scoping review methodology.

They are presented in the form of a publication currently under review:

Publication 1: *Frameworks to guide research partnerships between community-based organisations and universities: A scoping review*. Manuscript submitted for publication.

This publication relates to the following objective:

2. Identify key constructs from frameworks used to explain or evaluate research partnerships between community-based organisations and universities.

2.3.1. Scoping review: Introduction

An extensive body of literature describes the barriers to using evidence to inform decision-making to address health and social issues (Brownson et al., 2009; Jakobsen et al., 2019), including a lack of timely and relevant evidence and research capacity (e.g., skills and resources) (Brownson et al., 2009). A common approach to addressing these challenges is community-engaged research (CEnR). CEnR encompasses a range of relationships and collaborations that meaningfully engage communities in research (e.g., research-practice partnerships (Haapanen & Christens, 2021; Ortiz et al., 2020). CEnR exists on a continuum ranging from consultation with community partners to research led by communities (Key et al., 2019). CEnR aims to share power between researchers and communities, creating a new research paradigm valuing all types of knowledge and equitable relationships (Stewart et al., 2013; Wright et al., 2020). CEnR can lead to increased research capacity, EIDM, and improvements in the delivery of community services (Beckett et al., 2018; Hoekstra et al., 2020; Ortiz et al., 2020).

When describing who is involved in CEnR, the language used is inconsistent (Hoekstra et al., 2020; Key et al., 2019; Luger et al., 2020). The term community may be used to collectively describe all community members, including CBOs, government organisations, schools and individuals (Haapanen & Christens, 2021). Diverse community members are grouped despite

their different motivations, relational dynamics, and needs (Haapanen & Christens, 2021; Steens et al., 2018). Ignoring the heterogeneity of community groups has led to a lack of understanding of the differences between various CEnR partnerships (Haapanen & Christens, 2021).

CBO-university partnerships are a type of CEnR. CBOs have a unique role in research partnerships due to their close ties with local communities and their involvement in program development and implementation (Adebayo et al., 2018). Involving CBOs in the research process can facilitate access to target groups, build CBO research capacity, generate research that is fit for purpose, increase EIDM and improve community utilisation of CBO services (Adebayo et al., 2018; Currie et al., 2005; Drahota et al., 2016; Hoekstra et al., 2020; Stewart et al., 2013). For universities, engaging with communities can support the generation of relevant research that has an impact on critical issues (Douglas et al., 2020). CEnR is often undervalued in university ranking systems (Douglas et al., 2020). Recently, frameworks and ranking systems have been developed to assess how well universities engage with communities. For example, the Times Higher Education rankings now include university partnerships supporting action on the Sustainable Development Goals (Times Higher Education, 2022) and the Australian Engagement and Impact Assessment aims to encourage CEnR and demonstrate research impact within communities (Australian Government, 2019).

Despite their potential, CBO-university partnerships experience unique challenges in achieving their aims. These challenges include conflicting motivations (e.g., research versus practice-based outcomes) (Andrews et al., 2010), opposing ways of working (e.g., CBO need for timely evidence to inform program development versus slower research processes) (Chou & Frazier, 2020), differing values (Kivell et al., 2017) and mistrust (Pinto, 2009). A systematic approach to planning and monitoring CBO-university partnerships can help navigate these differences and increase the likelihood of success (Brush et al., 2011).

Frameworks provide a structure to organise and explain information and illustrate links between concepts (Moullin et al., 2020). Consequently, they are a valuable tool to inform the development, implementation, and evaluation of CBO-university partnerships (Brush et

al., 2011). Our understanding of how knowledge is created and subsequently applied to decision-making recognises the complexity of the CEnR process (Beckett et al., 2018). Existing CEnR frameworks have reflected this complexity in varying ways, including paying attention to context (Wallerstein et al., 2008), depicting the dynamic relationships between partners (Fielden et al., 2007; Greenhalgh, 2019), acknowledging the non-linear nature of change (Israel et al., 2020) and supporting the identification of unanticipated effects (Beckett et al., 2018). The application of complexity concepts may strengthen understanding of CEnR by explicating partnership mechanisms of action, identifying longer-term or unexpected outcomes of CEnR and tracking changes across multiple levels (Beckett et al., 2018; Conte & Davidson, 2020).

Recent reviews have explored CEnR including examining the characteristics of CEnR (Drahota et al., 2016), exploring the principles, strategies, outcomes and impacts of CEnR (Hoekstra et al., 2020), identifying measures to evaluate CEnR (Luger et al., 2020), synthesise reviews of CEnR (Ortiz et al., 2020), reviewing and examining CEnR initiation (Zych et al., 2020), exploring different CEnR models (Greenhalgh & Wieringa, 2011) and identifying the essential components of engagement between CBO staff and researchers (Adebayo et al., 2018). While there are many CEnR frameworks (Cooke, 2020; Ortiz et al., 2020; Zych et al., 2020), to the authors' knowledge, no reviews have explored CBO-university partnership frameworks.

Examining existing CBO-university frameworks and their constructs may provide CBOs, researchers, and funders with insights regarding developing, implementing, and evaluating these partnerships. This scoping review aimed to:

- (1) locate and describe frameworks created or applied to conceptualise, develop or evaluate CBO-university partnerships,
- (2) analyse and compare framework constructs,
- (3) identify and discuss framework strengths and limitations, and
- (4) provide recommendations regarding the development, implementation or evaluation of CBO-university partnerships.

2.3.2. Scoping review: Methods

A scoping review was selected to determine the range of available literature and summarise its focus (Munn et al., 2018). The Arksey and O'Malley Framework (2005) and guidance from Levac, Colquhoun and O'Brien (2010) informed the review.

Included studies developed or applied a framework to conceptualise, initiate, maintain or evaluate a research-focused partnership between research institutions and community-based health or social service organisations. CBOs were defined as non-government, not-for-profit health and social service organisations serving local communities (Wilson et al., 2012). Frameworks developed for other research partnerships, such as those between research institutes and government or service users, were excluded due to differences in motivations to partner, relational dynamics and partnership aims (Jull et al., 2017; Khan et al., 2014; Vaughn et al., 2018; Wallerstein et al., 2008). Partnership activities must have included undertaking research in public health or social contexts. Frameworks that focused on applying research (often termed implementation science or evidence-based practice), service learning, or service improvement were excluded. Community advisory boards established for research purposes were also excluded as the level of interaction is insufficient to constitute a partnership (Norris et al., 2007). Included sources were English-language, peer-reviewed and published before November 2020.

After supervisory team discussion and consultation with a university librarian, a review of terminology used in relevant studies was conducted to guide search terms (Adebayo et al., 2018; Corbin et al., 2015; Currie et al., 2005; Drahota et al., 2016; McKellar et al., 2014; Ovreteit et al., 2014). Search terms included: research partnership (e.g., community-based organisation, research partnership, research practice partnership, community academic partnership or integrated knowledge translation) and framework (model, framework or evaluation). Electronic databases ($n = 4$) were systematically searched: Proquest (1968 to 2020) ($n = 2020$), Business source complete (1997 to 2020) ($n = 86$), CINAHL (1993 to 2020) ($n = 468$); and PsychInfo (1974 to 2020) ($n = 988$). Additional file 1 presents an example search strategy with full search terms. Relevant studies were also identified by reviewing reference lists of included studies ($n = 648$).

Study selection and data extraction

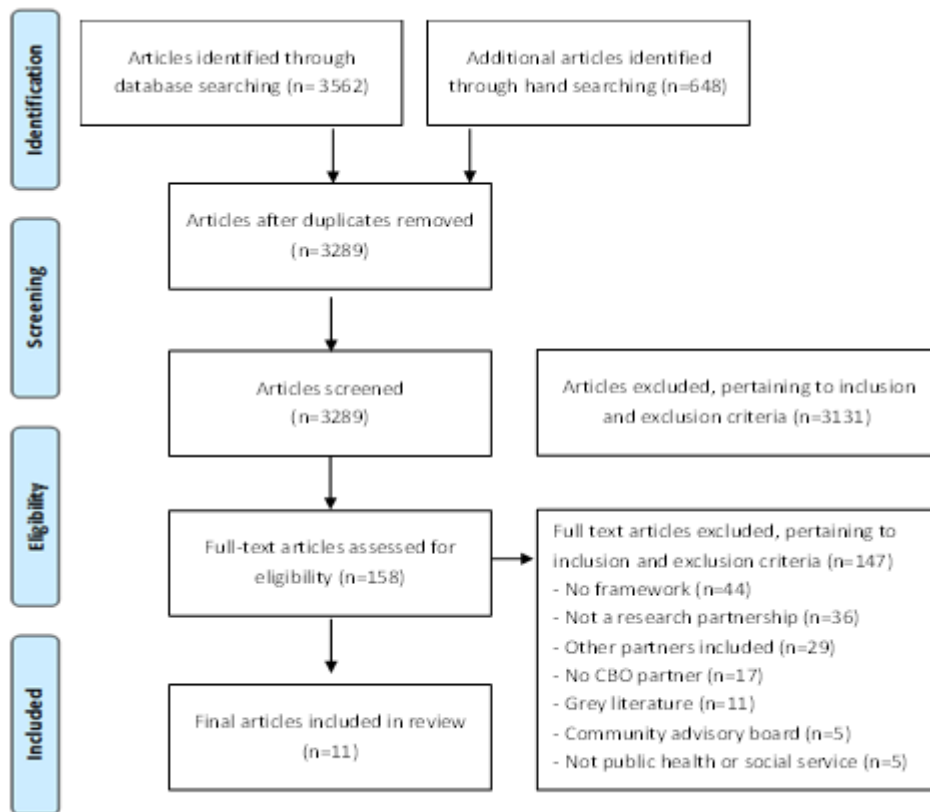
Identified studies were downloaded into Endnote (Clarivate Analytics, 2019), duplicates removed, and the remaining studies imported into Covidence (Veritas Health Innovation, 2020), an online review management software that streamlines the review process (Veritas Health Innovation, 2020). Two reviewers initially screened by title and abstract autonomously, excluding those that did not meet inclusion criteria. Reviewers resolved discrepancies by discussion. Full-text studies were retrieved for studies that met inclusion criteria. These studies then underwent a full-text review by two reviewers to determine eligibility. One reviewer developed and populated a data extraction template in Microsoft Excel (Version 2106). Fields were added to a template based on: a previous study of KT evaluation frameworks (McKellar et al., 2014), the results of the studies, and discussion between the reviewers. An undergraduate university student reviewed and verified the data extraction table for accuracy. In addition, the included studies were reviewed to identify how each framework could be used by other partnerships and to develop key recommendations for CBO-university partnerships.

2.3.3. Scoping review: Results

Of the 3562 articles identified from the review process, eleven were included for review (see Figure 5. PRISMA flow diagram). The results present:

- an overview of included studies,
- a description of how the frameworks were developed or applied in the studies,
- an examination of framework scope and constructs, and
- an analysis of framework strengths and limitations.

Figure 5 PRISMA flow diagram



Overview of included studies

All studies ($n = 11$) were undertaken in the USA across a range of health and social issues, including child health and HIV. A diverse range of terminology was used to describe the partnerships: *community-academic partnership* (Brush et al., 2011; King et al., 2015; Rodgers et al., 2014; Stewart et al., 2013), *university-community collaboration* (Carlton et al., 2009; Suarez-Balcazar et al., 2005), *community-based participatory research (CBPR)* (Darling et al., 2015), *participatory research* (Calderón et al., 2015), *community-university research partnership* (Currie et al., 2005), *community-engaged research* (Key et al., 2019) and *provider–researcher partnership* (Pinto et al., 2014). Table 1 provides an overview of each framework.

Table 1. Overview of frameworks

First author (year)	Framework description
Brush (2011)	Adapted the Lasker et al. (2001) Partnership Synergy Model to guide partnership development and evaluation. The Synergy Model illustrates three aspects of partnership functioning that contribute to partnership synergy: collaboration, engagement and trust. Synergy is considered an indicator of partnership outcomes, including sustainability, effectiveness and efficiency.
Calderón (2015)	Applied the Donabedian Model (Donabedian, 1982) as a conceptual framework to retrospectively explore partnership processes. The Donabedian Model depicts partnership structure, potential/actual partnership conflicts and conflict impact on research outcomes.
Carlton (2009)	Illustrates how partnership defining and refining factors interact and result in successful or unsuccessful partnerships. Partnership defining factors are contextual elements that support the establishment of the partnership. Partnership refining factors are partnership processes.
Currie (2005)	Describes the impacts of research partnerships from the perspective of the community. Includes five key aspects of research partnerships: functions (activities), outputs, utilisation (e.g., use of partnership materials), mid-term impacts, and long-term impacts.
Darling (2015)	Applied an existing framework (Andrews et al., 2010) to retrospectively analyse a CBO engaged in CBPR to develop tips on how CBOs can plan and contribute to CBPR. The framework created by Andrews et al. (2010) outlines three dimensions of partnership readiness: Goodness of fit - how compatible partners are; partnership capacity – resources

First author (year)	Framework description
	available; operations - factors affecting partnership functioning. Dimensions lead to intermediate outcomes (e.g., a sustainable partnership) and long-term outcomes (e.g., improved community health).
Key (2019)	Developed to enable community members and academics to understand how they can engage in partnered research. Illustrates a continuum of community involvement, from no community involvement to community-driven/community-led research. The level of community involvement interacts with contextual factors (e.g., history, trust) and equity indicators (e.g., power and control) to affect partnership functioning.
King (2015)	Identifies key factors that contribute to partnership success in a low-income community. Depicts how community and academic partners work together to build mutual respect/shared vision, which leads to trust, transparency, equity and fairness, need for adequate resources and developing protocols to provide structure. This leads to a memorandum of understanding that supports the partnership to achieve partnership goals and outcomes.
Pinto (2014)	Developed and tested a framework that identifies key factors influencing provider intentions to partner. Considers how demographic factors (e.g., age), agency size/capacity, and cognitive factors (e.g., knowledge and skills) affect partnership success.
Rodgers (2014)	Created to guide the implementation and evaluation of a partnership. Depicts four related domains: inputs (e.g., grants), activities (e.g., training), outputs (e.g., grant proposals) and outcomes. Outcomes include seven domains of collaborative research capacity (e.g., fiscal and human resources, research skills). Ultimately, this leads to achieving the overall outcome of sustainable collaborative research that improves community health.

First author (year)	Framework description
Stewart (2013)	Applied an existing framework (Wallerstein et al., 2008) to describe partnership activities. Presents: contextual factors (e.g., community capacity), group dynamics (e.g., power/resource sharing), interventions and outcomes. Group dynamics are considered across three areas: structural (e.g., real power/resource sharing), relational (e.g., leadership) and individual (e.g., cultural identities and values). Outcomes include CBPR system and capacity changes (e.g., cultural revitalisation) and health outcomes.
Suarez- Balcazar (2005)	Developed a model that describes the main phases in the development and sustainability of partnerships. Phases include gaining entry into the community, developing and sustaining a mutual collaboration (e.g., trust and respect) and recognising the benefits and outcomes of partnership work (e.g., increased funding for researchers and CBOs). Considers potential challenges and threats (e.g., power, resource inequality).

How the frameworks were developed or used

Seven studies created an original framework (Carlton et al., 2009; Currie et al., 2005; Key et al., 2019; King et al., 2015; Pinto et al., 2014; Rodgers et al., 2014; Suarez-Balcazar et al., 2005). Two provided a limited description of framework development methods (Rodgers et al., 2014; Suarez-Balcazar et al., 2005). Remaining studies ($n = 5$) provided detailed descriptions, including data collection and analysis methods (Carlton et al., 2009; Currie et al., 2005; Key et al., 2019; King et al., 2015; Pinto et al., 2014). Framework development used a variety of methods. These included drawing on researcher experience (Currie et al., 2005; Rodgers et al., 2014; Suarez-Balcazar et al., 2005), analysing data collected from the literature (including other frameworks and models) (Currie et al., 2005; Key et al., 2019; Pinto et al., 2014; Rodgers et al., 2014; Suarez-Balcazar et al., 2005), observing partnership activities (Carlton et al., 2009; Key et al., 2019), reviewing partnership documents (Carlton et al., 2009) and examining partner experiences (e.g., interviews, surveys, or focus groups) (Carlton et al., 2009; King et al., 2015; Pinto et al., 2014). Most studies included both researcher and CBO staff perspectives in developing the framework (Carlton et al., 2009; Currie et al., 2005; Key et al., 2019; King et al., 2015). Two studies included only researcher perspectives (Rodgers et al., 2014; Suarez-Balcazar et al., 2005), and one only CBO perspectives (Pinto et al., 2014). Three studies identified theories or models that informed their framework (Currie et al., 2005; Key et al., 2019; Pinto et al., 2014). These included balance and coordination theory (Hollister et al., 1977; Litwak et al., 1970), organisational theory (Quinn, 1988), diffusion of innovations (Rogers, 1995) and citizen participation (Arnstein, 1969). Three studies used guiding principles (e.g., co-learning) to underpin framework development, these principles were drawn from CBPR (Key et al., 2019; Pinto et al., 2014) and CEnR (Key et al., 2019).

Four studies applied an existing framework (Brush et al., 2011; Calderón et al., 2015; Darling et al., 2015; Stewart et al., 2013). One discussed the framework's utility for implementing or evaluating a partnership (Brush et al., 2011). Brush et al. (2011) applied an adapted version of the partnership synergy model developed by Lasker et al. (2001). The researchers concluded that applying the framework ensured they were cognisant of the central roles of trust, collaboration, and engagement in building successful partnerships. They reflected that when these aspects of partnership functioning were threatened, they were able to address

them, ensuring partnership sustainability.

Framework scope and constructs

The scope of the frameworks was broad and covered contextual factors, inputs, activities, processes, outputs, outcomes and impacts (Table 2). There was significant variation in how these constructs were defined and categorised, particularly outputs, outcomes and impacts. To compare frameworks, this study used the definitions in Table 2 to classify and analyse framework constructs, using these categories enabled the diverse framework constructs to be clearly presented in a table.

Table 2. Scope of frameworks

First author (year)	Framework constructs					
	Contextual <i>External factors that influence partnership functioning and effects.</i>	Inputs <i>Human, monetary and material resources of the partnership.</i>	Activities <i>Partnership strategies (e.g., data collection).</i>	Processes <i>The relational, procedural and structural dynamics of the partnership.</i>	Outputs <i>Tangible partnership products or services.</i>	Impacts and outcomes <i>Short and long term changes that result from the partnership.</i>
Brush (2011)			X	X		X
Calderón (2015)		X		X		
Carlton (2009)	X	X		X		X
Currie (2005)			X		X	X
Darling (2015)	X	X		X		X
Key (2019)	X			X		
King (2015)		X		X	X	X
Pinto (2014)	X	X				X
Rodgers (2014)		X	X	X	X	X
Stewart (2013)	X			X		X
Suarez-Balcazar (2005)	X			X		X

Contextual factors and reflecting the complexity of partnerships

Frameworks primarily addressed complexity by considering how contextual factors influence partnership initiation or functioning. Contextual factors included: political, organisational and social climate (Stewart et al., 2013); presence of mutual interest to partner (Darling et al., 2015); capacity to engage in a partnership (Pinto et al., 2014; Stewart et al., 2013); and a history of partners working together previously (Key et al., 2019; Stewart et al., 2013). Stewart et al. (2013) also explained that pre-existing relationships enhance partnership functioning by supporting the development of trust and a shared language to discuss challenging issues. The framework developed by Pinto et al. (2014) explored CBO intentions to partner and found that demographic factors (e.g., age, race, gender) did not generally influence partnering choices. The exception was education levels. CBO staff with lower education levels preferred partnerships where researchers undertook most research tasks. In contrast, higher educated CBO staff preferred a more balanced distribution of research tasks (Pinto et al., 2014).

Five studies presented frameworks that reflected the dynamic nature of partnerships (Brush et al., 2011; Currie et al., 2005; Stewart et al., 2013; Suarez-Balcazar et al., 2005). For example, Currie et al. (2005) (p. 408) acknowledged that partnership *"impacts occur reciprocally, in different directions, and from multiple sources in a process that evolves over time."* In addition, two studies noted how the attainment of partnership outcomes and impacts contributed to ongoing changes through influencing context (e.g., improved attitudes towards research and partnerships) and/or partnership processes (e.g., continued collaboration on new projects) (Stewart et al., 2013; Suarez-Balcazar et al., 2005).

Inputs

Framework inputs included people, partners and financial resources. Carlton et al. (2009) noted that having the right people involved in the partnership was key to success. This included people with the right skills and fully supported by their organisation to contribute to the partnership. Carlton et al. (2009) highlighted that this shows partner recruitment should be a carefully considered process. Several frameworks included adequate resource as important to partnership success (Darling et al., 2015; King et al., 2015; Pinto et al., 2014); Rodgers et al. (2014) found that the highest functioning partnership in their study

involved a CBO with ample human and financial resources, which enabled the partnership to exceed expectations.

Activities

Partnership activities included in the frameworks ranged from initiating the partnership to disseminating research findings. Specific activities included undertaking strategic planning (e.g., establishing partnership aims) (Brush et al., 2011), providing research training (Currie et al., 2005; Rodgers et al., 2014), setting research priorities (Brush et al., 2011), undertaking research (Brush et al., 2011; Currie et al., 2005; Rodgers et al., 2014) and sharing research findings (Brush et al., 2011; Currie et al., 2005). The framework created by Key et al. (2019) acknowledged the diversity in levels of community engagement in activities (e.g., from community consultation to community-led research).

Processes

It was challenging to analyse process constructs across the frameworks due to variations in terminology. For example, several different terms were used to describe power dynamics between partners (e.g., power dynamics, distribution of power, real power). Distinctions between these constructs were not clear. Despite inconsistencies, there was an overlap of process factors included in the frameworks. The most frequently included constructs were related to trust ($n = 4$) (Brush et al., 2011; Key et al., 2019; King et al., 2015; Suarez-Balcazar et al., 2005), power ($n = 4$) (Carlton et al., 2009; Darling et al., 2015; Key et al., 2019; Stewart et al., 2013), respect ($n = 3$) (Key et al., 2019; Rodgers et al., 2014; Suarez-Balcazar et al., 2005), shared vision/goals ($n = 3$) (Darling et al., 2015; King et al., 2015; Rodgers et al., 2014) and communication ($n = 3$) (Carlton et al., 2009; Darling et al., 2015; Suarez-Balcazar et al., 2005). Four frameworks acknowledged the important role of formal agreements, such as a memorandum of understanding, in establishing clear expectations and avoiding partnership dissolution (Brush et al., 2011; King et al., 2015; Stewart et al., 2013; Suarez-Balcazar et al., 2005). Nine process constructs were mentioned in two frameworks (e.g., flexibility, transparency, effective leadership), and 20 were only mentioned in one (e.g., mutual benefit, shared values, resilience).

Outputs

Outputs included publications, presentations, grants, outreach, meetings, training and websites. King et al. (2015) presented outputs as outcomes. Currie et al. (2005) suggested that treating outputs like outcomes is problematic as outputs (e.g., websites) do not contribute to change unless utilised. Consequently, they included utilisation measures in their framework (e.g., requests for materials, website analytics).

Outcomes and impacts

Most frameworks included outcomes or impacts, except those developed to support partner engagement (Key et al., 2019) or adapted to explore partnership conflict (Calderón et al., 2015). There were significant disparities in how frameworks classified outcomes and impacts; therefore, they were combined for analysis. Common outcomes and impacts were: enhanced research and/or partnering capacity (e.g., skills, attitudes) ($n = 3$) (Currie et al., 2005; Rodgers et al., 2014; Suarez-Balcazar et al., 2005), EIDM (includes changes to policy and/or services) ($n = 3$) (Currie et al., 2005; Darling et al., 2015; Stewart et al., 2013), sustainable partnership and/or research ($n = 3$) (Brush et al., 2011; Key et al., 2019; Rodgers et al., 2014). Three frameworks included outcomes for the wider community, including improved community health, wellbeing, equity and increased consumer satisfaction (Currie et al., 2005; Darling et al., 2015; Rodgers et al., 2014; Stewart et al., 2013). Twelve outcomes were mentioned only once, including increased funding for researchers and CBOs (Suarez-Balcazar et al., 2005), research quality (Currie et al., 2005), partnership effectiveness and efficiency (Brush et al., 2011). Three frameworks did not include specific outcomes and instead used broad terms, such as successful/unsuccessful partnership (Carlton et al., 2009; King et al., 2015; Pinto et al., 2014).

Utility and testing of the frameworks

Most of the studies that developed original frameworks applied their framework to one or more case studies; one was empirically tested. Pinto, Wall and Spector (2014) employed structural equation modelling to test factors influencing CBO intentions to partner in their Provider–Researcher Partnership Model. Most original framework studies reflected on how other partnerships could apply the frameworks. Table 3 presents these suggested uses.

Table 3. Potential uses of each framework

Potential use	Framework
Determine the readiness of partners to engage in partnered research.	The CBPR readiness model developed by Andrews et al. (2010) and applied by Darling et al. (2015).
Consider the influence of contextual factors on the partnership.	The original frameworks created by (Carlton et al., 2009) and Pinto et al. (2014). The Wallerstein et al. (2008) CBPR model adapted by Stewart et al. (2013).
Identify or evaluate processes that affect the functioning of the partnership	The original frameworks developed by Carlton et al. (2009); Key et al. (2019); King et al. (2015); Rodgers et al. (2014); Suarez-Balcazar et al. (2005). The Wallerstein et al. (2008) CBPR model adapted by Stewart et al. (2013), CBPR readiness model developed by Andrews et al. (2010) and applied by Darling et al. (2015) and the Lasker et al. (2001) synergy framework applied by Brush et al. (2011).
Identify or evaluate the level of community engagement	The original framework developed by Key et al. (2019).
Identify or evaluate partnership outcomes and impacts	The original frameworks produced by Currie et al. (2005) and Suarez-Balcazar et al. (2005). The Wallerstein et al. (2008) CBPR model adapted by Stewart et al. (2013).

Recommendations for CBO-University partnerships

Five key recommendations were identified through reviewing the included studies and are presented in Box 1. These recommendations can be applied to strengthen partnership development, implementation and evaluation.

Box 1 Consolidated review recommendations for CBO staff, researchers and funders seeking to develop, implement or evaluate a CBO-university partnership.

Leverage history: Previous positive experiences of working together can increase partnership efficiency and support swift responses to future collaborative opportunities (King et al., 2015; Stewart et al., 2013).

Balance and exchange skills: The right combination of partners can enhance functioning, balancing differences in skills and knowledge (Carlton et al., 2009; Pinto et al., 2014). These differences present an opportunity for co-learning (King et al., 2015; Rodgers et al., 2014; Stewart et al., 2013; Suarez-Balcazar et al., 2005).

Establish clear expectations: Creating agreements related to purpose, responsibilities, resourcing and processes can prevent or resolve partnership conflict and enhance sustainability.

Focus on partner dynamics: Partnership effectiveness is dependent on partner dynamics. Building strong relationships takes time (Brush et al., 2011; Rodgers et al., 2014; Suarez-Balcazar et al., 2005). It requires identifying and balancing power differences (Brush et al., 2011; King et al., 2015; Suarez-Balcazar et al., 2005), respecting partner needs, contributions and perspectives (Carlton et al., 2009; King et al., 2015; Rodgers et al., 2014; Suarez-Balcazar et al., 2005), cultivating trust through respectful and open dialogue (Carlton et al., 2009; King et al., 2015; Suarez-Balcazar et al., 2005) and employing transparent decision-making processes (Calderón et al., 2015; Carlton et al., 2009).

Plan for change: Partnerships are dynamic; goals and expectations can shift (Brush et al., 2011). Anticipating and adapting to change should be embedded in partnership processes (Carlton et al., 2009).

2.3.4. Scoping review: Discussion

The purpose of this review was to examine the utility and scope of available frameworks developed or applied to conceptualise, develop or evaluate a CBO-university partnership. Eleven studies were identified that developed or applied frameworks for various purposes, including determining readiness to engage, assessing the level of engagement,

understanding partnership processes, and undertaking evaluation. This discussion highlights the strengths and limitations of the identified frameworks and provides recommendations for CBO staff, researchers and funders seeking to develop, implement or evaluate a CBO-university partnership. Applying the insights from this review could potentially enhance CBO-university partnerships functioning and success.

Process and outcomes factors

Similar to other CEnR reviews (Hoekstra et al., 2020), there was little consistency between the constructs used across frameworks. Reasons for the lack of consistency include the diverse terminology used for the same or similar constructs making it challenging to make comparisons, and the varied purposes of the frameworks (e.g., understand process versus support impact evaluation). However, there was a greater overlap of process constructs when compared to impact and outcome constructs. Commonly identified process factors align with what is known to support partnership functioning in the broader literature including power (Jones & Barry, 2011b), respect (Lasker et al., 2001) and trust (Corbin et al., 2016).

While the frameworks included relevant partnership processes, they did not adequately reflect the range of partnership impacts and outcomes. Key outcomes and impacts identified and previously recognised in the broader CEnR literature included enhanced research capacity (e.g., skills, attitudes), EIDM, changes to policy or practice and improved capacity for partnering (Brush et al., 2020; Ortiz et al., 2020). However, a recent review exploring researcher-CBO engagement reported these partnerships have led to the generation of recommendations that informed subsequent research projects and increased the credibility of CBOs (Adebayo et al., 2018). These outcomes and impacts were not included in the frameworks identified in this review. Recently, researchers have highlighted a need for greater understanding of what changes research partnerships can achieve and how they are obtained (Adebayo et al., 2018; Hoekstra et al., 2020; Oliver et al., 2019). As this knowledge evolves, existing frameworks should be adapted or new ones developed to reflect potential effects comprehensively.

Several frameworks considered changes within the broader community (e.g., improved community health and wellbeing). However, no studies provided tangible evidence of these changes. Instead, their inclusion acknowledged the higher purpose of these partnerships. Stewart et al. (2013) noted that while evidence of impact on health and wellbeing did not yet exist, changes such as increased community use of health services indicate it is achievable. The reasons for the lack of evidence of the ability of research partnerships to achieve these kinds of changes are unclear. Many frameworks were based on or applied to, partnerships established for several years. Partnership longevity indicates that the paucity of evidence is unlikely to be due to inadequate time to see these changes. Instead, it may be due to evaluations focusing on short-term changes (Luger et al., 2020), lack of appropriate tools to measure impacts (Beckett et al., 2018; Brush et al., 2020; Luger et al., 2020) or the absence of partnership beneficiaries (e.g., service users) in the evaluation. As research partnerships proliferate (Hoekstra et al., 2020; Oliver et al., 2019), examining long-term changes may provide the evidence required to strengthen the case for ongoing investment.

Framework utility

Identified frameworks are instructive in partnership initiation, implementation and evaluation. Yet each was limited either by a lack of specificity for CBOs, comprehensiveness or validation with CBO-university partnerships. This limits their generalisability and usefulness as a comprehensive partnership development or evaluation tool. However, this review has identified each frameworks' strengths and utility in informing different aspects of a partnership (e.g., assessing the level of engagement, evaluation) (Table 3). In addition, the included frameworks were reviewed to identify key recommendations for CBO staff, researchers and funders seeking to develop, implement or evaluate a CBO-university partnership (Box 1). These recommendations can be applied to strengthen the operation of a partnership.

Utility of frameworks adapted from other types of partnerships

Several studies applied frameworks from other partnership types relevant to planning and evaluating CBO-university partnerships. Brush et al. (2011) applied the widely used synergy framework (Lasker et al., 2001). Its application supported partnership functioning in various ways, including developing trusting relationships. Stewart et al. (2013) applied the CBPR

conceptual model, acknowledging the role partnership processes play in contributing to synergy. A recent review by Ortiz et al. (2020) highlighted the broader applicability of the CBPR model across a range of CEnR partnerships. Our review identified two constructs not explicit in the CBPR model, including the process of creating shared vision/goals and the outcome of evidence-informed practice. The CBPR model includes the construct, 'formal agreements'; however, it is unclear if the agreement's purpose is to provide clear role delineation, create a shared vision or both. It also includes the construct, 'policies and practices', which could include evidence-informed practice, though this is not specified. Both these constructs occur across multiple frameworks in this review, illustrating their importance within CBO-university partnerships. This lack of specificity in the CBPR model highlights areas for modification to reflect CBO-university partnerships better. Several constructs were included in the CBPR model not identified in this review (e.g., flexibility). The CBPR model is the most comprehensive framework identified. CBOs or universities may find it has utility when planning, implementing or evaluating their partnerships. However, as the model frames community (e.g., government, individuals, healthcare) homogeneously, care should be taken to consider the unique aspects of CBO-university partnerships. Without distinguishing between various community groups, we lack practical insights regarding how universities and CBOs can work together and what they can expect to achieve.

Representing the complexity of research partnerships

The frameworks in this review provided limited insight into how complexity affects functioning and evaluation. The exceptions were the influence of context and dynamic relationships between partners on partnership functioning. Consideration of complexity is essential as researchers grapple with tracking the actions of CEnR to longer-term, emergent and unanticipated effects (Beckett et al., 2018). To attribute these effects, more substantial links are needed between processes and impacts to trace the change process (Beckett et al., 2018). Applying complexity and systems thinking concepts can strengthen partnership understanding and evaluation (Beckett et al., 2018; Cooke et al., 2018; Rycroft-Malone et al., 2016). Therefore, future framework development studies should consider their inclusion.

Study strengths and limitations

This review is the first to report on CBO-university partnership frameworks. It provides a broad scope capturing 15 years of the available peer-reviewed literature. Publication bias may have occurred by only searching academic databases. Included studies were undertaken in a high-income country (USA), which may limit applicability of findings. Two reviewers screened abstracts and full texts and checked data extraction to reduce error. Studies that tested or refined the included frameworks were not purposefully searched for. Most studies that tested these frameworks would have been identified in the search. However, as targeted searching was not undertaken, some may have been missed. Some frameworks have been widely cited (Donabedian, 1982; Wallerstein et al., 2008) and searching this expansive body of literature which largely lies outside of CBO-university partnerships was outside the scope of this study. There are no widely accepted terms to describe CBO-university partnerships (Haapanen & Christens, 2021; Hoekstra et al., 2020). Studies using terminology inconsistent with our search terms may have been overlooked.

Conclusion

CBO-university partnerships have a unique role in supporting the creation of relevant evidence and transforming research findings into action. This review strengthens the current understanding of CBO-university partnerships by identifying key factors that affect partnership functioning and providing actionable recommendations for those embarking on or evaluating a CBO-university partnership. Identified frameworks can guide establishing a partnership, achieving success and undertaking evaluation. There is an opportunity to strengthen existing frameworks through their wider application and refinement.

To view the supplementary material referred to in this publication, please refer to the corresponding appendices.

Supplementary file 1:

Example search strategy ProQuest [Appendix D](#)

2.4. Summary

The literature presented in the chapter describes the context and rationale for the research contained within this thesis. Within this chapter, an explanation of how capacity is built and the kinds of impacts and outcomes it can achieve were discussed. This was followed by an overview of systems approaches to evaluation, including how complexity sensitive methods have been applied to the evaluation of RECB to date.

[Publication 1](#) was then presented, which examined frameworks that have been developed to conceptualise, develop or evaluate research partnerships between CBOs and universities in a health and social service context. This review provided an overview of existing frameworks, insight into their usefulness and actionable recommendations for researchers, CBO staff and funders undertaking CBO-university partnerships. The review identified that each framework had value, yet none comprehensively reflected the uniqueness and complexity of CBO-university partnerships.

As highlighted in this chapter's introduction, responding to complex public health issues requires a collaboration between researchers, policymakers and service providers and EIDM (Australian Government, 2021b). RECB provides opportunities for collaboration and supports EIDM. Yet, there are gaps in the literature including:

- a limited examination of how relational factors (e.g. trust) influence ECB,
- incomplete understanding of the impacts and outcomes RECB and CBO-research partnerships can achieve, and
- few examples of evaluation of RECB programs.

Examining SiREN presents an opportunity to understand how a capacity building partnership that works across the SHBBV system can contribute to supporting effective public health action. The following chapter outlines the research methods for this study ([Chapter 3](#)).

3. Research methods

This chapter describes the methods across each of the study's five components:

1. a scoping review examining frameworks used to describe or evaluate CBO-university partnerships,
2. examination of factors that affect the operation of SiREN,
3. exploration of factors affecting engagement with SiREN and impacts and outcomes achieved,
4. development of an evaluation framework to support the ongoing monitoring and evaluation of SiREN, and
5. development of questionnaires to evaluate the program planning, research and evaluation support provided by SiREN.

Section 3.1 presents the study protocol ([Publication 2](#)), which provides an overview of the study, including background, methods and implications:

Tobin, R., Hallett, J., Maycock, B., Lobo, R. (2019). Taking a systems approach to explore the impacts and outcomes of a research and evaluation capacity building partnership: A protocol. *BMJ Open*, 9, Article e026706. <https://doi:10.1136/bmjopen-2018026706> (Impact factor: 2.692)

Section 3.2 describes how the study adhered to the protocol and provides greater detail of research processes.

3.1. Publication 2: Research protocol

Publication 2: Taking a systems approach to explore the impacts and outcomes of a research and evaluation capacity building partnership: a protocol.

Open access

Protocol

BMJ Open Taking a systems approach to explore the impacts and outcomes of a research and evaluation capacity building partnership: a protocol

Rochelle Tobin, Jonathan Hallett, Roanna Lobo, Bruce Richard Maycock

To cite: Tobin R, Hallett J, Lobo R, *et al.* Taking a systems approach to explore the impacts and outcomes of a research and evaluation capacity building partnership: a protocol. *BMJ Open* 2019;9:e026706. doi:10.1136/bmjopen-2018-026706

► Prepublication history and additional material for this paper are available online. To view these files, please visit the journal online (<http://dx.doi.org/10.1136/bmjopen-2018-026706>).

Received 15 September 2018
Revised 31 July 2019
Accepted 30 August 2019



© Author(s) (or their employer(s)) 2019. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

School of Public Health, Curtin University, Perth, Western Australia, Australia

Correspondence to

Rochelle Tobin;
rochelle.tobin@curtin.edu.au

ABSTRACT

Introduction Partnership models that bring researchers, policymakers and service providers closer together are gaining traction as a strategy to improve public health practice. Yet, there is little evidence of how these models work, or indeed if they do work. The Sexual Health and Blood-borne Virus Applied Research and Evaluation Network (SIREN) is one such model. SIREN is a partnership between researchers, policymakers and service providers that aims to develop the research and evaluation capacity and evidence-informed decision making capability of professionals working to address sexual health and bloodborne virus issues in Western Australia. This study will use a systems approach to identify the mechanisms of action, impacts and outcomes of SIREN and inform the development of evaluation tools.

Methods and analysis Data will be collected from organisational documents, surveys, in-depth interviews and a workshop. It will be analysed using a complex adaptive systems lens and findings will be used to inform the development of a type of qualitative systems model called a causal loop diagram. The causal loop diagram will illustrate the: contextual factors influencing engagement; mechanisms of action; and impacts and outcomes of SIREN. Evaluation tools will then be developed that can be used to assess the indicators identified in the causal loop diagram.

Ethics and dissemination Ethics approval was obtained from the Curtin University Human Research Ethics Committee (approval number: HRE2017-0090). Participants will be free to withdraw from the study at any point and confidentiality will be maintained by de-identifying participant responses in any published or shared data. The findings from this study will be shared in conference presentations, reports, peer-reviewed journals and online through websites and social media.

INTRODUCTION

Public health challenges benefit from evidence-informed and partnership-based responses.^{1 2} This has been demonstrated through Australia's response to HIV/AIDS, where evidence-informed and partnership-based strategies led to far fewer new infections and deaths when compared with other developed countries.³ Despite the

Strengths and limitations of this study

- The use of causal loop diagramming is a novel approach to programme evaluation and this study will explore the practicality and usefulness of this technique to evaluate a partnership model.
- A nuanced description of the influence of Sexual Health and Blood-borne Virus Applied Research and Evaluation Network (SIREN) on research and evaluation practices will be achieved through using a variety of data collection methods and providing rich descriptions in the causal loop diagram and accompanying textual narrative.
- The process of refining the causal loop diagram through a workshop will provide an opportunity for stakeholders to develop a shared understanding of what SIREN can achieve.
- Some of the study researchers are involved in the partnership being explored and therefore participants may wish to portray experiences positively and/or avoid focusing on negative aspects.
- Data collection will occur up to 24 months after participants engaged with SIREN which may lead to recall bias.

successes attributed to this response, similar inroads have not been made across all sexual health and bloodborne virus challenges. In order to achieve national objectives for improvements in health outcomes, public health programme and policies need to be supported by evidence.⁴

Three critical success factors support evidence-informed decision making in public health. First, the development of research and evaluation capacity is essential to enable the public health workforce to generate evidence on what works.¹ Research and evaluation capacity can be defined as the skills, knowledge, commitment and resources to engage in effective and sustained research and evaluation practice.^{5 6} Second, researchers, service providers and policymakers need to work in partnership to create evidence that is both



timely and relevant.⁷ Third, effective processes to increase sharing of, and access to, evidence are required.⁸

Acknowledging these factors, the Western Australian Department of Health funded the Sexual Health and Blood-borne Virus Applied Research and Evaluation Network (SiREN) project in 2012. SiREN is a partnership between sexual health and bloodborne virus researchers, service providers and policymakers in Western Australia. This project aims to: (1) build the capacity of professionals working to address sexual health and bloodborne virus issues to engage in research, evaluation and evidence-informed decision making; (2) support collaboration between policymakers, researchers and service providers; and (3) raise the profile of sexual health and bloodborne virus concerns that are relevant to Western Australia through building relationships with national research centres and contributing to national research agendas.

SiREN is governed by a project steering group and a management team. The project steering group members are representatives from research, not-for profit, professional and government organisations working to address sexual health and bloodborne virus issues. The project steering group has a strategic role in determining the direction of SiREN and ensure that SiREN's activities reflect the needs of researchers, service providers and policymakers working to address sexual health and bloodborne viruses. The management team are university-based staff with expertise in research, evaluation, sexual health and bloodborne viruses, who play a strategic and operational role in SiREN.

To achieve its aims, SiREN uses a diverse range of strategies. SiREN facilitates and participates in partnerships between research, government and non-government organisations to apply for competitive grant funding and undertake research and evaluation projects; provides tailored project planning, research and evaluation support; provides web-based resources to support evidence-informed policy and practice; hosts a biennial research and evaluation symposium that brings together those working in sexual health or bloodborne viruses across Australia; and maintains a network (database) of approximately 300 professionals with whom it shares relevant research and evaluation evidence, news, funding opportunities and events via electronic mail. A detailed description of the SiREN model has been published elsewhere.⁹

Partnerships, like SiREN, are based on the theory that more can be achieved by working together than by working alone.² Research shows that partnerships between researchers, policy makers and service providers can lead to knowledge and skill acquisition, the increased generation and use of evidence, improvements to service delivery and greater efficiencies in the use of limited health resources.¹⁰⁻¹⁴ Despite their potential, there is scant evidence describing the kinds of long-term changes that can be achieved by these partnerships, and of the processes that lead to these changes.¹⁵ Evaluations of

SiREN conducted 2 and 3 years after its inception established that SiREN had contributed to improving research, evaluation and evidence-informed practice, attitudes, skills and knowledge.^{9,16} While these short-term impacts are promising, exploration of long-term outcomes and the processes by which these are achieved is important given the potential of partnership models, like SiREN, to support the practice of public health.

Evaluating partnerships is challenging. This is because of their dynamic nature; they adapt and evolve in response to the complex relationships between partners and the contexts in which they are embedded.^{13,15,17} Furthermore, establishing a causal link between partnership processes and outcomes can be difficult as: partnerships may attempt to bring about change in various areas and across various levels (individual, organisational and system); there can be a long lag time between the establishment of the partnership and outcomes occurring; and outcomes are often influenced by contextual factors outside of the partnership such as organisational, policy and funding environments.¹⁴

A systems approach offers a way to overcome some of these evaluation challenges. A systems approach is a way of thinking that brings together components of a bounded system, illuminates the relationships between them and how they interact as part of a whole.¹⁸ Traditional approaches to evaluation are very linear, often with direct causal links made between strategies and outcomes without consideration of external factors that may influence outcomes. When systems thinking is applied to evaluation, it considers the programme within the context in which it works with all its variables and relationships, and then refocuses attention on the most relevant points for evaluation purposes.^{19,20}

AIMS

The overall objective of this mixed methods study is to use a systems approach to explicate the influence that SiREN has on research, evaluation and evidence-informed decision making practices. This study aims to: (1) identify the impacts and outcomes of SiREN and the mechanisms by which these are achieved using a type of systems map called a causal loop diagram and (2) develop and pilot test evaluation tools to measure the indicators identified through the process of developing the causal loop diagram.

METHODS AND ANALYSIS

This study will have two stages. Stage 1 will involve collecting data from organisational documents, surveys and in-depth-interviews and a workshop to inform the development of the causal loop diagram. The second stage of this study will be the development and testing of evaluation tools that can be used to evaluate SiREN.

Participants

The study will recruit three groups of purposefully selected participants: (1) the entire SiREN member network.

This is SiREN's database of individuals with an interest in sexual health and bloodborne viruses who have voluntarily subscribed to receive regular electronic mail from SiREN containing summaries of the latest evidence, news, grants and events; (2) SiREN partners and service recipients. This group will be individuals who have actively engaged with SiREN at least once in the last 24 months. Active engagement will be defined as: participated in the SiREN project steering group or other advisory groups; partnered with SiREN to apply for research grants, or undertake research or evaluation; or received project planning, evaluation or research support. These participants will be from: government, non-government and research organisations across Australia; and employed in a variety of positions including managers, project officers and researchers; (3) the SiREN management team which consists of university-based staff who are involved in the strategic and operational management of SiREN.

Stage 1: causal loop diagram development

In this stage, a causal loop diagram will be developed. Causal loop diagrams provide a visual representation of systems, including their boundaries, component parts and the relationships within them.²¹ For the purposes of this research, the bounded system is SiREN and the influence it has had on the thinking and practice of individuals it has interacted with.

A causal loop diagram comprises of variables (system factors) and links (relationships). Links are depicted by arrows and the type of relationship indicated by a plus (positive) or minus (negative) symbol. The system variables and links are matched together to form feedback loops, which tell the story of the relationship between them. Feedback loops can either be reinforcing or balancing. A reinforcing loop represents a change that creates more of the same change, resulting in an increase or decrease in growth.²² Balancing loops illustrate when a change in one direction is balanced by a change in the opposite direction.²²

Figure 1 shows an example of a reinforcing and balancing loop. In the reinforcing loop (indicated by an R in the centre of the loop), a service provider engages with SiREN, which increases their motivation to engage in evidence-informed decision making, leading to an increase in evidence-informed decision making and further engagement with SiREN. In the balancing loop (indicated by a B in the centre of the loop), service

providers engage in evidence-informed decision making, which increases their workload, and subsequently decreases their available time to engage in further evidence-informed decision making.

Data collection to inform the development of the causal loop diagram

Data collection will be undertaken by the lead author. Data will be collected from organisational documents, surveys, in-depth interviews and a workshop and used to inform the development of the causal loop diagram.

SiREN organisational documents will be collected to establish an understanding of the structure, processes, impacts and outcomes of SiREN. These will include documents such as past evaluations, funding agreements and activity reports dating back to SiREN's inception in 2012.

The SiREN member network (n=204) will be asked by email to complete an online survey (see online supplementary appendix 1) designed using Qualtrics survey-building software.²³ The findings from this survey will provide insight into the broader context in which SiREN operates. The survey aims to: understand contextual factors that influence research, evaluation and evidence-informed decision-making, as well as engagement with SiREN, and identify how they have engaged with SiREN and the influence this had on their practice.

Semistructured qualitative interviews will be undertaken with SiREN partners and service recipients (n=35), and the management team (n=5). The interviews will explore the impacts, outcomes and mechanisms of action of SiREN in detail. The interview guide for SiREN partners and service recipients (see online supplementary file 2) is flexible and will be modified based on findings from past interviews and the type of engagement the participant has had with SiREN. The interview will be approximately 1 hour in length and will cover: contextual factors influencing evidence-informed practice, research and evaluation; details of engagement with SiREN; and how and in what ways engagement with SiREN has influenced practice. The interview guide for the management team (see online supplementary file 3) will explore their perspectives of SiREN and how factors such as governance, staffing and resourcing influence the ability of SiREN to achieve its aims.

In-depth interview participants will be recruited via direct email. Interviews will be undertaken face-to-face with Perth-based participants and via webcam or

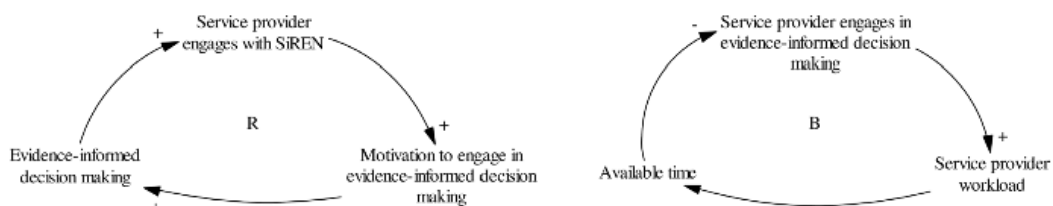


Figure 1 An example of a reinforcing loop and a balancing loop.

**Table 1** Elements of complex adaptive systems

Element	Description
Path dependence	History is important. Processes can have similar starting points and lead to different outcomes.
Feedback loops	An output within the system is fed back as an input.
Emergent behaviours	Spontaneous creation of order. Occurs when elements within the system interact to bring about change within the system.
Time delays	Time delays between events occurring within the system.

telephone with regional or remote participants. Interviews will be digitally recorded and transcribed verbatim, and checked for accuracy.

Approximately 40 people meet the criteria of actively engaging with SiREN in the last 24 months and are eligible to participate in an in-depth interview. Recruitment will continue until the sample is exhausted or saturation of the findings from data analysis is reached. Saturation is the point where no new information arises from the analysis.²⁴

Data analysis and development of the causal loop diagram

All data collected will be entered into QSR NVivo V.11 data management software²⁵ for analysis. Data will be coded to identify contextual factors that influence research and evaluation practices and engagement with SiREN, mechanisms of action, impacts and outcomes. Following this, a complex adaptive systems lens will be applied to identify tenets common to complex adaptive systems (table 1).^{26–28} This lens has been chosen as the sexual health and bloodborne virus system in which SiREN operates is a complex adaptive system; it has many actors (individuals, organisations or groups), who are constantly interacting, learning and evolving in response to changes within the system.^{21 29} Applying a complex adaptive systems lens will enable a more complete representation of how and why system elements influence each other.

Once the draft causal loop diagram is developed, SiREN partners and service recipients and the management team will be invited to attend a workshop to refine it. The workshop will be run by two facilitators, one to lead the discussion and a second to observe and record the discussion. Workshop participants and facilitators will work together to clarify: the system variables; the nature of the relationships between them; and if there are any factors that had not been considered. This consensus building process increases the credibility of the causal loop diagram and is similar to approaches taken in other systems modelling studies.^{29 30}

Stage 2: identification and development of evaluation tools

In the second stage of this study, evaluation tools that can measure the process and outcome indicators identified

in the causal loop diagram will be identified and developed. To identify existing tools, a rapid review of the literature will be undertaken. A rapid review is a streamlined evidence synthesis approach.³¹ The indicators identified in the causal loop diagram will be used, along with their synonyms, as search terms to systematically search the literature for existing tools that can measure them. Tools identified through this process will be appraised for design, content and methodological quality. Suitable tools will either be modified or used in their current form.

Where a suitable evaluation tool to measure an indicator cannot be located, a new one will be developed. The process of identifying and developing tools will be undertaken in consultation with the SiREN management team and the SiREN project steering group. They will be asked to comment on practical aspects of the tool such as the implementation processes, usefulness of data collected and level of administrative and respondent burden. The specific aspects of the tools to be developed cannot be described in detail at this stage, as it will depend on the indicators identified. However, it is anticipated that tools may assess factors such as: changes in research and evaluation skills and confidence, increased application of evidence in programme planning and changes to how services and programme are delivered.

To increase content validity, questions for the tools will be primarily sourced from existing tools with predetermined reliability and validity. Once the tools are developed, they will be pilot tested with SiREN partners and service recipients. This will involve participants reviewing the tools and undertaking an online survey using Qualtrics Survey Software.²⁵ The survey will assess participants' perceptions of the tools, specifically: (1) Usability: Appropriateness of language, ease of use and clarity of content. (2) Acceptability: If the time, resources and skills required to complete the tools were acceptable. (3) Sustainability: The likelihood that the tool will continue to be used and suggestions to improve it for future use. The tools will be refined based on the feedback from these processes; if a major revision is required further testing will be undertaken.³²

Patient and public involvement

No patients or members of the public were involved in this study. Input into the methods will be sought through meetings with the SiREN management team and the SiREN project steering group.

DISCUSSION

SiREN is a partnership between researchers, policy-makers and service providers that aims to develop the research and evaluation capacity and evidence-informed decision making capability of professionals working to address sexual health and bloodborne virus issues. This study will explore the processes, impacts and outcomes of SiREN and develop and test evaluation tools. This will enhance understanding of how and in what ways

partnership approaches support research, evaluation and evidence-informed decision making practices in public health. The findings from this research are intended to provide insight for researchers, service providers and policymakers seeking to establish or evaluate a similar capacity building partnership.

Approaches to evaluating partnerships need to be sensitive to their dynamic nature, the influence of contextual factors, and able to show causal links between partnership processes, impacts and outcomes.^{13 14} Causal loop diagramming is a qualitative systems modelling technique that is well suited to this as it enables understanding of how elements within the system in which the partnership is embedded interact and lead to change.³³ Furthermore, the process of developing the causal loop diagram provides an opportunity for stakeholders to develop a shared understanding of how the partnership functions and what it can achieve which can enhance partnership functioning.^{33 34} While causal loop diagramming can strengthen an evaluation, it is not without its drawbacks. It involves the collection and analysis of large amounts of data which can be time consuming, and as the partnership evolves, the causal loop diagram may need to be updated which will require expertise. Additionally, presenting findings as a causal loop diagram can be difficult for those who are not experienced in the technique to understand.³⁵

While there have been calls for greater application of systems thinking to evaluation, there are limited examples of systems approaches to evaluation in the literature,^{33 35} particularly for causal loop diagramming. This research will contribute to building understanding of how to use causal loop diagramming for evaluation purposes, as well as provide insight into the usefulness of this approach.

Results from this research will be shared in conference presentations, reports, peer-reviewed journals and online. Results will be made available to those who participated in the study as well as those with an interest in SiREN's approach.

Contributors The study concept and design was conceived by all authors. RT will recruit and undertake all data collection and analysis with input and supervision from RL, JH and BRM. RT drafted and edited the manuscript and RL, JH and BRM provided critical feedback. All authors have approved the final manuscript.

Funding This work was supported by an Australian Government Research Training Program Scholarship and funding from the SiREN project which is supported by the Sexual Health and Blood-Borne Virus Program, Government of Western Australia Department of Health.

Competing interests RT and RL are paid staff of SiREN and JH is on the management team of SiREN.

Patient consent for publication Not required.

Provenance and peer review Not commissioned; externally peer reviewed.

Open access This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

REFERENCES

- Brownson RC, Fielding JE, Maylahn CM. Evidence-Based public health: a fundamental concept for public health practice. *Annu Rev Public Health* 2009;30:175–201.
- Jones J, Barry MM. Exploring the relationship between synergy and partnership functioning factors in health promotion partnerships. *Health Promot Int* 2011;26:408–20.
- Bowtell W. Australia's Response to HIV/AIDS 1982-2005: Lowy Institute for International Policy. Available: www.lowyinstitute.org/files/Bowtell_Australia's_Response_to_HIV_AIDS_logo.pdf [Accessed 29 Apr 2018].
- Third national sexually transmissible infections strategy 2014-2017. Department of health, 2014. Available: [http://www.health.gov.au/internet/main/publishing.nsf/Content/8DB875B386DC5672CA257BF0001E377D/\\$File/STI-Strategy2014-v3.pdf](http://www.health.gov.au/internet/main/publishing.nsf/Content/8DB875B386DC5672CA257BF0001E377D/$File/STI-Strategy2014-v3.pdf)
- Preskill H, Boyle S. A multidisciplinary model of evaluation capacity building. *Am J Eval* 2008;29:443–59.
- Cooke J. A framework to evaluate research capacity building in health care. *BMC Fam Pract* 2005;6:44.
- Brownson RC, Fielding JE, Green LW. Building capacity for evidence-based public health: reconciling the Pulls of practice and the push of research. *Annu Rev Public Health* 2018;39:27–53.
- Dobbins M, Hanna SE, Ciliska D, et al. A randomized controlled trial evaluating the impact of knowledge translation and exchange strategies. *Implementation Sci* 2009;4:1–16.
- Lobo R, Crawford G, Hallett J, et al. A research and evaluation capacity building model in Western Australia. *Health Promot Int* 2016;33:468–78.
- King G, Servais M, Forchuk C, et al. Features and impacts of five multidisciplinary community-university research partnerships. *Health Soc Care Community* 2010;18:59–69.
- Bumbarger BK, Campbell EM. A state agency-university partnership for translational research and the dissemination of evidence-based prevention and intervention. *Adm Policy Ment Health* 2012;39:268–77.
- Gagliardi AR, Berta W, Kothari A, et al. Integrated knowledge translation (IKT) in health care: a scoping review. *Implementation Sci* 2015;11.
- Jagosh J, Bush PL, Salsberg J, et al. A realist evaluation of community-based participatory research: partnership synergy, trust building and related ripple effects. *BMC Public Health* 2015;15:725.
- Currie M, King G, Rosenbaum P, et al. A model of impacts of research partnerships in health and social services. *Eval Program Plann* 2005;28:400–12.
- Corbin JH, Jones J, Barry MM. What makes intersectoral partnerships for health promotion work? A review of the international literature. *Health Promot Int* 2016;33:4–26.
- John Scougall Consulting Services. *Siren evaluation final report*. Perth: Department of Health WA, 2015. <http://siren.org.au/wp-content/uploads/2015/07/SIREN-evaluation-report-July-2015.pdf>
- Midboe AM, Elwy AR, Durfee JM, et al. Building strong research partnerships between public health and researchers: a Va case study. *J Gen Intern Med* 2014;29(S4):831–4.
- Best A, Holmes B. Systems thinking, knowledge and action: towards better models and methods. *Evidence & Policy: A Journal of Research, Debate and Practice* 2010;6:145–59.
- Hargreaves MB. Evaluating system change: A planning guide [Internet]: Mathematica Policy Research, 2010. Available: http://www.mathematica-mpr.com/-/media/publications/PDFs/health/eval_system_change_methoddr.pdf [Accessed 20 Jan 2018].
- Cabrera D, Colosi L, Lobdell C. Systems thinking. *Eval Program Plann* 2008;31:299–310.
- BeLue R, Carmack C, Myers KR, et al. Systems thinking tools as applied to community-based participatory research: a case study. *Health Educ Behav* 2012;39:745–51.
- Merrill JA, Deegan M, Wilson RV, et al. A system dynamics evaluation model: implementation of health information exchange for public health reporting. *J Am Med Inform Assoc* 2013;20:e131–8.
- Qualtrics [program] 2015Provo, Utah, USA
- Morse JM. The significance of saturation. *Qual Health Res* 1995;5:147–9.
- QSR International Pty Ltd. *NVivo qualitative data analysis software [program] Version 11*, 2017.
- de Savigny D, Taghreed T. Systems Thinking for Health Systems Strengthening [Internet]: World Health Organization, 2009. Available: www.who.int/alliance-hpsr/alliancehpsr_overview_fr_eng.pdf [Accessed 29 Apr 2019].
- Paina L, Peters DH. Understanding pathways for scaling up health services through the lens of complex adaptive systems. *Health Policy Plan* 2012;27:365–73.



28. Rickles D, Hawe P, Shiell A. A simple guide to chaos and complexity. *J Epidemiol Community Health* 2007;61:933–7.
29. Rwashana AS, Nakubulwa S, Nakakeeto-Kijijambu M, et al. Advancing the application of systems thinking in health: understanding the dynamics of neonatal mortality in Uganda. *Health Res Policy Syst* 2014;12.
30. Fredericks KA, Deegan M, Carman JG. Using system dynamics as an evaluation tool: experience from a demonstration program. *Am J Eval* 2008;29:251–67.
31. Hite J, Gluck ME. Rapid Evidence Reviews for Health Policy and Practice [Internet]: AcademyHealth. Available: www.academyhealth.org/sites/.rapid_evidence_reviews_brief_january_2016.pdf [Accessed 15 May 2015].
32. Sarantakos S. *Social research*. 3rd ed. New York: NY: Palgrave MacMillan, 2005.
33. Owen B, Brown AD, Kuhlberg J, et al. Understanding a successful obesity prevention initiative in children under 5 from a systems perspective. *PLoS One* 2018;13:e0195141.
34. Seaton CL, Holm N, Bottorff JL, et al. Factors that impact the success of Interorganizational health promotion collaborations: a scoping review. *Am J Health Promot* 2018;32:1095–109.
35. Chen HT. Interfacing theories of program with theories of evaluation for advancing evaluation practice: Reductionism, systems thinking, and pragmatic synthesis. *Eval Program Plann* 2016;59:109–18.

To view the supplementary material referred to in this publication, please refer to the corresponding appendices.

Supplementary file 1:

Online survey with SHBBV sector. Refer to [Appendix E](#).

Supplementary file 2:

Interview schedule for SiREN partners and service users. Refer to [Appendix F](#).

Supplementary file 3

Interview guide for the management team. Not included as not used in the final study as workshops were used instead.

3.2. Research designs

This section describes the supervisory team, theoretical perspective, how a systems approach was used, participants, data collection and analysis, engagement with the steering group, reflexivity, rigour and ethical considerations. This information provides further depth on the study protocol ([Publication 2](#)) and highlights any deviations.

3.2.1. Supervisory team

Three members of the supervisory team were involved in the management of SiREN during the time the research was undertaken. RL was the manager of SiREN and RL, JH and GC were part of the management team. BM has not previously worked for or with SiREN. BM is a senior and experienced public health academic with decades of experience in research and practice. The dual roles of supervisor, SiREN staff or management team member had implications for the research. These considerations are described within Publications [3](#) and [4](#) as well as [Sections 3.2.5](#), [3.2.6](#) and [3.2.9](#).

The supervisory team has extensive experience in areas relevant to this research, including public health, qualitative research, evaluation, knowledge translation, and capacity building. In addition, all supervisors have experience working with, or within, health services in the government and non-government sector, including those that aim to address STIs and BBVs in WA.

3.2.2. Steering group

As outlined in [Section 1.3](#) and the [study protocol](#), SiREN is governed by a steering group which includes representatives from key SHBBV organisations. The steering group meet twice a year, for 1.5 hours per meeting. In these meetings, SiREN provides an update of its activities, presents findings from relevant research and evaluation projects, and seeks input into future activities. In addition, steering group members highlight current and planned evaluation and research projects and opportunities for group members to collaborate are identified. The PhD Scholar attended steering group meetings throughout the research process ($n = 5$). The purpose of attending these meetings included providing an overview of

the planned research, providing updates of progress, seeking input into the development of the questionnaires ([Publication 5](#), [Chapter 7](#)), and providing summaries of findings.

3.2.3. Theoretical perspective

The study's research paradigm was interpretivist, comprising a relativist ontology and constructionist epistemology. Ontology is one of two overarching and linked branches of philosophy in the social sciences concerned with what exists in the world for people to know about (Moon & Blackman, 2014). A relativist ontology takes the position that reality is shaped by the person viewing it. Therefore, there is no one true reality (Moon & Blackman, 2014). The other branch of philosophy is epistemology, and this branch addresses how knowledge is created and what can be known. In this study, a constructionist epistemology was used, which supports the idea that meaning arises as humans engage with and make sense of the world (Moon & Blackman, 2014). This aligns with the PhD Scholar's world view that reality is defined by how individuals experience it and that meaning can be constructed by combining multiple individual perspectives. This research reflects this perspective by examining SiREN and combining and analysing the subjective experiences of different groups of SiREN stakeholders.

The conceptual orientation used in this study is systems thinking and was introduced in [Section 1.5](#) and [2.2.1](#). The origins of systems thinking can be traced back to the study of biology in the first half of the twentieth century (Checkland, 1999). Many biologists could see that the living organisms they were studying were more than the sum of their parts. For example, Karl Ludwig von Bertalanffy, founded general systems theory (von Bertalanffy, 1969). This theory is based on the idea that to understand a system effectively, one must look at the whole system and the relationships between its parts (von Bertalanffy, 1969). In the 1970s and 80s systems thinkers such as Checkland (1981), Churchman (1971) and Ackoff (1979) further developed systems theory to incorporate an interpretivist approach whereby multiple perspectives were used to understand an issue. This period was underpinned by the concept of multiple realities (Torres-Cuello et al., 2018). The next significant change to systems thinking was based on the belief that previously developed participative methodologies did not adequately account for power relationships and conflicts built into

the structure of society (Williams & Imam, 2006). Systems thinkers began to argue that these different schools of thought should be considered as complimentary rather than conflicting. This is when the works of Jackson and Keys (1984), Ulrich (2010) and Midgley (2003) came to the forefront. This period of systems thinking was underpinned by the concept of critical awareness, where assumptions and conditions that give rise to power are closely examined. This time also introduced methodological pluralism into systems thinking, where a range of research methods are used in a theoretically coherent manner to examine an issue (Torres-Cuello et al., 2018).

This research views SiREN as an event within a complex system (Hawe, Shiell, et al., 2009). This was described in [Section 1.4](#). A systems approach was employed to reflect the complexity of the SHBBV system and SiREN. Systems approaches are suited to examining programs like SiREN, which aim to build change within a system (Grack Nelson et al., 2018). This is because a systems approach seeks to understand a program by exploring the context in which it is implemented, the relationships between program and system elements, and how the program contributes to change (Chen, 2016; Hawe, Shiell, et al., 2009). For example, an important contextual consideration is understanding how factors outside of SiREN influence research and evaluation capacity (e.g., organisational culture). Another example is tracing the processes that lead to SiREN contributing to increased capacity within the system. In addition to examining a program, systems thinking can support the identification of useful indicators for monitoring and evaluation (Brown et al., 2018).

Within systems thinking, there are multiple paradigms, methodologies and concepts to draw upon (Midgley, 2006). These provide similar, and at times conflicting, perspectives on how to define, understand and change a system. For example, as noted in [Section 2.2.1](#), systems thinking evolved from systems science, which views systems as real-world phenomena and assumes that knowledge of a system reflects reality (Williams & Imam, 2006). Whereas systems thinking, as applied in this study, uses systems concepts to inform how a program is conceptualised. This is more in line with the work of Checkland (1981) and Cabrera et al. (2008), who view systems as constructs to support understanding and value the construction of knowledge through participatory rather than expert-led methods

(Williams & Imam, 2006). Within this study, systems approaches were used in different ways. An overview of how systems approaches were used is provided below.

3.2.4. How systems approaches were utilised

This study used systems thinking in two distinct ways. Firstly, concepts and a diagramming method from systems thinking were employed to explore the factors that influence the functioning, impacts and outcomes of SiREN. Secondly, systems concepts were used to develop an evaluation framework and questionnaires that reflected the complexity of SiREN. These approaches are described below. More detail on how systems approaches were used are provided in relevant publications ([2](#), [3](#), [4](#), [5](#)) and chapters ([4](#), [5](#), [6](#), [7](#)).

Systems approach to explore the functioning, impacts and outcomes of SiREN

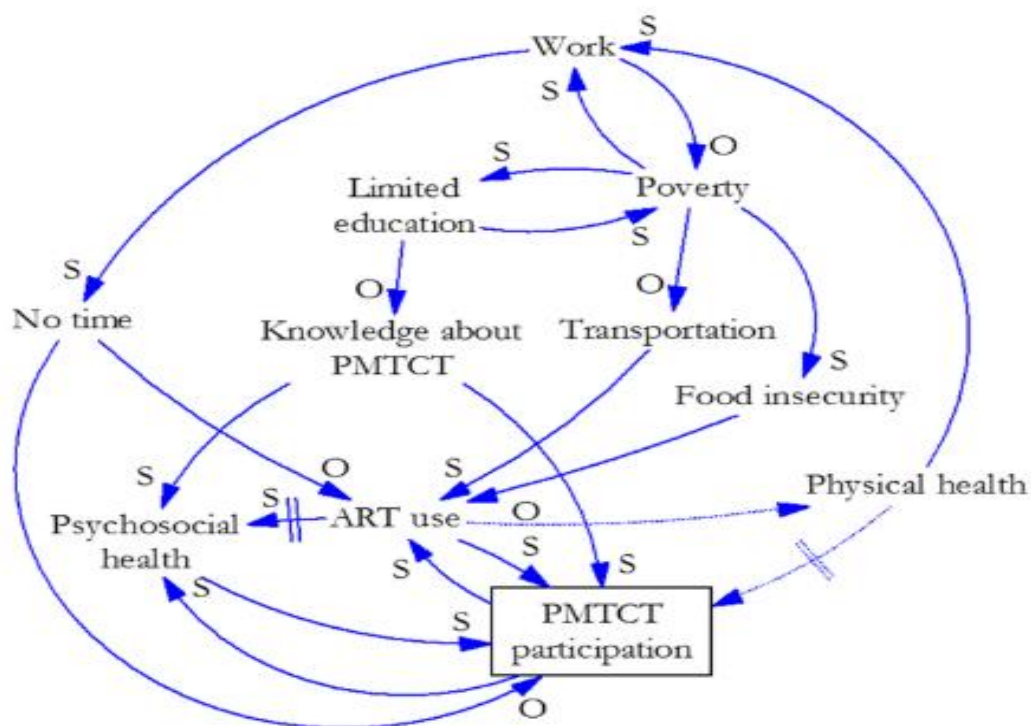
Three core systems concepts were used to explore the functioning, impacts and outcomes of SiREN. These were drawn from Cabrera et al.'s (2008) theory of systems thinking, Williams and Imams (2006) key systems concepts for evaluation and the examination of these concepts by Hummelbrunner (2011). The three key concepts were boundaries, perspectives and relationships. Boundaries focus the inquiry by defining what lies inside and outside the system (Cabrera et al., 2008; Hummelbrunner, 2011). For example, within this study the SHBBV sector was the bounded system. Perspectives acknowledge that system stakeholders hold different views and thus, to enable a comprehensive understanding of the system, multiple perspectives should be included (Cabrera et al., 2008; Hummelbrunner, 2011). Relationships are described as causal links between system elements (Cabrera et al., 2008). Understanding relationships requires examining how system elements interact and lead to change (Renger et al., 2019). The application of these concepts varied slightly depending on the study context. Therefore, their application is described in each relevant publication (Publications [3](#) and [4](#)).

CLDs

In this study, relationships were explicated through CLDs, a type of qualitative systems modelling method (Sterman, 2000). CLDs are used to create visual depictions of a system or situation. They are composed of words and arrows that depict the type of relationship

(positive or negative) between them (Kenzie, 2021). They include feedback loops which are circular relationships between variables that can either reinforce (amplify) or balance (dampen) change (Williams & Hummelbrunner, 2010). Figure 6 presents a CLD developed by Yourkavitch et al. (2018). This diagram examined how poverty influences women’s participation in prevention of mother-to-child transmission (PMTCT) of HIV services. Following the arrows tells the story of PMTCT service use. Beginning with the ‘psychosocial health’ variable, the diagram shows that if a woman has strong psychosocial health (e.g., family support) they are more likely to participate in PMTCT services which increases use of antiretroviral therapy (ART), a HIV medication, which can improve physical health.

Figure 6. Poverty-related influences on women’s participation in prevention of mother-to-child transmission services



Source: Yourkavitch et al. (2018)

CLDs originated from the field of system dynamics as one of the first steps in developing quantitative predictive models (Forrester, 2007; Homer & Oliva, 2001). However, they have since evolved in their application and it is now argued that they are not a classic system dynamics method (Coyle, 2000; Richardson, 1986) and are instead more commonly claimed as a systems thinking method (Carey et al., 2015; Williams & Hummelbrunner, 2010). This

divergence can be attributed primarily to their purpose. CLDs are used to describe a problem or program, whereas system dynamics models are used to predict future behaviour (Coyle, 2000; Forrester, 2007; Homer & Oliva, 2001).

CLDs have been used in a wide range of studies seeking to understand public health programs (Baugh Littlejohns et al., 2021) and establish program theory (Renmans et al., 2017). These have included prevention marketing (Biroscak, 2014), supporting people with developmental disabilities (Fredericks et al., 2008), health system responses to a payment for performance model (Cassidy et al., 2021), obesity prevention (Clarke et al., 2021; Jalali et al., 2019; Owen et al., 2018), implementing health information systems (Merrill et al., 2013), scaling up HIV treatment (Grove, 2015), health service participation (Yourkavitch et al., 2018), peer-led programs (Brown et al., 2018) and telehealth service adoption (Gaveikaite et al., 2020).

When used to examine public health programs, CLDs can:

- explain how program elements and the system interact and influence program functioning and effectiveness, thus supporting the development of program theory (Fredericks et al., 2008; Gaveikaite et al., 2020; Kenzie, 2021; Renmans et al., 2017),
- identify unintended consequences of a program (Fredericks et al., 2008),
- inform program decision-making through detecting opportunities to strengthen program effectiveness and mitigate risks (Baugh Littlejohns et al., 2021; Brown et al., 2018; Merrill et al., 2013),
- pinpoint useful indicators for program evaluation (Brown et al., 2018), and
- take a participatory approach that strengthens stakeholder understanding of a program (Baugh Littlejohns et al., 2021; Fredericks et al., 2008).

However, to the PhD Scholar's knowledge, and based on examination of two recent reviews (Baugh Littlejohns et al., 2021; Kenzie, 2021), CLDs have not been used to examine a RECB program in public health or SHBBV context.

Further descriptions of CLDs are provided in the preceding protocol paper ([Publication 2](#)) and in the publications presenting CLDs (Publications [3](#) and [4](#)).

Systems approach to develop the evaluation framework and questionnaires

As described in the research aims and objectives, SiREN required monitoring and evaluation tools. To address this need, an evaluation framework and two questionnaires were developed. Evaluation frameworks are *“both a planning process and a written product designed to provide guidance to the conduct of monitoring and evaluation functions over the life span of a program or other initiative”* (Markiewicz & Patrick, 2016, p. 1).

Developing the CLDs explicated the complexity of SiREN and the SHBBV system. To enable these tools to accurately evaluate the processes, impacts and outcomes of SiREN, these complexity sensitive insights needed to be incorporated into their design. To do this, key systems concepts that arose through the development of the CLDs informed the development of the framework and questionnaires. Detail on the concepts used and how they were applied is provided in [Chapter 6](#) and [7](#).

The following is an overview of three key systems concepts used:

- **Contextualisation:** Contextualising a program deepens understanding of how it contributes to change within the context it operates (Midgley, 2006; Renger et al., 2019). Contextualising reflects the concept of open systems from general systems theory (von Bertalanffy, 1969). Open systems reflect the understanding that a system exchanges matter and energy with its surroundings (Midgley, 2006). Therefore, a program is sensitive to context and contextual influences can lead to a high variability of outcomes (Prashanth et al., 2014). SiREN was contextualised within the SHBBV system, enabling the evaluation framework and questionnaires to accommodate identified interdependencies.
- **Causality:** The CLDs illustrated causal relationships that influence SiREN’s ability to achieve its aims. These causal mechanisms can be regularities that occur consistently within the system and are beneficial points to monitor for evaluation (Brown et al., 2018). Furthermore, causal relationships can act as initial indicators of success as they occur before the longer-term impacts such as EIDM. Therefore, designing the

framework and questionnaires to examine causality may address challenges with assessing RECB within a complex system.

- **Flexibility:** Programs and the systems in which they operate are dynamic. This concept comes from the field of system dynamics (Forrester, 1961). In system dynamics, systems are characterised by feedback, non-linear causality, interdependence and interaction (Cabrera & Cabrera, 2019). Therefore, program evaluations need to integrate flexibility that anticipates and captures this dynamic behaviour (Renger et al., 2019). For example, as SiREN and the SHBBV system change, previously unidentified impacts and outcomes may occur. Therefore, the framework and questionnaires needed to be able to capture these changes as they emerged.

3.2.5. Participants

The study collected data from four participant groups to support a comprehensive understanding of SiREN and ensure the evaluation framework and questionnaires met stakeholder needs. A description of each participant group and their role in the study is provided below.

SHBBV system and SiREN network members

The SHBBV system (described in [Section 1.2](#)) comprises individuals and organisations working to address SHBBV issues. They predominantly work in state government, non-governmental organisations or universities. Their roles include project officers/coordinators, nurses, physicians, managers, executives, educators and academics. SiREN network members have an interest in SHBBV issues and have subscribed to receive regular electronic communications from SiREN, including evidence summaries, upcoming events, and funding and employment opportunities. When data collection for this study commenced in 2016, the network had 204 members. By 2021, this number had increased to 457.

At the time this research was undertaken, people working within the SHBBV system, including SiREN network members, had varying levels of engagement with SiREN, from no engagement to regular engagement. The SHBBV system, including SiREN network members

were invited to participate in this study to enable an understanding of research, evaluation and evidence-informed decision-making capacity, factors that influence engagement with SiREN, and impacts and outcomes that occurred because of engagement. This participant group ($n = 104$) took part in an online survey in 2016 that formed a part of SiREN's biennial needs assessment. The findings from this survey informed the development of the CLDs depicting factors that affect engagement with SiREN and the impacts and outcomes it has achieved ([Publication 4, Chapter 5](#)).

SiREN partners and service users

SiREN partners are individuals who have collaborated with SiREN to undertake a research or evaluation project and/or are a member of the steering group. The steering group is a group of representatives who hold senior positions within key stakeholder organisations and provide input into the strategic direction of SiREN. The steering group was described in [Section 1.3](#) and [Section 3.2.2](#). Service users are individuals working to address SHBBV issues in WA that have received tailored project planning, evaluation or research support from SiREN, for example, developing an evaluation framework. SiREN partners and service users work within the SHBBV system and may also be SiREN network members.

SiREN partners and service users were included in this research as they provided their experiences of working with SiREN and the types of changes that occurred as a result. They contributed to this study by participating in:

- in-depth interviews which informed the development of the CLDs depicting factors that affect engagement with SiREN and the impacts and outcomes it has achieved ([Publication 4, Chapter 5](#)), and
- a workshop to refine a CLD depicting factors that affect engagement with SiREN and the impacts and outcomes it has achieved ([Publication 4, Chapter 5](#)), and
- pilot testing of the questionnaires ([Publication 5, Chapter 7](#)).

SiREN management team

The SiREN management team (hereafter, management team) comprise five university staff described in [Section 1.3](#). As highlighted in [Section 3.2.1](#), three members of the management team were members of the supervisory team. Management team members have provided

governance for SiREN since the beginning of the funded contract in 2012. The fifth member commenced their role in 2013 when an original member left to return to their home country. In 2019, another original member left due to changing work responsibilities and an alternative university staff member filled their position.

The management team were included as participants in this research as they have in-depth knowledge of SiREN and the broader SHBBV system. In addition, they have an interest in ensuring the evaluation framework and questionnaires were fit for purpose. Including the perspectives of the management team aligns with participatory evaluation (Patton, 1997), which engages stakeholders throughout evaluation planning and design. A participatory approach increases both the use and practicality of evaluation (Bryson et al., 2011). The management team contributed to this study through participating in:

- workshops ($n = 2$) and meetings ($n = 8$) to develop and refine a CLD depicting factors that influence the functioning of SiREN ([Publication 3, Chapter 4](#)),
- a workshop to refine a CLD illustrating factors that affect engagement with SiREN and the impacts and outcomes it has achieved ([Publication 4, Chapter 5](#)),
- meetings ($n = 5$) and online surveys ($n = 2$) to determine the structure and content of the evaluation framework ([Chapter 6](#)), and
- meetings ($n = 3$) to refine the structure and content of the questionnaires ([Publication 5, Chapter 7](#)).

SiREN staff

SiREN staff members who participated in this study included research officers ($n = 2$), a project officer ($n = 1$) and a project coordinator ($n = 1$) who were currently employed by SiREN or had been employed in the 12 months prior to data collection commencing. An organisational chart is provided in [Appendix C](#). At the time of data collection, staff had worked with SiREN on a part-time or casual basis for between one to eight years across a range of evaluation, research and knowledge translation related projects. All staff were female and held tertiary qualifications at an honours level or higher. SiREN staff participated in:

- an in-depth semi-structured interview ($n = 4$) which informed the development of a CLD depicting factors that influence the functioning of SiREN ([Publication 3, Chapter 4](#)), and
- a workshop ($n = 1$) to refine a CLD illustrating factors that influence the functioning of SiREN ([Publication 3, Chapter 4](#)).

3.2.6. Data collection

This study utilised various data sources to strengthen its credibility (Corbin & Strauss, 2008). Credibility is one of the four criteria used to establish the trustworthiness of a qualitative research study. The other criteria include transferability (show how study findings may be applied in other contexts), dependability (findings are consistent and could be replicated) and confirmability (findings are shaped by the participants) (Lincoln & Guba, 1985). Achieving credibility involves establishing confidence in the truth of the research findings (Lincoln & Guba, 1985). Techniques to enhance credibility used in this study include collecting data from multiple sources (e.g., service users, staff), using multiple data collection methods (e.g. interviews, online surveys) and validating findings with participants (e.g., CLD workshops) (Lincoln & Guba, 1985).

As described in the introduction ([Section 1.7](#)), there were five components in this study. Within each of these components, data were collected from a range of sources. These sources included the literature, SiREN organisational documents, surveys, in-depth interviews, workshops, consultation and pilot testing. A summary of the data collected for each component of this study is provided in Table 4. Data collection is described in detail under each of the five study components in the following section. Details of recording and transcribing data collected at CLD related workshops, interviews and meetings is described in [Section 3.2.7](#).

Table 4. Data collection methods used in each study component

Data collection methods	Component one: Scoping review	Component two: Operation of SiREN	Component three: Impacts and outcomes of SiREN	Component four: Evaluation framework	Component five: Development of questionnaires
Review of the literature	✓				✓
Organisational documents			✓		
Online survey tool			✓		
In-depth interviews		✓	✓		
Workshops		✓	✓		
Consultation			✓	✓	✓
Consensus-building process				✓	
Questionnaire pilot testing					✓

Component one: Literature review

Exploration of the relevant literature was an essential component of this research and was undertaken across multiple stages of the research process. A scoping review examining frameworks used to describe or evaluate CBO-university partnerships was undertaken ([Publication 1](#)). In addition, the literature was used to inform the scope of the study and research processes (e.g., candidacy² and protocol), describe the RECB literature ([Chapter 1](#) and [2](#)), develop data collection tools (e.g., interview guides) ([Publication 2](#) and [4](#)), and identify existing tools to inform the development of the questionnaires ([Publication 5](#), [Chapter 7](#)).

² The period of preparing the PhD research proposal (both written and oral) to present to the university. Once the university confirms the proposal as satisfactory, the PhD candidate is then accepted as a PhD student.

Component two: Operation of SiREN

A CLD examining the internal operation of SiREN ([Publication 3, Chapter 4](#)) was developed using data collected from two workshops and four in-depth interviews (See Box 2 for an overview of approaches to building CLDs). This diagram was not planned in the original study protocol ([Publication 2](#)). However, as data were collected, it became evident that it would not be possible to develop a comprehensive evaluation framework without further insight into the operation of SiREN. Therefore, data collection methods were expanded to include staff interviews, meetings, and two workshops. The in-depth interviews with management team members (described in the study protocol) were changed to a workshop. As described by Caretta and Vacchelli (2015), unlike individual interviews, group workshops enable participants to build on each other's ideas.

Box 2. Common approaches to building CLDs

A recent review by Baugh Littlejohns et al. (2021) described the diverse approaches to developing CLDs in public health. These included: group model building, created by researchers using own knowledge and created by researchers with stakeholder refinement. Group model building is one of the most widely used processes to develop CLDs and involves participants in constructing a diagram from the beginning (Vennix, 1999). This collaborative process can strengthen the process by increasing stakeholder understanding of the issue and commitment to taking action (Scott et al., 2016).

In this study, the researcher developed the diagrams from a range of data sources, including in-depth interviews. The diagram was then collaboratively refined and validated with participants. This approach was selected as interviews, unlike group workshops, enable participants to anonymously share their perspectives and experiences without jeopardising their "*position in a system*" (Dicicco-Bloom & Crabtree, 2006, p. 319).

Furthermore, collaborative model building workshops require a significant investment of time (Hovmand, 2014). Therefore, using interviews (and other data sources) to inform the development of a draft diagram before the workshop reduced participant burden.

Workshop #1: Management team

A workshop with the management team ($n = 5$) was the first step in developing the CLD representing operation of SiREN. A workshop was considered the most appropriate data collection method as it would enable the collective development of opinions and ideas (Caretta & Vacchelli, 2015). Questions asked in the workshop included what factors affect SiREN's ability to achieve its aims, how SiREN has changed since its inception, and how does SiREN need to change in future.

The SiREN manager informed the management team that the PhD Scholar would attend one of their regular monthly meetings to hold a workshop to discuss the aforementioned points. All five management team members were present at the workshop.

The initial plan for the workshop was to document each variable identified on a post-it note, place it on a whiteboard, and begin to map the relationships between each of the variables. However, once the PhD Scholar asked the first question, the conversation evolved rapidly, and it was not possible to keep pace with writing the variables as they emerged. Each management team member contributed their perspective, questioned each other, and built on each other's input. Only minor prompting was required. The rapport and cooperation witnessed in this meeting between the management team members was included as observational data. The workshop ran for 50 minutes.

In-depth interviews with SiREN staff

In-depth, semi-structured, qualitative interviews ($n = 4$) were undertaken with SiREN staff to explore their experiences working with SiREN ([Publication 4, Chapter 5](#)). Interviews were selected as the first step in the data collection process with staff. Interviews instead of workshops were selected to encourage open dialogue and reduce perceived power dynamics as the supervisory team and the PhD Scholar agreed staff would feel more comfortable sharing information in a confidential environment. Group-based methods (e.g., workshops, focus group) are not recommended when there are differences in power as the discussion may be led by those in positions of power (Sim & Waterfield, 2019).

The SiREN manager confirmed the identification of all staff who were currently employed or were employed by SiREN in the previous 12 months. They were invited by email ([Appendix G](#)). All agreed to participate.

Staff interviews focused on discussing factors that influence SiREN's ability to achieve its aims, issues that influence their ability to undertake their role, their observations on the perception of SiREN within the broader SHBBV system and how SiREN may need to adapt to respond to meet the future needs of the SHBBV system ([Appendix H](#)). Questions were developed in consultation with the supervisory team and built on questions and concepts identified in the aforementioned workshop with the management team. For example, in the workshop, it was determined that several factors influence SiREN's ability to be innovative. Therefore, the PhD Scholar added a question about factors influencing SiREN's ability to create and respond to new opportunities.

Due to COVID-19 restrictions at the time of data collection, the PhD Scholar undertook all interviews with SiREN staff online using Microsoft Teams (Microsoft Corporation, 2020). Interviews were audio-recorded using Teams. Each recording was immediately downloaded to a secure online research data storage location and then deleted from the recording device, in line with appropriate data storage methods (Lobe et al., 2020). The recorded duration of the interviews ranged from 20 to 55 (mean = 40) minutes. Some of the questions required an in-depth understanding of SiREN and the broader SHBBV system (e.g., 'What factors influence SiREN's ability to create and respond to new opportunities?'). Two of the staff had been employed for less than a year. Therefore, they had limited ability to answer these questions comprehensively.

Meetings with the supervisory team

Using the data collected from the workshop with the management team and staff interviews, the PhD Scholar developed a draft CLD using Vensim (Ventana Systems Inc., 2015), a software program used for creating and presenting CLDs. This diagram was refined through a series of meetings ($n = 3$) with members of the management team ($n = 3$). Four versions of the diagram were developed through this process. These meetings ranged from 45 to 90 minutes. In each of these meetings, the PhD Scholar presented the latest version of

the diagram and facilitated discussion within the group. Questions were posed on different aspects of the diagram, for example, 'What other variables influence the willingness of the management team to spend time on SiREN activities?' Members of the supervisory team also posed questions about the phrasing and meaning of variables and the nature of the relationships and identified missing variables or relationships. The PhD Scholar refined the diagram based on this feedback. This process continued until the supervisory team and the PhD Scholar agreed that the diagram sufficiently represented the functioning of SiREN.

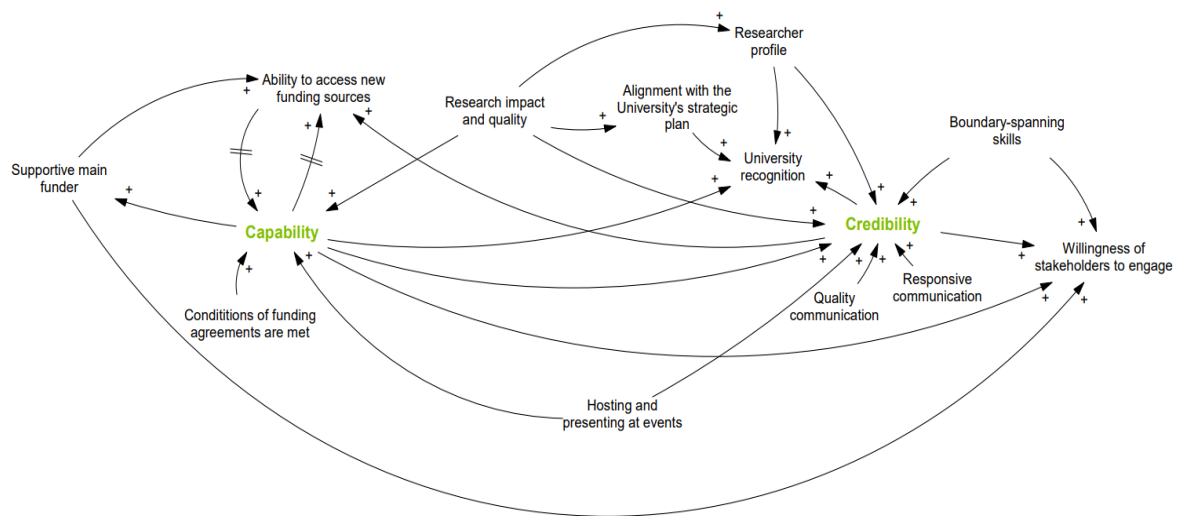
Workshop # 2 with the management team and staff and follow-up meetings

The PhD Scholar held a two-hour workshop with SiREN staff and management team members ($n = 8$) to refine and validate the diagram.

SiREN staff ($n = 4$), current management team members ($n = 5$) and one past management team member were invited to participate in the workshop via email ([Appendix I](#)). The past management team member was involved in the first workshop and was invited to attend because of their knowledge of SiREN, gained over eight years as a management team member. The email asked invitees to indicate their availability to attend using online scheduling software (Doodle, 2017). Three staff and five management team members attended the workshop.

The workshop began with the PhD Scholar providing an overview of systems thinking and instruction on how to interpret the CLD. This overview was kept to a minimum as most participants were familiar with the research project. The PhD Scholar separated the diagram into three smaller diagrams. Splitting the diagram was based on central diagram variables that were central to the success of SiREN. Figure 7 provides an example of one of the three sections of the diagram.

Figure 7. One of the three sections of the draft CLD



Participants were allocated into three groups (two groups of three and one group of two). A round-robin style approach was used, whereby each group took turns discussing a diagram section around a table for fifteen minutes before moving to the next table and diagram section. Splitting the diagram and working in groups had two objectives. Firstly, the supervisory team and the PhD Scholar felt this would make it easier for participants to understand because of the complexity of the whole diagram. Secondly, as noted by Gerritsen et al. (2020), working in smaller groups ensures that each participant has the opportunity to contribute. This was important as group members had varying levels of seniority and experience working with SiREN, therefore, this approach may reduce perceived power dynamics. The group then reconvened to share their insights and review the entire diagram.

The diagram was subsequently refined based on workshop feedback. It was then discussed in a meeting with a member of the management team who could not attend the workshop. In this meeting, the PhD Scholar explained the diagram and asked to what extent it reflected their experience working with SiREN and if any variables or relationships were missing or required modification. Following this, the PhD Scholar held a final meeting with two management team members who were also members of the supervisory team (GC, JH). This meeting ran for approximately 30 minutes and aimed to ensure that the revised diagram reflected what was discussed in the workshop. At this point, there was consensus that the

diagram accurately reflected the factors that influenced the operation of SiREN and data collection ceased. Gaining group consensus that the diagram accurately represents the situation or issue is the end point of the model development process (Siokou et al., 2014).

Component three: The impacts and outcomes of SiREN

CLDs were developed to examine factors that influence engagement with SiREN and the impacts and outcomes that occurred ([Publication 3, Chapter 4](#)). Data were collected from organisational documents ($n = 42$), online surveys ($n = 104$), in-depth interviews ($n = 17$) and a workshop.

SiREN organisational documents

Organisational documents ($n = 42$) were used to orient the PhD Scholar of SiREN's historical and current activities and organisational processes. They were used to create a history of SiREN's activities and outputs that occurred each year since SiREN was established ([Appendix J](#)). In addition, they were used to collect evidence of the impacts and outcomes of SiREN. For example, in 2014 at the request of the main funding body, SiREN was evaluated by an external consultant (John Scougall Consulting Services, 2015). This evaluation was central to establishing what was known about the impacts achieved by SiREN in its first two years. SiREN organisational documents examined included: twice-yearly reports to its primary funder describing its activities and outputs ($n = 18$), steering group meeting minutes ($n = 12$), evaluation reports of SiREN and its activities ($n = 6$), needs assessment reports ($n = 3$), and emails from stakeholders describing impacts or outcomes of SiREN ($n = 3$). A complete list of organisational documents is provided in [Appendix K](#).

Online survey with the SHBBV system

An online survey was undertaken with individuals ($n = 104$) working within the SHBBV system, including SiREN network members ([Publication 4, Chapter 5](#)). This online survey formed part of SiREN's biennial needs assessments. SiREN undertakes these assessments to understand research and evaluation practices within the SHBBV system and uses findings to inform the development of its activities and resources. Online surveys were used as they are an efficient and anonymous tool to collect data from a diverse range of respondents residing across a large geographical area (Van Selm & Jankowski, 2006).

The 2016 online needs assessment survey was sent out to SiREN network members ($n = 210$)³ and individuals who have regular contact with SiREN (e.g., steering group members) ($n = 29$) via email ([Appendix L](#)). A follow-up email was sent four weeks after the initial email. In addition, it was promoted in various communications such as SiREN email communications, Australian Health Promotion Association e-news, SiREN and CERIPH⁴ Twitter and the Local Government Health Promotion Network. All survey communications asked recipients to share the survey with their SHBBV networks. The purpose of disseminating the survey outside the SiREN network and asking recipients to share with their networks was to collect data from people who were part of the SHBBV system but not SiREN network members. The survey had 104 respondents, just under half ($n = 50$) of whom were not current SiREN network members. The high proportion of respondents who were non-SiREN members supports these efforts to extend the reach of the survey.

For the purposes of this study, additional items were added to the needs assessment survey and existing items were refined using previous research and questionnaires. These modifications were made to understand engagement with SiREN resources and services and the impact this had on practice. Table 5 lists the additional items added to the needs assessment and how each question was developed. The survey was refined with two members of the management team who are also members of the supervisory team (GC and RL). The survey tool was designed using Qualtrics survey-building software (Qualtrics, 2019). The final needs assessment survey contained a combination of 43 open and closed questions and is provided in [Appendix E](#).

Table 5. Additional questions included in the needs assessment

Additional questions	Source
How long have you been a SiREN member?	SiREN needs assessment (2014)

³ This was the number of SiREN network members when the survey was sent in 2016. Currently, SiREN has over 450 members.

⁴ SiREN is situated within CERIPH, a research collaboration within the Curtin University School of Population Health.

Additional questions	Source
My organisation values research. Please rate how much you agree with this statement.	Adapted from Dobbins et al. (2009)
My organisation values evaluation. Please rate how much you agree with this statement.	Adapted from Dobbins et al. (2009)
In the last 12 months, what barriers to undertaking research have you experienced? Options included lack of time, lack of knowledge and skills etc.	Adapted from SiREN needs assessment (2014, 2016). Additional response options were sourced through Holden et al. (2012), Lobo et al. (2014) and Pager et al. (2012).
Do you undertake evaluation as part of your current role?	Developed by PhD Scholar and refined with members of the management team.
What proportion of your week at work do you usually spend on evaluation?	Developed by PhD Scholar and refined with members of the management team.
In the last 12 months, what barriers to undertaking evaluation have you experienced?	Adapted from SiREN needs assessment (2014, 2016). Additional response options were sourced through Lobo et al. (2014).
Are you involved in making decisions in relation to programs or policies?	Developed by PhD Scholar and refined with members of the management team.
Thinking about your work in the last 12 months, what barriers have you experienced when accessing research evidence?	Adapted from SiREN needs assessment (2014, 2016). Additional response options were sourced through Dobbins et al. (2009)
To what extent have SiREN services and resources influenced your work?	Developed by PhD Scholar and refined with members of the management team.
Could you explain why the SiREN services or resources you used did or did not influence your work?	Developed by PhD Scholar and refined with members of the management team.

In-depth interviews with SiREN partners and service users

In-depth, semi-structured interviews ($n = 17$) were used to elicit accounts of partners' and service users' experiences of SiREN ([Publication 4, Chapter 5](#)). Semi-structured interviews are the most widely used interview approach in qualitative research (Dicicco-Bloom & Crabtree, 2006) and were selected as they provide a flexible structure to explore participant experiences and perspectives in a confidential environment (Dicicco-Bloom & Crabtree, 2006).

Participants were purposively selected to ensure they could provide detailed information relevant to the research questions. Purposive sampling is the deliberate selection of individuals based on the information they can provide (Patton, 2002). These information-rich sources enable researchers to gain an in-depth understanding of the examined issue (Patton, 2002). SiREN organisational documents (e.g., emails, activity reports) were reviewed to develop a list of individuals and organisations who had engaged with SiREN. In addition, the PhD Scholar asked SiREN staff to identify relevant participants. Before the interviews, the PhD Scholar developed a background of each participant's interactions with SiREN in consultation with the SiREN manager. Understanding how participants had previously engaged with SiREN enabled specific questions to be prepared in advance (e.g., 'Can tell me about the research project you partnered with SiREN on?'). Individuals ($n = 22$) were invited via email to participate ([Appendix M](#)). Three did not respond to the invitation and two declined, citing conflict of interest as SiREN's main funder employed them. As the main funder is also SiREN's government partner, this limited the government perspectives in this study. This was addressed by recruiting three participants in government roles outside the program that funds SiREN. However, two of these participants had low levels of engagement with SiREN. This limited the depth of their experience of SiREN but provided valuable insight into reasons for low engagement. Consistent with a grounded theory approach (Corbin & Strauss, 2015), data collection and analysis occurred simultaneously to enable the development of new probing questions to address emerging concepts as they arose. Sampling ceased after 17 interviews when theoretical saturation was reached (discussed in [Section 3.2.7](#)).

The interview schedule was developed in consultation with the supervisory team. Domains of inquiry were informed by the broader systems thinking literature which enabled exploration of context, causal effects, changes over time, and change across multiple levels (individual, organisational, and system) (Hummelbrunner, 2011; Williams & Imam, 2006). Interviews began by exploring participant research, evaluation and evidence-informed decision-making practices. This line of enquiry enabled an understanding of context and built on the findings of the online survey. The interviews then examined participant expectations of SiREN, how they have worked with SiREN, the impact of engagement, their perceptions of the influence of SiREN at an organisational and system level, and intentions to work with SiREN in the future. The PhD Scholar pilot tested it with two university staff who were familiar with SiREN. The final interview schedule is provided in [Appendix F](#).

The PhD scholar conducted all interviews. Fifteen interviews were undertaken in person with participants at their workplace, one interstate participant was interviewed at a non-government organisation they were visiting and one regional participant was interviewed over the telephone. The recorded duration of the interviews ranged from 30 to 90 (mean = 51) minutes.

Workshop and meetings with SiREN partners, service users and management team members

A workshop and meetings ($n = 3$) were held to refine the draft CLD; procedures are described below.

In-depth interview participants ($n = 17$) and management team members ($n = 5$) were invited by email ([Appendix N](#)) to participate in the workshop. Similar to the other CLD workshop, participants were asked to provide their availability to attend using online scheduling software (Doodle, 2017). Eight people were unavailable due to work commitments, five did not respond, and one was unwell on the day. Workshop participants included in-depth interview participants ($n = 5$), management team members ($n = 3$) and an observer from the supervisory team (BM).

The PhD scholar facilitated the 120-minute workshop. To begin, the PhD Scholar described the research aims and purpose of the overall research and workshop. Following this, the

PhD Scholar explained systems thinking, including CLDs, and how the PhD Scholar developed the diagram. Next, the PhD Scholar described the diagram in three sections firstly, factors that affect engagement (e.g., awareness of SiREN), then processes that occur during engagement (e.g., development of trusting relationships) and finally, impacts and outcomes that have occurred (e.g., networks and partnerships). Workshop slides are provided in [Appendix O](#). Each participant received a handout describing the diagram variables to support interpretation. At the end of describing each section, the PhD Scholar posed questions to the group, including:

- To what extent does this reflect your organisation's experience of engaging with SiREN?
- Based on your experience, are there any aspects that are not represented here?
- Any comments on the terms used?

Participants were seated around a square table, and in the middle was a laminated copy of the CLD (A0 size). Participants used whiteboard markers to alter variables and relationships as the group discussed them. The diagram reflected what SiREN has achieved, not what it intended to achieve. Therefore, all participants were reminded that they needed to draw on past observations or experiences when discussing the diagram.

Prior to the workshop, the PhD Scholar discussed the role of the management team and supervisory team at the workshop with their supervisory team. It was decided that the presence of the management team at the workshop would strengthen the diagram, as they brought with them an understanding of SiREN, and many had personally engaged with the partners and service users. However, they were asked to let service users and partners lead the discussion. The management team had insight into several diagram areas from their work with SiREN or past experience within the SHBBV system (e.g., contextual factors such as presence of collaborative culture) and supported the interrogation of the diagram by asking questions (e.g., 'Does a history of collaboration reflect collaboration as it is presently?'). An observer from the supervisory team was also present (BM), and their role was to support the facilitation of the discussion when required. For example, at one point, they identified that a variable did not lead anywhere and opened a conversation to identify

other related variables. The workshop was audio recorded and one member of the management team took written notes.

Following the workshop, meetings ($n = 3$) were held, ranging from an estimated 30 to 60 minutes. Meetings were held with individual members of the management team ($n = 2$) who could not attend the workshop. In these meetings, the updated diagram was presented and described. Participants were asked if it reflected their experience or if modifications were required. A final meeting was held with members of the supervisory team ($n = 4$) to refine the diagram where it was determined that it reflected SiREN and data collection ceased. The PhD Scholar took written notes during each of these meetings.

Component four: Evaluation framework

This section describes the methods used to develop the evaluation framework to guide the ongoing monitoring and evaluation of SiREN. This framework was not described in the study protocol ([Publication 2, Chapter 3](#)). The purpose of the framework was to transform the CLDs into a functional structure to support ongoing monitoring and evaluation. The development and validation of the evaluation framework used data from the three CLDs. It also involved the management team in a consultation process followed by a Delphi style (defined later) consensus-building method.

Utilising a participatory evaluation to develop the framework

The methods selected to develop and validate the framework align with participatory evaluation, an approach that involves stakeholders with a vested interest in the evaluation (e.g., program managers, funders) participating in the evaluation planning and design (Patton, 1997). Including these stakeholders strengthens evaluation by fostering stakeholder commitment to the process and leads to evaluation that is more likely to be used (Bryson et al., 2011). A participatory approach has been used in previous evaluation framework development studies (Brown et al., 2018; Stack et al., 2018). For example, Brown et al. (2018) took a systems thinking approach to develop an evaluation framework for peer-based programs. To understand how peer-based programs operate within the broader policy and community system, multiple perspectives from system stakeholders were

included in the development of the framework (Brown et al., 2018). This led to an increased understanding of how peer-based programs operate amongst stakeholders and identified the most important factors for ongoing monitoring and evaluation.

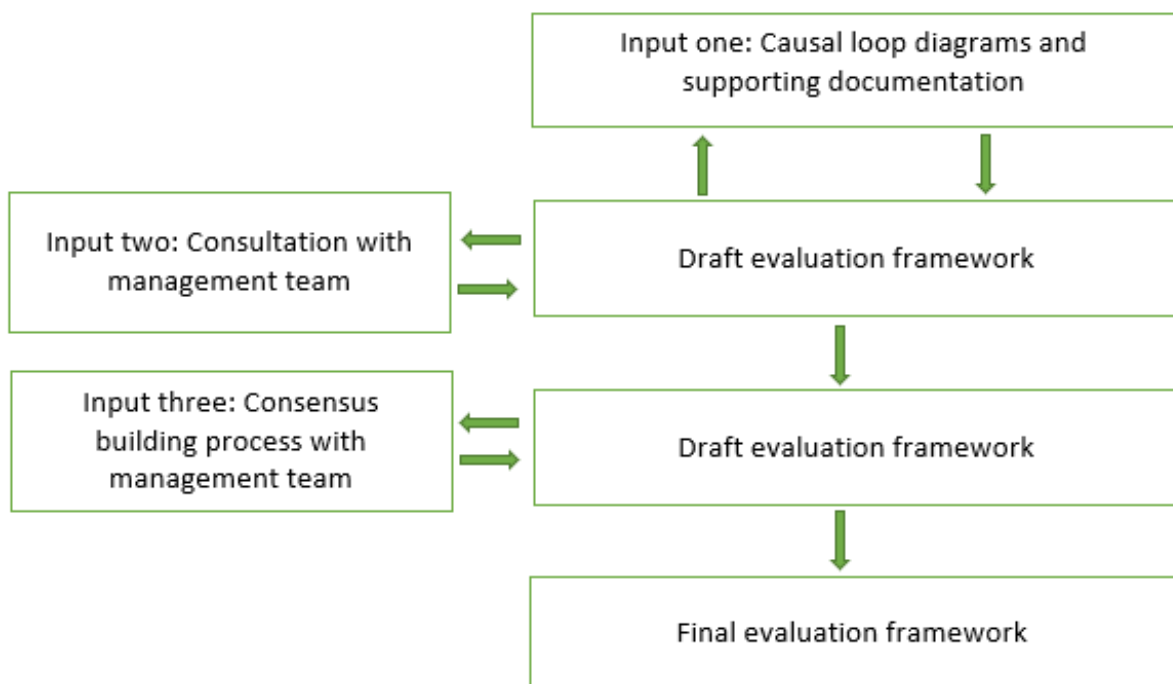
Participants

Participants involved in developing the evaluation framework for SiREN were management team members. The characteristics of the management team are described in [Section 1.3](#) and [3.2.5](#). They were selected as they have an in-depth understanding of SiREN and would implement the evaluation framework.

Framework inputs

The development and validation of the evaluation framework was an iterative process that drew on three input sources (Figure 8). The first input included data from the three CLDs and their supporting documentation. The second was a consultation process with management team members to refine the framework structure and validate its content. Finally, a consensus-building process was undertaken with the management team to determine the importance of the framework indicators.

Figure 8. The development and validation of the evaluation framework



Framework components

To coherently explain how these inputs informed development, the components of the final framework are first described. The framework components included the following:

1) Evaluation questions

Seven questions were developed which framed the scope of the evaluation. The evaluation questions enable value judgements on SiREN’s context, implementation and effectiveness.

2) Domains and descriptions

Domains are aim statements that determine the response to their corresponding evaluation question. Each domain has a description that explains its relationship to the system and the functioning of SiREN. These descriptions act as a theory of change providing insight into how and why change occurs (Funnell & Rogers, 2011).

3) Indicators

Measurable pieces of information used to determine if SiREN is on track to achieve the domain statement. The indicators are a combination of inputs, processes, outputs, impacts and outcomes.

4) Data sources

Where the data to demonstrate progress towards an indicator is collected (e.g., service user surveys).

Figure 9 is an extract from the final framework illustrating the framework components. The complete framework is in [Appendix P](#).

Figure 9. Example illustrating framework components

Evaluation questions	Domain and description	Indicators	Data sources
1. To what extent is SiREN developing relationships for research and evaluation?	<p>5.1 There are trusting relationships with partners and service users</p> <p>Alignment processes (e.g. engaging with stakeholders to determine SiREN activities), meeting stakeholder and service user expectations, and boundary-spanning skills build trusting relationships.</p> <p>Once trust is established engagement increases and there is increased potential for impacts and outcomes to occur. When expectations of engagement are not met trust can be damaged.</p> <p>Due to staff changes, both within SiREN and the system, new trusting relationships need to be developed which takes time.</p>	<p>Essential</p> <ul style="list-style-type: none"> • Proportion of service users reporting the support provided by SiREN met their expectations • Proportion of service users reporting SiREN can be relied on to do what they say they will do • Proportion of service users reporting they worked with SiREN to effectively problem solve and overcome difficulties • Processes to establish clear expectations of engagement with partners and service users (e.g. memorandum of understanding) <p>Desirable</p> <ul style="list-style-type: none"> • Proportion of service users who have engaged with SiREN previously • Proportion of partners who have engaged with SiREN previously • Stakeholder reported reasons for not accessing SiREN services or resources 	<ul style="list-style-type: none"> • Organisational documents • Periodic stakeholder surveys • Service user surveys • Stakeholder support record

Input one: CLDs and supporting documentation

Developing the draft framework was a three-stage process that required reviewing and condensing information from the CLDs, SiREN organisational reports and evaluation tools. An overview of this process is provided in Figure 10.

Figure 10. Overview of processes to develop framework components



Developing domains and descriptions

The CLDs provided a program theory through linking system factors and SiREN processes to observed impacts and outcomes. To construct the draft framework, all variables were extracted from the diagrams and used as topics to form the basis of the domains. For example, the CLD variable *Networks and partnerships* was reworded to domain 5.2 *Networks and partnerships are established and developed*. There were 92 variables derived from the diagrams; these were condensed to 21 domains. This consolidating process was based on combining similar variables or those that were interim steps to achieving another variable. For example, the diagram variable *Boundary-spanning skills* was merged under domain 5.1 *There are trusting relationships with partners and service users* as boundary-spanning skills support the development of trust. The PhD Scholar documented the decision-making processes for converting CLD variables to domains in a Microsoft Excel (Version 2105) spreadsheet. An extract from this spreadsheet is provided in Table 6.

Table 6. Extract from spreadsheet documenting diagram condensing process

CLD variable	Corresponding framework domains	Justification for merging
Boundary-spanning skills of the SiREN team	4.1 SiREN activities are aligned with stakeholder needs 5.1 There are trusting relationships with partners and service users	Boundary spanning is a process that helps to build alignment and trust. Boundary-spanning skills facilitate the alignment building process by facilitating the exchange of knowledge. Boundary-spanning skills build trusting relationships by demonstrating understanding of different ways of working, establishing clear expectations and being approachable.

Developing evaluation questions

Once the domains were drafted, they were grouped into areas of inquiry. These areas formed the basis to develop the evaluation questions. For example, domains that related to how stakeholders perceive SiREN (e.g., if SiREN is perceived as trustworthy and credible) were grouped together under the question '*How is SiREN perceived by stakeholders?*'

Developing indicators

Framework indicators were developed using data collected from the CLD variables, relationships and supporting textual descriptions ($n = 3$) and organisational reports ($n = 47$). The type of reports included biannual summaries of SiREN activities and outputs ($n = 18$); findings from needs assessments ($n = 4$); steering group minutes ($n = 19$) and evaluations of SiREN activities ($n = 6$). In addition, SiREN evaluation survey tools ($n = 3$) were examined. [Appendix K](#) contains a list of all organisational documents reviewed. Directed content analysis was used to analyse data; this deductive approach using predetermined codes provided a structure for analysis (Hsieh & Shannon, 2005). In this study, the framework domains were used as categories to guide coding. For instance, for the domain 4.3 *There are*

resources to sustain and grow SiREN activities, the data were reviewed to identify indicators to demonstrate SiREN achieved this outcome, such as new funding awarded.

Input two: Consultation with management team members

The purpose of the consultation process was to ensure the framework structure and content met the evaluation needs of SiREN (described in [Section 1.5](#)). The PhD Scholar led a consultation process with three management team members who were also members of the supervisory team (RL, JH, and GC). This group were purposefully selected as they have been responsible for managing SiREN since its inception. Therefore, they have an in-depth understanding of SiREN and what is required for its ongoing monitoring and evaluation. In addition, they were already involved in the study and therefore could provide input as part of this role and reduce the time required from the remaining management team members.

Participants were emailed invitations to attend face-to-face meetings ($n = 4$). These meetings lasted between 45 to 180 minutes (mean = 94 minutes) in recorded duration. The consultation process was iterative; the PhD Scholar presented a draft framework for discussion and feedback, took notes on agreed changes, made agreed changes and scheduled a follow-up meeting. The participatory process of developing the CLDs had already established consensus on important factors to include in the framework. Therefore, points addressed in these meetings included how to structure the framework, checking the framework comprehensively conveyed all aspects of SiREN (e.g., aims, activities, intended effects) and ensuring domains adequately addressed the evaluation questions. In addition, the appropriateness of indicators was reviewed. When reviewing indicators, preference was given to those aligned to SiREN's aims and activities, demonstrated in previous analyses of SiREN activities that were readily available from existing data sources and that SiREN had the capacity to monitor. When differences of opinion arose, findings from the CLDs and the experiences of the management team were used to reach agreement between the PhD Scholar and all management team members present. Inviting a non-management team member of the supervision team (BM) to negotiate this process was an option; however, this was not required.

At the conclusion of the final meeting, it was decided that the future feedback and reviews could be completed via email. A draft of the evaluation framework was emailed to all three participants. One participant provided written feedback on this draft. Following this, the group agreed that the framework was ready to be validated with the remaining members of the management team.

Input three: Consensus-building process with management team members

A consensus-building process adapted from the Delphi survey method (hereafter, Delphi) was used to ascertain the importance of each framework indicator in the monitoring and evaluation of SiREN. Delphi is used to convert opinion into group consensus (Hasson et al., 2000). The first round of a traditional Delphi is usually an open-ended survey to collect information on the topic; this is then followed by closed-ended surveys until consensus on the topic is reached (Hsu & Sandford, 2007). In this study, survey rounds consisting of primarily closed-ended questions were used, followed by a face-to-face meeting to establish consensus. This method was selected as a systematic method of prioritising which indicators were most important to use in a resource-limited environment. Previous evaluation framework development studies have also successfully used modified Delphi processes with evaluation end-users (Lin, 2015; Mitchell et al., 2009; Sapag et al., 2015).

The PhD Scholar invited the entire management team ($n = 5$) via email to participate in a consensus-building process. Reminder emails to complete the consensus-building surveys were sent at six weeks. Recruitment and reminder emails are provided in [Appendix Q](#). One management team member did not participate due to demands from other work commitments. Participants ($n = 5$) were emailed the framework and a link to a questionnaire ([Appendix R](#)) using Qualtrics survey software (Qualtrics, 2019). The questionnaire asked participants to determine if the framework indicators were 'essential' or 'desirable' in demonstrating the corresponding domain was met. 'Essential' meant it is very important in demonstrating the domain has been met. Essential indicators were intended to be included in a minimum set of indicators that could form the basis of the monitoring and evaluation of SiREN. Developing a minimum set of indicators would enable evaluation to focus on priority areas when resources were limited. 'Desirable' meant somewhat important but not essential to establish the domain has been met. Participants were also asked to provide

feedback on any indicators that required modification. The consensus level was determined by a majority vote (75%), which is similar to other studies (Lin, 2015; Mitchell et al., 2009; Von Der Gracht, 2012). A second survey round occurred where a revised list of indicators that had not reached consensus was emailed to participants who used the same voting methods as before. Following this, a face-to-face meeting was held to discuss any indicators that had not reached consensus, review indicators requiring modification and to reflect on the framework development processes. This meeting ran for 85 recorded minutes. The meeting was audio recorded and key points transcribed (e.g., changes to framework). Responses were analysed by calculating percentage and frequency or agreement using Microsoft Excel (Version 2105).

Component five: Development of two questionnaires

Two questionnaires were developed to assess the processes, impacts and outcomes of the RECB support provided by SiREN. The development of the questionnaires involved collecting data from the CLDs, the literature and consultation and pilot testing with SiREN stakeholders, as described next and in [Publication 5](#) and [Chapter 7](#).

CLDs

The systems-based insights that were gained from the development of the CLDs (n=2) related to the engagement with SiREN and impacts and outcomes achieved were incorporated into the design of the questionnaire. For example, the questionnaire needed to be flexible to capture unintended impacts of SiREN. In addition, the process, impact and outcome related variables identified in the two CLDs were used as the basis for identifying constructs the questionnaires should assess.

Literature review

A literature review identified existing tools that could be adapted for use within the questionnaires. Three health related databases were searched (ProQuest, PsycINFO, and CINAHL) using terms related to RECB, evaluation, questionnaires and partnerships (described in [Publication 5](#)). From this, 3498 articles were identified. In addition, an evaluation knowledge platform was searched (Better Evaluation, 2020). Twelve relevant tools were identified from this process.

Consultation

Three groups were consulted to inform the development of the questionnaires. One meeting was undertaken with the steering group ($n = 8$, plus two SiREN staff), meetings ($n = 3$) with individual members of the management team, and meetings ($n = 5$) with members of the supervisory team ($n = 3$). These meetings ran for an estimated 45 to 90 minutes and written notes were taken. The feedback sought from each of these groups is detailed below.

- Steering group: First step in determining proposed tool format (e.g., face-to-face discussion, online survey), timing and general content considerations (e.g., focus on process or outcomes).
- Supervisory team: Method used, inclusion and exclusion of questions, the timing of implementation, sequencing of questions, face validity of selected questions and clarity of the questionnaire instructions and questions.
- Management team members: Inclusion and exclusion of questions, the timing of implementation, sequencing of questions, face validity of selected questions and clarity of the questionnaire instructions and questions.

Pilot Testing

To assess content validity, individuals who had engaged with SiREN in the last 12 months were purposefully selected to pilot test the questionnaires. Using experts to assess content validity and adapting the questionnaire accordingly is recommended practice (Haynes et al., 1995). Invitations to participate were delivered to participants by email ([Appendix S](#)), which contained a link to review the questionnaires and a link to the pilot testing survey ([Appendix T](#)) in Qualtrics Survey Software (Qualtrics, 2019). Surveys were completed individually. Data collection was confidential but not anonymous, so the PhD Scholar could contact participants to clarify responses. All eligible individuals ($n = 18$) were invited to participate, and 16 responses were received representing 89% of the available sample. Changes were made to the questionnaires based on consolidated feedback.

3.2.7. Analysis of causal loop diagram data

This section describes the data analysis for the development of the CLDs. Data analysis for the development of the evaluation framework and questionnaires are described in Chapter [6](#) and [7](#), respectively.

Transcription

All interviews and workshops were audio recorded. The PhD Scholar took handwritten notes for all meetings. An independent professional web-based transcription service was used to transcribe all interviews and one of the workshop recordings verbatim. The remaining two workshops were not transcribed verbatim as multiple speakers and discussions made verbatim transcription difficult. For these two workshops, the audio recordings were listened to while checking notes for accuracy. All transcripts were checked for accuracy by the PhD Scholar, which consisted of reviewing and editing the transcript while listening to the audio recording. This process facilitates PhD Scholar familiarisation with the data (Braun & Clarke, 2006) and supported preparing for coding by providing the PhD Scholar with an opportunity to reflect on what was discussed (Liamputtong, 2013). Transcripts were not offered to participants for validation (member checking) as this opportunity was provided through the CLD workshops.

Coding

Data collection and analysis co-occurred. Consistent with grounded theory principles (Corbin & Strauss, 2008), simultaneous data collection and analysis supported the analysis of existing data and identified opportunities to collect richer data until theoretical saturation (when 17 in-depth interviews were complete) was reached. At this point, the range of variables and relationships that made up the CLDs was fully represented by the data. According to Morse (1995) this is when the study findings make sense and are devoid of gaps. Identifying information was removed from interview and workshop transcripts and notes and imported into NVivo qualitative data management software (QSR International, 2018). Organisational documents were also imported. The analysis of organisational documents followed the analysis processes of all data described below.

Data were coded using the grounded theory-informed approach recommended by Kim and Andersen (2012). A manifest qualitative content analysis approach was used. Using this approach, the PhD Scholar stays close to the data, describing what is presented, thus reflecting participant perspectives (Bengtsson, 2016). Analysis was iterative. It involved reviewing the data and coded data using descriptive labels. Initially, over 190 descriptive codes were developed (e.g., *research experience*). These were then refined and grouped (e.g., *research evaluation and evidence-informed capacity*) into categories until no new variables emerged and several dominant categories were identified. Following this, axial coding occurred. This process involved reassembling the data to identify causal relationships between variables (Kim & Andersen, 2012). For example, the variable *'shared vision'* had a positive relationship with the variable *'cooperation between management team members'*.

The CLDs were developed using Vensim (Ventana Systems Inc., 2015). During the coding process and diagram development process, a table was developed in Microsoft Excel (Version 2105) that included variables, relationships and supporting data (see. Table 7). The table was modified from Kim and Andersen (2012), and created an audit trail of transparent and traceable links between data and the CLD, building confidence in the diagram's reliability. The process of creating the table supported the identification of discrepancies or previously unidentified relationships and improved the diagram's accuracy.

Table 7. Coding table example

Variable	Effect variable	Relationship type	Supporting data and source
Trust built	Engagement with SiREN	Positive	<i>(SiREN's) got a nice connection with NGOs (non-government organisations), and I think there's a lot of trust between NGOs and the Government Department of Health with the SiREN. And I think that helps facilitate it (engagement) as well.</i> Source: Interview (P14).

In addition to the coding table described above, a Microsoft Word document was maintained that contained a detailed description of each variable. These descriptions were written and refined in discussion with the supervisory team (Figure 11).

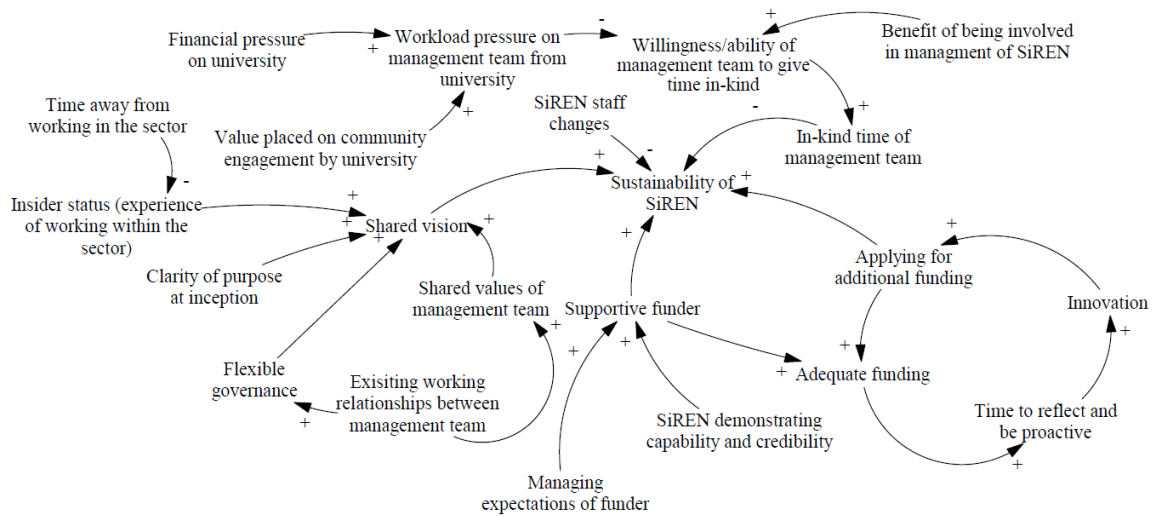
Figure 11. Variable description example

Shared values: Guide the actions of the team. The development of these values predates SiREN. Formed through personal and professional experience, including a shared experience of working in health promotion which has its own values. Shared values are implicit, but without them the cooperative nature of the team would be compromised.

The PhD Scholar undertook all coding. This enabled their immersion in both the data collection and analysis. During data analysis, regular meetings with the supervisory team were held to discuss emerging findings, the PhD Scholar's interpretations of the data, preliminary CLDs, and the definitions of each diagram variable. This process improved the dependability of the findings (Given, 2008). For the data collected to describe the internal functioning of SiREN ([Publication 3, Chapter 4](#)) one of the supervisors (BM) who was not directly involved with SiREN, reviewed the coding table to ensure findings reflected the participants' experiences as closely as possible. Having another researcher review data and analysis can verify that findings accurately reflect the data (Asselin, 2003). During data collection and analysis to develop the CLDs that illustrated engagement and impacts and outcomes of SiREN ([Publication 3, Chapter 4](#)), the same supervisor was present at meetings discussing emergent findings. This process can enhance objectivity (Krefting, 1991). At two time points during data analysis, the PhD Scholar held confidential meetings with this supervisor alone to discuss findings that may have been identifiable to other supervisory team members. This enabled the researcher to maintain participant confidentiality.

As the diagrams were developed through a parallel data collection and analysis process, described above, they grew in complexity. Figure 12 shows the first draft of the CLD that was developed to illustrate factors that affect the operation of SiREN. The final diagram, presented in [Chapter 4](#), has substantially more variables and relationships, showing how an iterative process of refining the diagram with stakeholders added detail to the diagrams.

Figure 12. An early version of the causal loop diagram illustrating factors that affect the operation of SiREN



Data analysis deviation from protocol

The study protocol explained that data would be analysed using a complex adaptive systems lens to develop a CLD. This lens was selected as the SHBBV system in which SiREN operates can be considered a complex adaptive system. It has many actors (e.g., individuals, organisations), who are constantly interacting, learning and evolving in response to changes within the system (e.g., changes in STI and BBV epidemiology) (BeLue et al., 2012; Rwashana et al., 2014). In the early stages of data analysis, a complex adaptive lens was applied. However, it was changed to a method specifically for developing CLDs (Kim & Andersen, 2012). Both approaches have merits (Grack Nelson et al., 2018; Owen et al., 2018; Varghese et al., 2014). When applying a complex adaptive system lens to analysing data the main focus is on how the program affects the emergent behaviour of the system (Varghese et al., 2014). Whereas the approach by Kim and Andersen (2012) focuses on identifying variables and the causal relationships between them, thus enabling analysis to feed directly into the development of the CLDs. Furthermore, the approach by Kim and Andersen (2012) supported attainment of the research aims to examine the functioning and processes of SiREN by focusing the analysis on causal relationships. Therefore, this approach was determined to provide the most valuable insight into SiREN.

3.2.8. Reflexivity

Reflexivity requires a researcher to consider their role carefully and how their identity (e.g., class, occupation, gender) influences the research process (Couture et al., 2012). Therefore, I reflect on my sociodemographic characteristics, experiences, and perspectives concerning this study in the following section.

I am an Australian-born, cis-gendered, heterosexual, married woman. I am aged in my late 30s, healthy, with two young children. I am educated with a Bachelor of Science (Health Promotion) (Nutrition) (Honours). I recognise my privilege in relation to my sociodemographic characteristics. This privilege has provided me with the financial resources, familial support and education level to pursue this research. I have had experience working as a health promotion officer in two non-government health organisations outside of the SHBBV system. Within academia, I have worked in a range of roles, including as a knowledge translation coordinator, research and evaluation officer and sessional academic.

Prior to commencing my PhD, I was employed by SiREN as a project officer for six months. For this role, I was co-located within one of SiREN's partner organisations to support evaluation capacity building. I then left to have my first child. In 2016, I returned to undertake my PhD examining SiREN. My desire to undertake doctoral studies was motivated by my earlier work with SiREN supporting organisational capacity building. This experience sparked an interest in building my skills as an evaluator. It made me realise I had more to learn about research and evaluation before I would have the skills to excel. In addition, since I commenced my undergraduate degree, I have seen significant funding cuts to health promotion and public health. Therefore, I am driven by a need to support the generation of research and evaluation evidence to demonstrate the value of evidence-informed public health practice and policy development to funding bodies.

During the period I was undertaking my doctoral studies, I took an extended period of time away from the research when I had my second child. I also held several casual and part-time positions with SiREN and Curtin. These included undertaking research projects, tutoring and

managing knowledge translation-related activities. Recently, it has involved working within another one of SiREN's partner organisations to support research and evaluation capacity. None of these activities involved direct contact (e.g., meetings, emails) with SiREN stakeholders before or during data collection and analysis. Therefore, I maintained a degree of distance between myself and SiREN with a large proportion of study participants. However, it did mean that my Doctoral studies took longer than anticipated as family and work responsibilities took priority. SiREN, the SHBBV system and I continued to grow and change during this time. While this was at times frustrating, towards the end of my studies, I began to see this as a strength as it gave me the time to develop my knowledge and skills. It also provided me space away from my research where I had time to reflect, leading to moments of clarity and insight that I felt I may not have experienced had been constantly immersed in my research.

As I have experience working across practice and research, I identify as a pracademic. This was a strength in this research as it gave me first-hand experience in both contexts. For example, working within non-government organisations gave me insight into how evaluation and evidence-informed decision-making is undertaken as well as an appreciation for the value of the experiential knowledge held within these organisations. Secondly, working in academia gave me an understanding of the value, and challenges, of co-creating evidence with service providers. These experiences shaped my thinking throughout this research, primarily by giving me a deeper understanding of the motivations and experiences of the participants working in research and practice.

My supervisors have played different roles in my life, before and during my Doctoral studies. These roles included my lecturers while completing my undergraduate degree, my managers working for SiREN and Curtin, and, more broadly, as mentors and friends. I chose to undertake this research with them as I wanted to learn from their extensive qualitative research and evaluation expertise and their understanding of working across the boundaries of research and practice. My experience working with SiREN and my supervisors provided me with a solid understanding of SiREN and the SHBBV system at the commencement of my research. Still, it may have biased me towards viewing the value of SiREN more positively

than an outsider would. This potential bias was mediated through a range of approaches detailed in the following rigour section.

Systems thinking embraces the idea that everything is connected, making a researcher a part of the system they are observing rather than separate from it (Midgley, 2008). This research was reliant on consultation with SiREN stakeholders, management team members and staff. As I had worked as a project officer for SiREN, I was part of the system I was researching. Therefore, I undertook this research from an insider-research positionality (Asselin, 2003). My insider positionality is also explained in the following rigour section.

3.2.9. Rigour

Rigour is concerned with demonstrating the trustworthiness of the qualitative research enquiry (Liamputtong, 2010). Qualitative research is viewed as trustworthy when research processes are undertaken fairly, and the findings closely reflect the participants' perspectives and experiences (Clayton & Thorne, 2000). This research drew on a variety of actions to enhance rigour and establish trustworthiness. Rigour considerations for specific components of the study are also described in the relevant chapters ([4](#), [5](#), [6](#), [7](#)).

Rigour considerations for insider research

The study supervisors and PhD Scholar all had experience working with individuals and organisations within the SHBBV system. Three supervisors and the PhD Scholar had experience working with SiREN. Because of the experience of working with SiREN, this research can be considered insider research (Durand Thomas et al., 2000). A fourth member of the supervisory team (BM) was not involved with SiREN and therefore provided an outsider perspective. The supervisory team is described in [Section 3.2.1](#). Having a mixture of insiders and outsiders on the supervisory team broadens the available perspectives and interpretations (Durand Thomas et al., 2000). Researchers contend that categorising a researcher as an insider or outsider oversimplifies the complexities of their relationships with participants (Couture et al., 2012; Hayfield & Huxley, 2015). Despite this debate, using strategies that address concerns with insider research supported the rigour of this study (described below).

There were different points within this research where the supervisory teams' insiderness was a strength and others where it needed to be carefully managed. The management team (which included three members of the supervisory team) were the primary intended users of the evaluation framework and questionnaires. Actively involving intended users in evaluation design draws on their collective expertise and understanding, enhances the relevance and meaningfulness of the evaluation to end-users, and lays the foundation for its ongoing use (Ayers, 1987; MacLellan-Wright et al., 2007; Patton, 2012). Therefore, it was a strength to involve the management team as active participants during points of the study that required their input into the design of evaluation tools (e.g., developing the evaluation framework and questionnaires) (Bryson et al., 2011).

Kanuha (2000) explained that insider researchers might feel pressure from expectations that their research will produce findings that have value for the group. The PhD Scholar and supervisory team were aware that the study findings could be used to demonstrate the value of SiREN to stakeholders and funders. The PhD Scholar and supervisors discussed this at the commencement of the study and at various stages throughout the research process. Establishing a clear purpose of the research assisted in addressing this concern. The study was not intended to be used by SiREN to demonstrate its value to funders or other stakeholders. The purpose of this research was to examine SiREN and contribute to the evidence base on what RECB partnerships like SiREN can achieve and develop tools to support its ongoing evaluation. One component of the research where the perspectives of the management team needed to be carefully managed was developing the CLDs presented in [Publication 4](#). These diagrams explain factors that affect engagement with SiREN and the subsequent impacts and outcomes. The development of these diagrams was informed by data collected from SiREN service users and partners, not by the perspectives of the supervisory team. However, the supervisory team was involved in discussions relating to the processes used to collect and analyse data. During these discussions, the supervisory team were aware their role was only to interrogate the findings, not to share their perspectives of how SiREN had contributed to change. In addition, as described in [Section 3.2.6](#), the management teams' role in the CLD workshop was primarily to interrogate the diagram, not to provide their perspective on how, or in what ways SiREN contributed to change. Finally,

analysing data using a manifest qualitative content approach ensured SiREN partners and service user perspectives were reflected in the study findings.

The PhD Scholar's insider status was particularly notable when conducting interviews with SiREN service users, partners and staff. During these interactions, the PhD Scholar took care to interact in their role as a researcher, with the objective of exploring SiREN and understanding their experiences. The PhD Scholar described the processes established to ensure anonymity and confidentiality to each participant. As highlighted by Asselin (2003), familiarity between researcher and participants can support rapport and trust building. It also facilitated knowing how to approach participants and create a flow for the interaction. For example, prior to undertaking interviews, the PhD Scholar would familiarise themselves with the participant's experiences engaging with SiREN and use this information to develop probing questions.

Insider researchers have a better initial understanding of the study context, including the connections between events occurring, when compared to an outsider (Mercer, 2007). In contrast, as described by previous researchers (Hayfield & Huxley, 2015 ; LaSala, 2003), insider status can challenge a researcher's objectivity by assuming a shared understanding or ignoring data that appears ordinary to an insider. To address concerns with objectivity, the PhD Scholar employed two main strategies. First, during data collection, participants were asked to explain situations where knowledge was assumed (e.g., times the participant had engaged with SiREN). Second, during data analysis, the PhD Scholar was mindful not to dismiss data that seemed obvious as an insider.

Insider research may lead to participants feeling that they need to '*confirm or conform*' to the PhD Scholar's own opinions (Heslop et al., 2018). In relation to the present study, some individuals may be interested in seeing funding support for SiREN continue as SiREN provides them with access to research and evaluation support at no or low cost. Therefore, they may have wanted to provide positive feedback. This was mitigated by strategies described by various insider researchers including the PhD Scholar clearly explaining the purpose of the research (Asselin, 2003), framing questions neutrally (Heslop et al., 2018), and refraining from expressing their own opinions (Hayfield & Huxley, 2015). Participants

were also encouraged to share negative experiences of SiREN. Participants did share examples of these during data collection, indicating the approaches described had a degree of success.

Field notes

As part of reflexive journaling, field notes were developed after interviews and workshops. As described by Phillippi and Lauderdale (2017), these notes support thick, rich descriptions of context and enabled the PhD Scholar to reflect on and identify sources of bias. These notes focused on the PhD Scholar's personal feelings towards the interview or workshop process and included how interview or workshop facilitation techniques could be improved in future. Field notes also reflected on the PhD Scholar's observations of participant behaviour and context (see Figure 13 for an example fieldnote).

Figure 13. Example fieldnote

Field note from a workshop: *There is a familiarity with how the group converses with each other. They finish each other's sentences and build on ideas, refining and developing them as a group. They add clarity and depth of each other's responses through asking questions and digging deeper. Most of them listen attentively to each other. There is often not a need to finish sentences as others seem to 'know' what they are saying. Found it hard to clarify and probe as the discussion moved so quickly. I will need to listen for missed opportunities when I listen to the recording and follow up in future meetings.*

General rigour considerations

In addition to insider research considerations, several general rigour strategies were used during study design, data collection and analysis and reporting.

Study design

- A publication of a study protocol for transparency.
- A clear rationale justifying the methodological approach was provided in [Section 3.2.3](#).

- An audit trail of research processes and decisions was documented through meeting minutes, ethics reporting, reflective journal and field notes. Audit trails enhance confirmability of research findings (Given, 2008).
- The PhD Scholar engaged with the relevant literature and attended regular SiREN team meetings throughout all stages of the research process. The literature highlights this as important to increase understanding of the research topic and current issues (Liamputtong, 2013).
- The PhD Scholar had prolonged engagement with the research topic which Korstjens and Moser (2018) suggested can enhance the credibility of research. This prolonged engagement included previous experience working with SiREN and the SHBBV system, extensive examination of the literature and long periods of time spent engaging in data collection and analysis.

Data collection

- Participants were sought from a range of backgrounds, including surveys with those who had never engaged with SiREN, and interviews with those who had minimal engagement to frequent engagement with SiREN. In addition, multiple data collection methods were used (e.g., surveys, in-depth interviews). Using multiple data collection methods and sources (triangulation) increases the credibility of research (Korstjens & Moser, 2018).
- All interviews, meetings and workshops were audio recorded. Interviews and one workshop were transcribed verbatim and checked for accuracy. This can assist with making sense of the data (Liamputtong, 2013). Notes were taken during the remaining two workshops and meetings and transcribed while checking using the audio recordings.
- Data collection ceased when theoretical saturation was achieved, as described in the data collection and coding sections above.
- Field notes were written after interviews and workshops. The literature suggests that these can support detailed descriptions of context and enable researchers to reflect on and identify bias (Ortlipp, 2008; Phillippi & Lauderdale, 2017). This was particularly useful during early interviews as the PhD Scholar had limited experience

with in-depth interviewing. At times the PhD Scholar prompted participants with potentially biasing information. For example, during an interview a participant was discussing their relationship with different universities. Instead of framing the question neutrally, the PhD Scholar asked, “*and you have good relationship with them (the university)?*” The related data were excluded from the analysis. Using field notes supported the PhD Scholar to become more cognisant of appropriate framing of questions and improve their interview skills.

Data analysis

- Regular discussions with the supervisory team occurred during data analysis. These discussions addressed the meaning of diagram variables, nature of relationships between variables and the PhD Scholar’s interpretations. These processes can increase the dependability of the findings (Given, 2008).
- During the coding process to develop the CLDs tables were developed that the literature suggest can create transparent and traceable links between data and the diagrams, building confidence in the diagram’s reliability (Kim & Andersen, 2012). The PhD Scholar found that developing the table facilitated the identification of inconsistencies or previously unidentified relationships, thus improving the diagrams’ accuracy.
- Use of iterative and participatory diagram building processes improved the validity of the diagrams (Fredericks et al., 2008).
- Participants were provided with an opportunity to validate the final CLDs in a workshop, a form of member checking, highlighted as an important consideration in the literature (Breen, 2007; Kornbluh, 2015).

Reporting of findings

- The Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist (Tong et al., 2007) was used to guide reporting.
- The researchers experiences and perspectives in the interpretation and presentation of the findings (Given, 2008). Therefore, the PhD Scholar acknowledged their experiences and perspectives when reporting on study findings.

- As recommended by Liamputtong (2010), verbatim quotes were used to convey meaning in the words of participants rather than the PhD Scholar's.
- As highlighted by Lincoln and Guba (1985), publishing the research papers in scholarly journals provided the opportunity for external peer review of the process and outcomes.

3.2.10. Ethical considerations

Ethical considerations relevant to different aspects of this research are discussed within the respective publications. Information sheets and the consent form are provided in [Appendix U](#).

Ethical approval

This study obtained ethical approval from the Curtin University Human Research Ethics Committee, approval number: HRE2017-0090 ([Appendix V](#)). All of Curtin's ethical and safety requirements, which align with those outlined in the Australian Code for Responsible Conduct of Research (National Health and Medical Research Council, 2018), were adhered to.

Data management and retention

Data were stored following a data management plan. Research data and primary materials were stored securely on the university research server, accessible only by those directly involved in the study. All research data, analysis and results will be retained for a minimum of 7 years after the date of publication, as per Curtin University's minimum data retention requirements (Curtin University, 2021b).

Ethical considerations

Ethical considerations for the study were outlined in Publications [2](#), [3](#), [4](#) and [5](#). These are further described here:

- The protocol was designed with input from supervisors, two of whom were on the management team (RL and JH). This supported a participatory process and the development of procedures to respond to any issues.

- Additional reassurances of confidentiality were required during recruitment and data collection as many participants were SiREN service users, partners or staff. This aligns with recommended practice when undertaking insider research (Asselin, 2003).
- Where possible, anonymous or individual data collection methods were employed to create a safe space to share experiences. For example, when developing the CLDs, interviews with staff were chosen as a first step in collecting data prior to a group workshop.
- Participants were free to withdraw from the study at any point, and confidentiality was maintained by de-identifying participant data before storing, sharing or publishing.

3.3. Summary

This chapter provided a description of the research methods for the thesis. At the start of the chapter, the research protocol was presented. Following this, an expanded overview of the protocol including theoretical perspective, participants, data collection methods (e.g., interviews, workshops), analysis and development of the CLDs, reflexivity, rigour and ethical considerations were presented. The methods used to develop the evaluation framework and questionnaires are provided in the relevant Chapters, [6](#) and [7](#), respectively.

A systems approach was utilised as it reflected the complexity of SiREN and the SHBBV system. It was selected to support examination of the context in which SiREN operates and to develop an understanding of how system factors and SiREN's actions interacted to bring about change (Chen, 2016; Hawe, Shiell, et al., 2009). In addition, a systems approach was used to identify indicators for the monitoring and evaluation framework (Brown et al., 2018). The following chapter presents the second component of this study that examined critical factors that affected the operation of SiREN through the development of a CLD ([Chapter 4](#)).

4. Critical factors affecting the functioning of SiREN

In this chapter, findings are presented from a study that developed a CLD to understand the factors that influence the internal functioning of SIREN. These are presented in the form of the following peer-reviewed publication.

Tobin, R., Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2022). Critical factors that affect the functioning of a research and evaluation capacity building partnership: A causal loop diagram. *PLoS ONE*, 17(1), Article e0262125.

<https://doi:10.1371/journal.pone.0262125> (Impact factor: 3.04)

This chapter relates to the following objective:

2. Explore the application of systems approaches to examine the functioning, impacts and outcomes of SiREN.

4.1. Publication 3: Factors affecting the functioning of SiREN

Publication 3: Critical factors that affect the functioning of a research and evaluation capacity building partnership: A causal loop diagram.

PLOS ONE

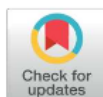
RESEARCH ARTICLE

Critical factors that affect the functioning of a research and evaluation capacity building partnership: A causal loop diagram

Rochelle Tobin^{1*}, Gemma Crawford¹, Jonathan Hallett¹, Bruce Richard Maycock², Roanna Lobo¹

1 Collaboration for Evidence, Research and Impact in Public Health, School of Population Health, Curtin University, Perth, Western Australia, Australia, **2** European Centre for Environment and Human Health, College of Medicine and Health, University of Exeter, Devon, South West England, United Kingdom

* Rochelle.tobin@curtin.edu.au



Abstract

Introduction

Public health policy and practice is strengthened by the application of quality evidence to decision making. However, there is limited understanding of how initiatives that support the generation and use of evidence in public health are operationalised. This study examines factors that support the internal functioning of a partnership, the Western Australian Sexual Health and Blood-borne Virus Applied Research and Evaluation Network (SiREN). SiREN aims to build research and evaluation capacity and increase evidence-informed decision making in a public health context.

Methods

This study was informed by systems concepts. It developed a causal loop diagram, a type of qualitative system model that illustrated the factors that influence the internal operation of SiREN. The causal loop diagram was developed through an iterative and participatory process with SiREN staff and management (n = 9) via in-depth semi-structured interviews (n = 4), workshops (n = 2), and meetings (n = 6).

Results

Findings identified critical factors that affected the functioning of SiREN. Central to SiREN's ability to meet its aims was its capacity to adapt within a dynamic system. Adaptation was facilitated by the flow of knowledge between SiREN and system stakeholders and the expertise of the team. SiREN demonstrated credibility and capability, supporting development of new, and strengthening existing, partnerships. This improved SiREN's ability to be awarded new funding and enhanced its sustainability and growth. SiREN actively balanced divergent stakeholder interests to increase sustainability.

Conclusion

The collaborative development of the diagram facilitated a shared understanding of SiREN. Adaptability was central to SiREN achieving its aims. Monitoring the ability of public health

OPEN ACCESS

Citation: Tobin R, Crawford G, Hallett J, Maycock BR, Lobo R (2022) Critical factors that affect the functioning of a research and evaluation capacity building partnership: A causal loop diagram. *PLoS ONE* 17(1): e0262125. <https://doi.org/10.1371/journal.pone.0262125>

Editor: Gabriel Hoh Teck Ling, Universiti Teknologi Malaysia - Main Campus Skudai: Universiti Teknologi Malaysia, MALAYSIA

Received: July 29, 2021

Accepted: December 18, 2021

Published: January 13, 2022

Copyright: © 2022 Tobin et al. This is an open access article distributed under the terms of the [Creative Commons Attribution License](https://creativecommons.org/licenses/by/4.0/), which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Data Availability Statement: All relevant data are within the manuscript and its [Supporting Information](#) files.

Funding: This study was undertaken as part of RT doctoral studies. To undertake their doctoral studies RT was supported by (1) an Australian Government Research Training Program Scholarship research.curtin.edu.au, (2) a completion scholarship from the Graduate Research School at Curtin University <https://www.curtin.edu.au>.

research.curtin.edu.au, and (3) A scholarship from the Sexual Health and Blood-borne Virus Applied Research and Evaluation Network <https://www.siren.org.au> which is supported by the Sexual Health and Blood-Borne Virus Program, Government of Western Australia Department of Health https://ww2.health.wa.gov.au/Articles/S_T/Sexual-health-and-blood-borneviruses-workforce-development. There are no grant numbers associated with this funding.

Competing interests: I have read the journal's policy and the authors of this manuscript have the following competing interests: This manuscript presents a study that analysed a capacity building project (the Sexual Health and Blood-borne Virus Research and Evaluation Network (SiREN)). RT has previously been employed by SiREN. RL is the manager of SiREN. GC and JH are on SiREN's management team. A scholarship from the SiREN project which is supported by the Sexual Health and Blood-borne Virus Program, Government of Western Australia, Department of Health was paid to the PhD student (RT). There are no grant numbers associated with this funding. These interests are declared within the article and their implications are discussed. This does not alter our adherence to PLOS ONE policies on sharing data and materials.

programs to adapt to the needs of the systems in which they work is important to evaluate effectiveness. The detailed analysis of the structure of SiREN and how this affects its operation provide practical insights for those interested in establishing a similar project.

Introduction

Improvement in public health policy and practice is supported by the capacity to generate and apply evidence to decision-making [1–4]. Consequently, initiatives to increase evidence-informed decision-making should consider the intersecting roles of knowledge translation and research and evaluation capacity building. Knowledge translation focuses on the creation of relevant and useful evidence and facilitating its exchange and application [4]. Research and evaluation capacity is concerned with strengthening research and evaluation abilities and using findings to inform decision-making [5–7]. This study examines the mechanisms underpinning the function of unique partnership that uses both knowledge translation and capacity building strategies to increase evidence-informed decision making within a public health context.

A substantial body of literature explores different knowledge translation and research and evaluation capacity-building strategies. These include tailored support, training, resources and tools (e.g. knowledge platforms), leadership support, partnerships, and increasing access to funding [2, 8–11]. Of these strategies, partnerships that increase the proximity of researchers and knowledge users support the generation and application of practical evidence to decision making [2, 12–14]. These partnerships enable researchers and knowledge users to build relationships based on reciprocity, trust, and respect, facilitating mutual learning [14]. There is growing interest in partnership-based and multi-strategic approaches that work across individual, organisational and system levels [2, 8, 9, 14]. Despite this interest, there is little empirical evidence of how partnership approaches may be designed and operationalised [2, 8, 11, 13].

The partnership approach examined in this paper is the Western Australian Sexual Health and Blood-borne Virus Applied Research and Evaluation Network (SiREN). SiREN is a public health intervention that works within a system of government, research and non-government organisations that prevent and manage sexual health and blood-borne virus (SHBBV) issues (the system). SiREN uses a multi-strategic, context-specific approach [2, 10, 15]. Impacts achieved previously by SiREN include the development of research and evaluation knowledge, skills, and confidence; increased research and evaluation funding and the establishment of networks [16].

SiREN is an example of a complex intervention. Willis et al. [17] described a complex intervention as one designed to meet the needs of the context in which it operates, incorporating a range of strategies that target different levels of a system, and with strategies that operate independently and interdependently. Given the complexity of SiREN, a systems approach was selected to investigate its functioning. A systems approach draws on a variety of concepts and methods to explore complex phenomena [18]. It defines the boundaries of the system or situation of interest, explores its structure, and identifies how its elements interact to bring about change [19–21]. A recent review highlighted a need for evaluators to test systems methods and share their findings to guide others interested in applying systems approaches to evaluation [19].

A systems approach has not been used to explore a research and evaluation capacity-building project to the authors' knowledge. One approach that has been used to examine the complexities of such projects is a realist approach. This method has been used to explore research

capacity building [2] and knowledge mobilisation [22] projects. A realist approach is well suited to exploring complex programs as it seeks to understand what works and why in different contexts [2]. It is similar to a systems approach in two main ways. Firstly, they are based on the assumption that programs can be viewed as complex events occurring within complex systems [22]. Secondly, they pay attention to context and causal relationships [22]. Studies have concluded that a realist approach provided a nuanced understanding of the processes by which capacity building and knowledge translation projects contributed to change [2, 22]. These findings indicate complexity sensitive methods will generate useful insight into the operation of SiREN.

System modelling was used to understand SiREN, specifically causal loop diagramming. This qualitative method visually depicts a bounded system or situation and how its components interact to generate change [23, 24]. The system variables are named and joined with arrows to illustrate their relationships [25]. The relationships between variables can form feedback loops. These are cyclical processes of change that either amplify an effect (a reinforcing loop leading to increases) or inhibit it (balancing loop leading to stability) [23]. For example, there will be multiple variables that influence the ability of a public health project to achieve its aims. These variables include those that increase effectiveness (e.g. access to additional funding) and those that reduce effectiveness (e.g. poor stakeholder engagement). Furthermore, these variables will interact, making the implementation of SiREN complex [26].

Several studies have used causal loop diagrams to explore the implementation or operation of a program or strategy [26–30]. Fredericks et al. [28] concluded that the development of a causal loop diagram provided insight into factors that affect variability in program implementation, highlighted competing goals within the system and identified critical feedback processes and unintended consequences. Brown et al. [30] described how creating the diagram with stakeholders deepened their understanding of their programs and led to the development of useful indicators for ongoing monitoring and evaluation. Despite its relatively limited application in this context, those who have utilised causal loop diagrams concluded that they gained practical insight into how the organisational dynamics of a project affected its success [26, 27, 29].

Aims

This research aimed to examine the organisational dynamics that influence the functioning of a research and evaluation capacity building partnership (SiREN). This paper describes SiREN, presents and discusses a causal loop diagram that illustrates factors that affect its operation, and provides insight for others interested in building capacity to engage in research, evaluation or evidence-informed practice in a public health context. This research forms part of a larger study that explores the external processes and outcomes of SiREN [31].

Methods

A causal loop diagram was developed to illustrate the factors (e.g. governance, funding, staffing) that influence the internal functioning of SiREN. The causal loop diagram was developed in an interactive process with SiREN staff and management ($n = 9$), including three research team members via in-depth semi-structured interviews ($n = 4$), workshops ($n = 2$), and meetings ($n = 6$). The study was approved by the Curtin University Human Research Ethics Committee (approval number: HRE2017-0090).

SiREN

The concept for SiREN began in 2009, formulated by a group of researchers, policymakers and service providers seeking a way to support the generation of evidence to inform the response

to local SHBBV issues. SiREN was formally funded and established in 2012 to strengthen evidence-informed practice through building research and evaluation capacity and promoting opportunities for collaboration between researchers, policymakers and service providers working to address SHBBV issues. SiREN is led by a management team (described below) and a steering group composed of stakeholders from policy, practice and research settings. Its strategies include: developing partnerships for research and evaluation; co-creating research and evaluation evidence; providing tailored program planning, research and evaluation support; delivering training and resources; and sharing knowledge through a network of over 450 members. A detailed description of SiREN is provided elsewhere [16, 31].

Participants

Participants included SiREN staff and management team members ($n = 9$). SiREN staff were research officers, project officers and project coordinators working on various research, evaluation and knowledge translation related projects. The management team comprised ($n = 5$) University staff, involved in the operational and strategic management of SiREN. Their roles within the University were research, teaching and project management related.

Theoretical framework

This research used a systems approach to investigate factors and interactions that affect the operation of SiREN. Systems approaches explore structures, relationships and patterns [18, 21, 32]. They directly contrast reductionist approaches that break down programs into their component parts and draw direct links between program strategies and effects [32]. Instead, systems thinking acknowledges that understanding a phenomenon requires viewing it holistically, with attention paid to how its parts interact to affect change [32]. Applying systems thinking concepts and methods can create a comprehensive shared understanding of programs that can be used to inform decision-making regarding implementation [33].

In this study, three fundamental tenets of a systems approach were applied to design the inquiry; boundaries, perspectives and relationships. Establishing boundaries sets the scope for what is to be explored, enabling clear lines to be drawn between what is pertinent and what is not [18, 34]. Boundaries are defined variously, including through organisational, geographical, or social means [35]. For analysis, SiREN is the bounded situation, factors outside of SiREN's control were not included. Taking a narrower focus supported a deeper exploration of SiREN and provided greater insight into how a model like SiREN may be implemented in another context [27]. The concept of perspectives acknowledges that each system stakeholder may hold a different view of reality. Modelling approaches that combine different perspectives can encourage shared learning and develop a more comprehensive view of the situation [18, 36]. Given the focus on the internal operation of SiREN, perspectives were sought from those working within SiREN. The concept of relationships demonstrate how variables within the situation of interest interact and influence each other to achieve an aim [35]. Because of this, relationships can be more important than the variables themselves in understanding the behaviour of the system [32]. In this study, relationships were elucidated through the development of a causal loop diagram.

Research team and reflexivity

During the time this study was undertaken four of the authors (RT, RL, JH and GC) had worked with SiREN. RL was the SiREN manager and RL, JH and GC were members of the SiREN management team. RT had previously worked with SiREN as a project officer. BM has not previously worked for SiREN. BM is a senior and experienced public health academic with

many decades of experience in research and practice. All research team members had experience working with SHBBV health issues, public health, qualitative research, and evaluation. Several members had experience in public health practice and policy. Two members had previously worked for a non-government organisation within the system.

As most of the research team (RT, RL, GC, JH) were past or present SiREN staff or management team members we considered this study to be insider research. Insider research has its unique strengths and challenges [37, 38]. The strengths associated with being an insider included a strong understanding of the subject matter and existing relationships between researchers and participants that can support data collection and analysis [38]. This was evident in interviews where the familiarity between researcher and participants supported the development of a safe space to share information. It was also apparent in workshops where the rapport between participants enabled them to easily build on each other's ideas and question opinions non-confrontationally. A challenge of insider research is a loss of objectivity, assuming shared understanding or overlooking data that appear commonplace to an insider [39–41]. To overcome this, during data collection participants were asked to explain situations where knowledge was assumed and during data analysis RT was mindful not to dismiss data that seemed obvious as an insider. BM, who was not directly involved with SiREN, reviewed the data and results to increase trustworthiness and consistency with analysis [37]. Participants were given an opportunity to validate the final causal loop diagram in a workshop and field notes were developed after interviews and workshops, which supported rich descriptions of context and enabled the researcher to reflect on and identify bias [42].

The development of the causal loop diagram

This study used a three-stage process to develop and validate a causal loop diagram, described in the following section. This process included collecting data, developing a draft diagram, and validating the diagram with study participants. Data analysis processes were informed by those generated by Kim and Anderson [43] and the diagram was verified with stakeholders using similar processes articulated in comparable studies [28, 44, 45]. The Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist was used to guide reporting [46].

Step one: Data collection to inform the development of the causal loop diagram. Data were collected through a workshop with the Project management team and interviews with SiREN staff to inform the initial causal loop diagram development. RT undertook all data collection and analysis.

Management team workshop. A workshop was held with the management team ($n = 5$). The aims of the workshop were to determine: what factors affect the functioning of SiREN; how and why SiREN has changed since it was established; and where SiREN needs to go in the future. A workshop was considered the most appropriate data collection method as it would enable the collective development of opinions and ideas [47]. In the workshop, the facilitator (RT) posed questions to the group that directly reflected the workshop aims. Participants discussed their responses as a group, questioning and building on points raised by other participants. The workshop ran for 50 minutes and was audio-recorded and transcribed verbatim by a transcription service and checked by RT.

Staff interviews. SiREN staff members ($n = 4$) who had been employed in the previous 12 months were contacted via email and invited to participate in semi-structured, qualitative interviews. All staff agreed to participate. Participants held an undergraduate degree or higher and worked with SiREN between one and eight years. Their roles within SiREN included senior research officer, project officer, project coordinator, and project administrator. Three were current staff members; one had ceased employment six months previously.

Interviews were selected as the most appropriate data collection method to address possible power dynamics between staff and management team members that may have arisen in a group environment. It was anticipated that staff would feel more comfortable sharing information individually rather than in group conversation. Using interviews provided a confidential environment for staff to share their experiences and views and have them incorporated into the diagram before it was presented to the group. As the research team is involved with SiREN's management, RT provided assurances to participants that participation or declining participation would not affect their employment or relationships with SiREN. RT also described how data would be managed to ensure that staff were aware that the management team would not have access to identifiable data [37]. The authors note that given the team's small size, it may be possible for participants to identify each other's input. To reduce this likelihood, no quotes were shared that contained information that may reveal the participant's identity.

Interviews were undertaken using Microsoft Teams video conferencing software [48] due to social distancing measures taken during the COVID-19 pandemic. As the researcher knew the participants from previously working together, rapport was easy to establish online. The interviews explored the same areas as the workshop with the management team, with additional questions relating to the staff members' role within SiREN. The research team developed the interview schedule (see S1). Interviews ranged in duration from 30 to 80 minutes and were audio recorded.

Step two: The development of the causal loop diagram. To develop the causal loop diagram, the workshop and interviews were transcribed verbatim by a transcription service and the transcripts were checked by a researcher (RT) for accuracy. Transcripts were not returned to workshop or interview participants for comment or correction as they were given an opportunity to validate the findings in a subsequent workshop to refine the causal loop diagram. Transcripts from the workshop and interviews and field notes were entered into QSR NVivo 11 data management software [49]. Using the grounded theory-informed approach recommended by Kim and Anderson [43], data were open coded to identify variables that affected the operation of SiREN. Data were analysed using manifest qualitative content analysis, thus staying close to what participants actually said [50]. The process of coding was iterative and involved reviewing the data and refining and grouping codes into categories until no new variables emerged and several dominant categories were identified. This resulted in further refining and narrowing the boundaries of the enquiry. Initial data analysis explored external and internal factors that affect the operation of SiREN, the history and future directions of SiREN, and its perceived value. As described in the literature [51], attempting to include all of these aspects of SiREN in one diagram would make it too complicated. Therefore, the diagram focused only on internal factors that affected the operation of SiREN. Axial coding identified causal relationships between variables e.g., the variable '*shared vision*' had a positive relationship with the variable '*cooperation between management team members*'. These relationships formed the arrows in the causal loop diagram.

During the coding process a table was developed in Microsoft Excel (Version 2105) that included variables, relationships and supporting data (see Table 1). Adapted from Kim and

Table 1. Coding table example.

Variable	Effect variable	Relationship type	Supporting data and source
Knowledge of the system	Adaptability	Positive	"We have more insight into around what is happening in the sector because of those partnerships and so we are able to respond quicker..." Source: Interviews, P6

<https://doi.org/10.1371/journal.pone.0262125.t001>

Anderson [43], table's purpose was to create an audit trail of transparent and traceable links between data and the diagram, building confidence in the diagram's reliability. Developing the table facilitated the identification of inconsistencies or previously unidentified relationships and improved the diagram's accuracy.

Step three: Validation of the causal loop diagram. Validation involved refining the draft causal loop diagram through a series of consensus-building activities. The research team held three one-hour meetings (RT, RL, GC, JH). At each meeting, RT presented the latest version of the diagram. The group discussed the phrasing and meaning of variables, the nature of the relationships and identified missing variables or relationships. In addition, the research team identified themes: points within the diagram where related variables and relationships converged. These themes were deemed as central to the operation of SiREN. RT then refined the diagram based on this feedback. This process continued until no new variables or relationships emerged.

Combined management team and staff workshop. Once the research team agreed that the diagram sufficiently represented SiREN, RT held a two-hour workshop with SiREN staff and management team members. To facilitate understanding, the diagram was separated into three smaller diagrams. RT allocated participants into small groups, which were rotated to discuss the diagrams. Participants were asked to examine the diagram variables and relationships and describe any missing variables or relationships. Working in smaller groups ensured that each participant had the opportunity to contribute, a process used in a similar study [36]. The group then reconvened to share their insights and review the whole diagram. Separate meetings were held with one management team member who could not attend the workshop and with two research team members (GC, JH). At this point, there was consensus that the diagram was an accurate depiction of SiREN and data collection ceased.

Results

Fig 1 presents the causal loop diagram illustrating factors that influence the functioning of SiREN. To read the diagram, start with a variable of interest and follow its relationships through to other variables. To support readers' understanding of the diagram, variables have been italicised in the narrative description, and the S1 Table in S1 File presents glossary of the diagram variables.

The diagram illustrates four main themes depicted in coloured text: adaptability, capability, credibility, and sustainability and growth. These themes were identified as variables that were fundamental to the success of SiREN and were used to frame the discussion of the results. The meaning of the themes and their relationships to diagram variables are presented in Table 2.

Adaptability

The *adaptability* of SiREN was vital to achieving its aims. Participants described SiREN as dynamic and explained that it has evolved in response to changes in the system in which it is nested. Participants reported that *adaptability* was enhanced by SiREN's *commitment to a flexible approach*. This was demonstrated by the team continually seeking to improve its structure and activities. The team were curious about trying new approaches and working in different areas. With support from its main funder, SiREN maintained a flexible approach, enabling modification of its activities to respond to changes within the system:

"I think that the flexible governance of SiREN... allowed us to do that... rather than being too rigid. We can kind of go, well, we're going to have to try all this and we're going to have to be okay with that, rather than saying, well, it has to be delivered in this particular way."

(P2)

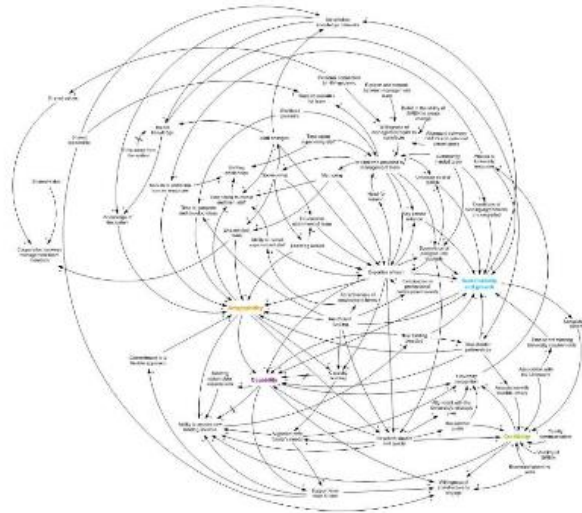


Fig 1. Causal loop diagram illustrating the operation of SiREN.

<https://doi.org/10.1371/journal.pone.0262125.g001>

Stakeholder partnerships and stakeholder knowledge networks enhanced SiREN's *knowledge of the system* by facilitating knowledge exchange. *Knowledge of the system* was gained through formal processes such as project steering group meetings and stakeholder needs assessments and informal processes such as networking events. Participants understood the critical role *knowledge of the system* plays in supporting *adaptability* as it enabled them to see what was required. Participants observed that the free flow of knowledge between stakeholders and SiREN necessitated the presence of trusting relationships. As the system constantly fluctuates, participants had limited capacity to keep abreast of all relevant changes, consequently acknowledging their understanding of the system was incomplete. However, *stakeholder partnerships* boosted *adaptability*, by enabling an informed and rapid response to emerging issues:

"We have more insight into around what is happening in the sector because of those partnerships and so we are able to respond quicker to things even when it is not yet in the epidemiology, but we know that is an issue because we are hearing it from organisations. So, in many ways those connections to these organisations have allowed us to kind of respond quicker to some of their needs."

(P6)

Adaptability improved SiREN's *ability to access new funding sources* as new opportunities were identified. The acquisition of new funding sources, in turn, increased the number and strength of *stakeholder partnerships*, and in turn, the capacity of SiREN to adapt (Fig 2). Temporality was a consideration with the time taken to build these partnerships explained by a participant:

Table 2. Definition and linkages of causal loop diagram themes.

Themes	Definition	Influencing variables ¹ (relationship type +/-)	Effect variables ² (relationship type +/-)
Adaptability	How SiREN learns from the system and adjusts its processes and activities to respond (e.g. changes in epidemiology).	Access to additional human resources (+) Commitment to a flexible approach (+) Expertise of team (+) Insufficient funding (-) Knowledge of the system (+) Learning culture (+) Like-minded team (-) Stakeholder partnerships (+) Time taken to recruit and train staff (+)	Ability to access new funding sources (+) Capability (+) Capacity building (+) Research impact and quality (+) Time to generate and develop ideas (+)
Capability	The extent to which SiREN can undertake its activities and achieve its aims.	Adaptability (+) Capacity building (+) Expertise of the team (+) New funding awarded (+) Research impact and quality (+) Stakeholder partnerships (+) Sustainability and growth (+)	Ability to access new funding sources (+) Meeting stakeholder expectations (+) Support from main funder (+) University recognition (+) Willingness of stakeholders to engage (+)
Credibility	The extent to which SiREN is a trusted and believable source of knowledge.	Association with credible others (+) Association with University (+) Boundary-spanning skills (+) Longevity of SiREN (+) Quality communication (+) Research impact and quality (+) Researcher profile (+) Visibility of SiREN (+)	Ability to access new funding sources (+) University recognition (+) Willingness of stakeholders to engage (+)
Sustainability and growth	The ability of SiREN to acquire and utilise resources to grow and maintain its activities and achieve its aims. Resources include financial, human resources and partnerships.	Access to University resources (+) Conditions of funding agreements are exceeded (-) Expertise of team (+) Insufficient funding (-) Key person reliance (-) New funding awarded (+) Stakeholder partnerships (+) Supervision of postgraduate students (+) Unknown cost of SiREN (-)	Capability (+) Longevity of SiREN (+) Time spent meeting University requirements (-)

¹Variables that affect the theme. Direction of the relationship is from the variable to the theme.

²Variables that the theme affects. Direction of the relationship is from the theme outwards.

<https://doi.org/10.1371/journal.pone.0262125.t002>

“The relationship building took two to four years to be of any value, to really start to be able to apply for grants and to do significant work together.”

(P5)

The *insider knowledge* held by many management team members was highlighted by participants as another critical source of knowledge. This *insider knowledge* came from the management team’s history of working with and within stakeholder organisations. From these experiences, they had relationships to draw on to support the work of SiREN. As pseudo

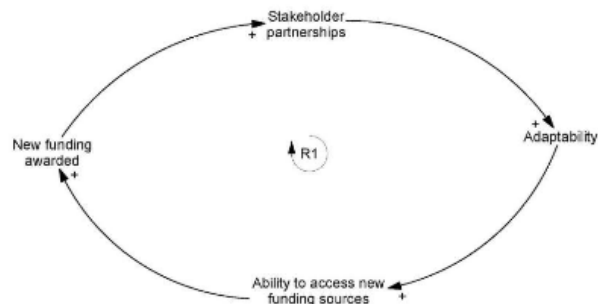


Fig 2. Reinforcing loop one: Adaptability, funding and partnerships.

<https://doi.org/10.1371/journal.pone.0262125.g002>

insiders they also understood how the system worked, who the decision makers were, and appropriate ways to respond to the system's needs. This was reported by a participant:

"I think there's that connection with the sector and also them knowing you makes it (SiREN) work. ... there's more of a reputation."

(P3)

Participants explained how the *insider knowledge* held by the management team supported SiREN as it became established. As University employees, many management team members have now spent several years or more with limited contact with stakeholders, which has reduced their level of *insider knowledge*. SiREN staff now hold some of this knowledge, developing their understanding over several years working with SiREN and its stakeholders. A participant observed that these relationships were essential in the early days of SiREN, but over time it developed its own identity:

"But some of that insider knowledge that we did have. ... a lot of that's evaporated. ... SiREN has picked up the mantle of its own relationship to the NGO (non-government organisation) sector, so it's not reliant on our previous or historic connections. SiREN now has its own reputation."

(P1)

SiREN's *shared leadership* structure (shared between the management team and steering group) supported inclusive decision-making on how it will achieve its aims. Participants noted that sharing leadership increased the *willingness of stakeholders to engage* as they become familiar with SiREN. Historically, *shared leadership* played an essential role in establishing the *shared vision* of what SiREN aimed to achieve as key stakeholders had a say in setting SiREN's aims. The presence of a *shared vision* strengthened the *cooperation between management team members*:

"You have the shared vision around what we're actually trying to achieve. ... everyone's kind of invested in achieving that, then the uniqueness of the personalities come together."

(P1)

The presence of *shared values* increased *cooperation between members of the management team*. Their *shared values* were formed through personal and professional experience predating the inception of SiREN. While the management team's *shared values* were implicit, they recognised their role in guiding decision-making and acknowledged that their cooperative nature would have been compromised without them.

The management team reflected a level of like-mindedness due to similar work experiences and values. However, being a *like-minded team* could reduce *adaptability* by limiting innovation. The team reported that like-mindedness could negatively affect the creation of new ideas and ability to challenge each other's ways of thinking, requirements for innovation:

"...having like-minded people can also be a negative. Those habitual practices, you know, having expectations that are not, kind of, challenged. ... And those things, I think, happen when you have limited resources and limited time, because you just fall back into doing the everyday"

(P3)

The amount of available *time to generate and develop ideas* negatively affected *adaptability*. Participants highlighted the need for adequate time to reflect on past actions and learn from them. They explained that *time to generate and develop ideas* was essential to support innovative responses to changes within the system. Participants highlighted that working with limited resources it was difficult to find this time as they are busy 'doing' instead of 'thinking':

"How can you be innovative if you don't have the resources? ... You know that having the opportunity and the luxury of being able to think and have new ideas is a luxury these days."

(P3)

Participants recognised the value *adaptability* adds to SiREN, but acknowledged its challenges. They reflected that managing SiREN (e.g. staffing, governance) was challenging when the needs of SiREN and system were in a constant state of change (e.g. new project activities, new research projects). At times they felt their willingness to trial new ways of managing and staffing meant that they did not hold to a particular structure to give it a real chance at success:

"However, I think sometimes we are very flexible in the way we govern, and it can be challenging to find the model and hold to it, probably, for enough time to see it if it works."

(P2)

Capability

SiREN demonstrated its *capability* by *meeting stakeholder expectations*, including those of its funders, which enhanced its *ability to access new funding sources*. In turn, greater access to funding sources led to new funding, which enhanced the capability of SiREN, forming a reinforcing loop (Fig 3).

Demonstrating *capability* increased *support from the main funder*. Participants agreed this was a strength, as the funder then linked SiREN to new funding opportunities and promoted it to stakeholders, which increased the *willingness of stakeholders to engage*. Demonstrating capability built trust in SiREN so that when staff identified a new approach, the primary funder supported its trial:

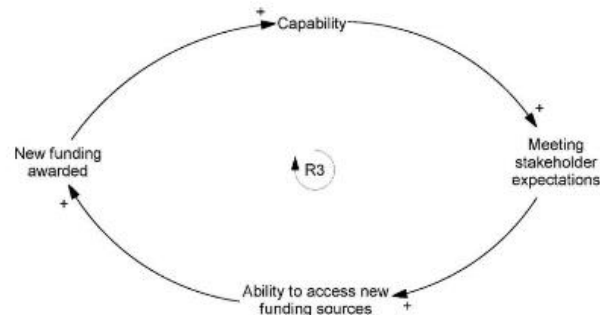


Fig 3. Reinforcing loop two: The relationship between capability and funding.

<https://doi.org/10.1371/journal.pone.0262125.g003>

"But once they (the funder) were happy and could see the growth and the value, then I think we were able to change direction."

(P4)

Credibility

Participants reported SiREN's *credibility* was enhanced by its quality communications (e.g. electronic communications with its member network). In addition to written communication, interpersonal skills (e.g. responsive, approachable) were fundamental in increasing SiREN's credibility. SiREN comprised predominantly research-focused staff. Researchers have been criticised for being disconnected from those working in practice [52]. However, a participant reflected that this was not the case with SiREN. They explained this was particularly evident with the project manager who was a "a skilled broker." The project manager and other team members have used their interpersonal skills to build relationships and support the exchange of knowledge across diverse groups, thus building the credibility of SiREN through their *boundary-spanning skills*.

SiREN regularly hosted and presented at events (e.g. conferences, discussion panels) which increased the *visibility of SiREN* and further increased its *credibility*. This process was depicted by a participant:

"We are constantly at conferences or in conversations. . . We've also had to kind of build up a bit of a reputation. So it's been a process of publications and reports and kind of just starting to kind of lift our profile and be a little bit more visible because previously that never existed. . . And that has been a large volume of work, a number of conversations we've had with consistent messaging across a number of years to be able to have our own spot at the table."

(P6)

SiREN had *associations with credible others*, including high profile researchers, which built credibility by association [53]. This differs from the credibility derived from its *association with a University*, which is attributed to source credibility [54]. A participant described credibility by association:

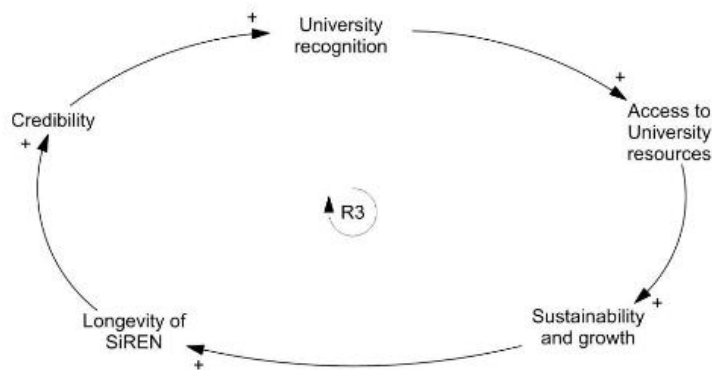


Fig 4. Reinforcing loop three: Credibility and University support.

<https://doi.org/10.1371/journal.pone.0262125.g004>

"I think that the growth of connections with (national research centres) has been really critical. . . they value what we do. . . they come and speak at our symposiums. I think that gives us credibility."

(P4)

Participants also noted that *the longevity of the SiREN increased credibility*. They explained that SiREN has been operating for many years, which built trust in SiREN. Participants observed how the *association with credible others* boosted SiREN's *credibility* and subsequent *ability to access new sources of funding*.

Participants suggested that the ability of SiREN to generate high quality and impactful research was essential to establishing *credibility* and *capability*. Participants acknowledged the imperative for high-quality research, which to them meant co-produced with stakeholders to meet an identified need. At the same time, they explained their research also needs to demonstrate impact through traditional metrics (e.g. citations) to align the work of SiREN with the University's objectives and those of being a university-based academic. Aligning SiREN's aims and activities with the University was considered necessary as it increased *University recognition*, which increased access to *University resources*, such as additional funding to support doctoral students. This had a reinforcing relationship with *sustainability and growth* (Fig 4).

Sustainability and growth

Key to the *sustainability and growth* of SiREN the amount of *new funding awarded* to SiREN and the strength and diversity of its *stakeholder partnerships*. While SiREN's partnerships and funding sources had grown since its inception, it remained constrained by inadequate financial resources. *Insufficient funding* limited the ability of SiREN to build capacity and contribute to the generation and translation of research. At times, participants suggested that limited resources affected the level of expertise within the SiREN team by reducing the *attractiveness of the employment terms offered* and *access to professional development opportunities*. Participants identified *staff changes* as a threat to sustainability, as this increased the *time taken to recruit and train staff* and thus reduced *staffing efficiencies*. The effectiveness of SiREN

depended on the team's understanding of, and relationships with, the system. A participant described what this process was like when they first commenced their role:

"I think that, for me, it was hard because to do the job well, you do need to have time to build up knowledge of the sector, and relationships with the people in the sector. And they're things that... you can't rush them."

(P7)

Situating SiREN within a University had a generally positive impact on *sustainability and growth*. This was because of *access to University resources* such as academic databases, ethical review processes, administrative support, expertise, and *additional human resources* such as postgraduate students to support research projects. Participants noted that being part of the University environment was not without its challenges, mainly related to bureaucracy as significant time was spent on navigating University contracts, administration and ethical processes, which could slow progress.

Participants reported that the most valuable University resource, was the *in-kind time provided by the management team* as this was essential to the sustainability and growth of SiREN. Within this team was a wealth of knowledge on SHBBV, research and evaluation methods, and capacity building approaches that SiREN relied on. The in-kind time that the management team invested in SiREN formed part of their research allocation provided by the University, except for one person who volunteered their time. Therefore, it was generally the University bore the cost of this time. Despite this investment by the University, the time spent on SiREN by the management team consistently exceeded this allocation. The *in-kind time provided by the management team* had diverging effects on sustainability. In some ways it threatened it, while in others it supported it. Some management team members reported that the main funder or University did not recognise the value of their in-kind time. Lack of recognition meant that this time was not costed in SiREN's budget, masking its real cost. Because this time was not directly financed, pressure from other areas of the management team's roles within the University diminished the amount of time provided to SiREN. This *workload pressure* occurred when the research allocation provided by the University was reduced or during busy times of semester.

The management team increased *support available for the team* as they shared their knowledge that strengthened the operation and activities of SiREN and acted as a sounding board for other team members. It also reduced *key person reliance*. Participants explained that SiREN has previously been overly reliant on one staff member to build stakeholder relationships and manage less experienced staff. This dependence threatened sustainability, as there was a risk that relationships and knowledge may be lost if this person left SiREN. An external evaluator identified this risk two years into the operation of SiREN. At which point, this risk was mitigated by shifting some responsibilities (e.g. relationship building, project management) to other management team members. In addition, the management team regularly shared their expertise with less experienced staff. They provided *mentoring, sponsorship, and supervision of postgraduate students*. *Sponsorship* cultivated a *learning culture* amongst staff, encouraging them to engage in postgraduate study and take up research positions within SiREN that they may not otherwise have pursued. This built the *expertise of the team* over time and reduced the *need for management team support* (Fig 5).

Despite its differing effects on sustainability, the *in-kind time provided by the management team* has offered consistent support to SiREN since its inception. When this research was undertaken, only two management team members had stepped down in eight years, reasons

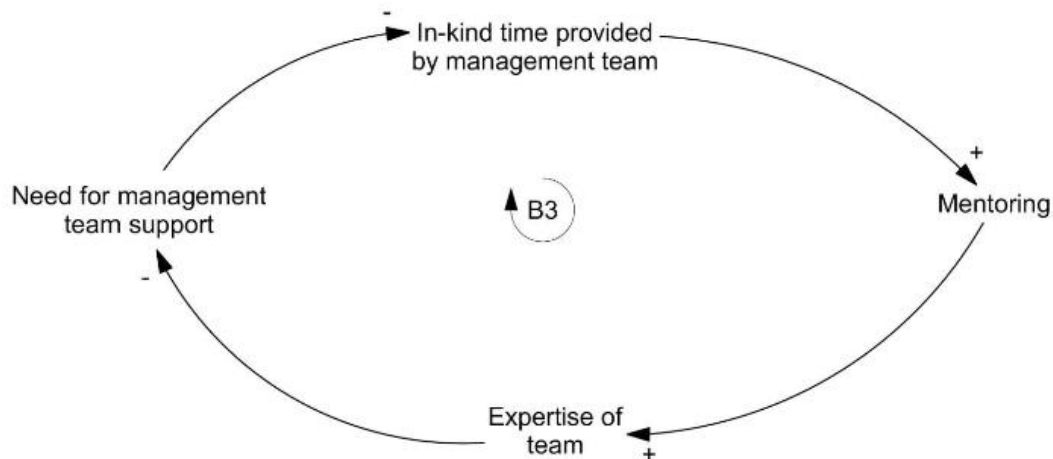


Fig 5. Balancing loop one: Mentoring and the need for management team support.

<https://doi.org/10.1371/journal.pone.0262125.g005>

for which were outside SiREN's control (relocation and changing work roles). This stability was due to the *willingness of the management team to contribute their time*. Willingness was driven by a combination of personal and professional motivations. Firstly, because the management team had a *belief in the ability of SiREN to create change*, there was a good fit between motivation to contribute and SiREN's aims. Secondly, most management team members have a *personal connection to the HIV epidemic*, which intrinsically motivated them to participate in ongoing prevention and management efforts. Thirdly, rapport and respect between the management team members increased their willingness to invest time. Lastly, SiREN's outputs, e.g. publications and research grants aligned with their career goals. One management team member reflected that if team members changed, this dynamic might shift, reducing willingness to contribute time. The community-minded nature of the management team also increased their willingness to contribute and led to SiREN exceeding expectations of some funding agreements. Participants reported that this occurred when they were motivated to meet community needs. Participants explained although this added value satisfied funders, it depleted limited resources and could lead to staff burnout.

Participants described tensions and misalignment between University expectations of SiREN, main funder expectations, and the team's view of SiREN's role. In the diagram this is reflected under *alignment with funder's needs*. Participants explained that the University endeavoured to be awarded competitive grants and publish in high impact journals. At the same time, the main funder valued tangible *capacity building* outcomes (e.g. number of training sessions held). Participants recognised the importance of both these outputs to SiREN, but explained that they also valued building networks and partnerships to facilitate the co-development and exchange of knowledge. While these value differences have always existed, they have become more pronounced over time and are not unique to SiREN. This is due to growing financial pressures on Australian universities [55] and a lack of incentives provided to staff to engage with communities [56]. Two participants reflected on the conditions when SiREN was initially funded:

"The climate was right. . . The funding climate, the University climate, our combined team's climate. Everything kind of aligned to go, "Yeah, you know what, we'll put that out if people were happy to fund it, support it." So it all just came together."

(P1)

"If we tried to repeat the origin story of SiREN, it would look different now. . . It would look very different. I think it would be much harder."

(P5)

Discussion

This study used systems concepts and methods to explore the internal operation of a research and evaluation capacity building partnership (SiREN). In doing so, it addresses a growing interest in capacity building projects that take a multi-strategic approach and work across the individual, organisational and system level [9, 15] and a need for examples of taking a systems approach to understanding public health programs [19]. The diagram was developed through an iterative and participatory process that involved in-depth interviews, meetings, and workshops with participants. Box 1 provides a summary of key findings relevant to public health practitioners, researchers, or policymakers interested in establishing a similar model.

Similar to research by Fredericks and colleagues [28], the authors found that the value of causal loop diagrams lies in their ability to bring to the forefront key factors that affect project functioning and strengthen stakeholders' understanding of a project. Developing the causal loop diagram identified leverage points that can be used to increase SiREN's success. These new insights were SiREN's ability to adapt, establish and maintain partnerships, demonstrate

Box 1. Critical factors that affected the functioning of a public health research and evaluation capacity building partnership.

- Adaptability was strengthened by a commitment to a flexible response to meet aims, strong relationships, and knowledge of the system.
- Establishing and building diverse networks and partnerships required an adequate investment of time.
- Consistently demonstrating capability and credibility increased stakeholder willingness to engage.
- Building knowledge of the system required a range of processes (e.g. developing relationships to exchange knowledge, undertaking a needs assessment).
- Cooperation was strengthened by the presence of a shared vision and shared values.
- Expertise and credibility were increased through being located within a university and having access to university resources (e.g. management team)
- Sustainability and growth were enhanced by being cognisant of the different interests and contributions of stakeholders.

capability and credibility and balance different stakeholder interests. This knowledge has since been used to develop a comprehensive evaluation framework (incorporating objectives and indicators) and evaluation tools to support monitoring and evaluation.

Central to SiREN's ability to achieve its aims has been its capacity to adapt. Adaptation was important as it enabled SiREN to evolve with the needs of the system. It supported the identification of emerging issues that led to the acquisition of new funding sources and increased SiREN's sustainability. Adaptation was supported by stakeholder partnerships, knowledge of the system and the expertise of the SiREN team. The process of adaptation was challenging within the constraints of the research system, as a swift response to the emerging evidence needs of stakeholders is difficult due to lengthy research processes e.g. preparing funding applications, ethics approvals. Adaptation is a fundamental concept in systems thinking [20, 57]. It has been well explored in the business and management literature for many decades [58–60], yet its use in public health has been limited. This appears to be shifting as public health programs are increasingly viewed as events in systems [29, 30, 61–63]. This change in perspective increases the relevance of how a program interacts with and meets the needs of the system in which it operates. This study found that having a shared vision to work towards and shared values to guide decision making kept SiREN on track while adapting.

SiREN's strong connections to the system underpinned its ability to adapt. These connections acted as conduits, transferring knowledge between stakeholders and SiREN. SiREN used both formal (e.g. needs assessment, stakeholder meetings) and informal processes (e.g. networking events) to achieve this. As identified in previous research, knowledge sharing was based on trusting relationships [64, 65], and provided SiREN with a valuable understanding of the system which it used to inform the development of its activities (e.g. research project topics, types of training offered). This free flow of knowledge supports adaptation [30, 62]; when this flow is impeded, so too is SiREN's understanding of the needs of the system. This makes partnership approaches particularly suited to interventions that require adaptation as they can support the exchange of knowledge.

This research found that pre-existing relationships provided a solid starting point for SiREN. Even with this foundational base, significant time was spent establishing and building relationships, particularly as stakeholders entered and exited the system. Consistent with findings from Corbin and colleagues [66], the study determined the accrual of benefits from these relationships takes time. However, once established, the value provided by these relationships was tangible and included quicker responses to emerging issues and greater efficiencies in developing collaborative grant applications. Partnerships also added expertise and credibility to funding applications, thus increasing the likelihood of funding being awarded. These benefits are examples of how capacity building can unlock the potential within a system leading to it being 'more than the sum of its parts' [2]. Despite the significant time investment required, findings reinforce the importance of partnerships as key to effectively building research capacity and generating evidence to inform public health decision-making [2, 67].

Like McGill et al. [68], this study found that a systems perspective supported understanding of the level of alignment between SiREN and the interests of system stakeholders. This was evident in SiREN balancing divergent stakeholder needs that can threaten sustainability. SiREN is financially supported by a university, a government department and additional research and evaluation grant funding. These stakeholders have different expectations of SiREN (e.g. research or capacity building outputs). Despite their differing interests, both stakeholders were integral to the sustainability of SiREN. The government funder supported SiREN by encouraging stakeholder engagement and supporting it to adapt as it learned and responded to changes within the system. Being situated within the University was an asset to SiREN as it increased its credibility, the expertise of the team, and access to university resources such as postgraduate

students and academic databases. Furthermore, SiREN was often able to find a 'middle ground' where it could align its activities across a range of stakeholder needs. For example, co-producing research with stakeholders built research capacity (valued by the main funder) while also achieving research outputs (valued by the University). Those considering developing a similar model should spend time reflecting on the different perspectives of stakeholder partners and how they impact the sustainability of a partnership model.

Strengths, limitations, and considerations for future studies

Using a systems approach requires defining the boundaries of what is to be included [18]. In doing so, certain elements and perspectives will be excluded. In this study, SiREN partner and service user perspectives were deemed as outside the boundaries. The perspectives of SiREN's main funder were not included as they declined to participate, citing a conflict of interest. Therefore, the diagram reflects the SiREN teams understanding. Given the nature of boundaries and perspectives, system research will at times be considered insider research. This can be a strength with strategies to reduce bias (e.g. not assuming knowledge, having data and findings reviewed by an outsider) [40]. In this study, including management team members as insider researchers added richness to the diagram as they drew on their deep understanding of SiREN. The authors acknowledge that identifying feedback loops is an important part of developing causal loop diagrams [69]. This study did not report on all feedback loops contained within this diagram as including them all would have complicated the reporting of results. A list of all feedback loops is available from the first author upon request.

The iterative and participatory diagram building process was a strength of this study as it improved the validity of the diagram [28]. Similar to Brennan et al. [45], the authors found involving SiREN team in the model building process added depth to the diagram and developing a shared understanding of SiREN. Participants also felt the diagram crystallised what aspects of SiREN were most valued. However, the iterative nature of refining the model and seeking feedback required a significant investment of time. Traditionally, the development of causal loop diagrams involves collecting data from stakeholders but stops short of including them in the diagram building process [36, 70]. As recognition of the value that participatory approaches bring to the development of causal loop diagrams grows [28, 36, 45, 70], so too should its application. Yet many recent public health studies that have developed a causal loop diagram have not involved stakeholders in the diagram building process [24, 26, 71]. Future studies that utilise causal loop diagrams should weigh the benefits and challenges that collaborative diagram development can bring.

Conclusion

This study provides insight into critical factors that support the functioning, sustainability and growth of a partnership to build research and evaluation capacity and strengthen evidence-informed decision-making in public health. Key mechanisms for successful functioning were building credibility, capability, strong stakeholder partnerships and knowledge of the system. Adaptability of the partnership within a dynamic system context was an important leverage point to increase its effectiveness. These factors could be applied to partnership models in other public health contexts to facilitate evidence-informed decision-making.

Supporting information

S1 File. Interview schedule and casual loop diagram variables.
(DOCX)

S2 File.
(DOCX)

Author Contributions

Conceptualization: Rochelle Tobin, Gemma Crawford, Jonathan Hallett, Bruce Richard Maycock, Roanna Lobo.

Data curation: Rochelle Tobin.

Formal analysis: Rochelle Tobin.

Investigation: Rochelle Tobin.

Methodology: Rochelle Tobin, Gemma Crawford, Jonathan Hallett, Roanna Lobo.

Project administration: Rochelle Tobin.

Supervision: Gemma Crawford, Jonathan Hallett, Bruce Richard Maycock, Roanna Lobo.

Visualization: Gemma Crawford.

Writing – original draft: Rochelle Tobin.

Writing – review & editing: Rochelle Tobin, Gemma Crawford, Jonathan Hallett, Bruce Richard Maycock, Roanna Lobo.

References

1. Brownson RC, Fielding JE, Green LW. Building capacity for evidence-based public health: reconciling the pulls of practice and the push of research. *Annu Rev Public Health*. 2018; 39:27–53. <https://doi.org/10.1146/annurev-publhealth-040617-014746> PMID: 29166243
2. Cooke J, Gardois P, Booth A. Uncovering the mechanisms of research capacity development in health and social care: a realist synthesis. *Health Res Policy Syst*. 2018; 16(1):93. <https://doi.org/10.1186/s12961-018-0363-4> PMID: 30241484
3. Kislov R, Waterman H, Harvey G, Boaden R. Rethinking capacity building for knowledge mobilisation: developing multilevel capabilities in healthcare organisations. *Implementat Sci*. 2014; 9(1). <https://doi.org/10.1186/s13012-014-0166-0> PMID: 25398428
4. Murunga VI, Oronje RN, Bates I, Tagoe N, Pulford J. Review of published evidence on knowledge translation capacity, practice and support among researchers and research institutions in low-and middle-income countries. *Health Res Policy Syst*. 2020; 18(1). <https://doi.org/10.1186/s12961-019-0524-0> PMID: 32039738
5. Cooke J. A framework to evaluate research capacity building in health care. *BMC Fam Pract*. 2005; 6(1):1–11.
6. Labin SN, Duffy JL, Meyers DC, Wandersman A, Lesesne CA. A Research Synthesis of the Evaluation Capacity Building Literature. *Am J Eval*. 2012; 33(3):307–38. <https://doi.org/10.1177/1098214011434608>
7. Preskill H, Boyle S. A multidisciplinary model of evaluation capacity building. *Am J Eval*. 2008; 29(4):443–59. <https://doi.org/10.1177/1098214008324182>
8. Norton S, Milat A, Edwards B, Giffin M. Narrative review of strategies by organizations for building evaluation capacity. *Eval Program Plann*. 2016; 58:1–19. <https://doi.org/10.1016/j.evalprogplan.2016.04.004> PMID: 27258905
9. Lamarre A, D'Avernas E, Raffoul A, Riley B, Jain R. A Rapid Review of Evaluation Capacity Building Strategies for Chronic Disease Prevention. *Can J Program Eval*. 2020; 35(1):1–19. <https://doi.org/10.3138/cjpe.61270>
10. Bourgeois I, Simmons L, Buetti D. Building evaluation capacity in Ontario's public health units: promising practices and strategies. *Public Health*. 2018; 159:89–94. <https://doi.org/10.1016/j.puhe.2018.01.031> PMID: 29599056
11. Gagliardi AR, Berta W, Kothari A, Boyko J, Urquhart R. Integrated knowledge translation (IKT) in health care: a scoping review. *Implementat Sci*. 2016; 11(1):38. <https://doi.org/10.1186/s13012-016-0399-1> PMID: 26988000

12. Oliver K, Innvar S, Lorenc T, Woodman J, Thomas J. A systematic review of barriers to and facilitators of the use of evidence by policymakers. *BMC Health Serv Res*. 2014; 14:2. <https://doi.org/10.1186/1472-6963-14-2> PMID: 24383766.
13. Haynes A, Rowbotham S, Grunseit A, Bohn-Goldbaum E, Slaytor E, Wilson A, et al. Knowledge mobilisation in practice: an evaluation of the Australian Prevention Partnership Centre. *Health Res Policy Syst*. 2020; 18(1). <https://doi.org/10.1186/s12961-019-0496-0> PMID: 32005254
14. Nguyen T, Graham ID, Mirkias KJ, Bowen S, Cargo M, Estabrooks CA, et al. How does integrated knowledge translation (IKT) compare to other collaborative research approaches to generating and translating knowledge? Learning from experts in the field. *Health Res Policy Syst*. 2020; 18:1–20.
15. DeCorby-Watson K, Mensah G, Bergeron K, Abdi S, Rempel B, Manson H. Effectiveness of capacity building interventions relevant to public health practice: a systematic review. *BMC Public Health*. 2018; 18(1):684. <https://doi.org/10.1186/s12889-018-5591-6> PMID: 29859075
16. Lobo R, Crawford G, Hallett J, Laing S, Mak DB, Jancey J, et al. A research and evaluation capacity building model in Western Australia. *Health Promotion International*. 2016; 33:1–11. <https://doi.org/10.1093/heapro/daw088> PMID: 28028011
17. Willis C, Riley B, Lewis M, Stockton L, Yessis J. Guidance for organisational strategy on knowledge to action from conceptual frameworks and practice. *Evid Policy*. 2017; 13(2):317–41. <https://doi.org/10.1332/174426416X14609194878495>
18. Cabrera D, Colosi L, Lobdell C. Systems thinking. *Eval Program Plann*. 2008; 31(3):299–310. <https://doi.org/10.1016/j.evalprogplan.2007.12.001> PMID: 18272224
19. McGill E, Er V, Penney T, Egan M, White M, Meier P, et al. Evaluation of public health interventions from a complex systems perspective: A research methods review. *Soc Sci Med*. 2021; 272:113697. <https://doi.org/10.1016/j.socscimed.2021.113697> PMID: 33508655
20. Gates EF. Making sense of the emerging conversation in evaluation about systems thinking and complexity science. *Eval Program Plann*. 2016; 59:62–73. <https://doi.org/10.1016/j.evalprogplan.2016.08.004> PMID: 27591941
21. Hargreaves MB. *Evaluating system change: A planning guide*. Princeton: Mathematica; 2010.
22. Rycroft-Malone J, Burton CR, Wilkinson J, Harvey G, McCormack B, Baker R, et al. Collective action for implementation: a realist evaluation of organisational collaboration in healthcare. *Implementat Sci*. 2016; 11(1):1. <https://doi.org/10.1186/s13012-016-0380-z> PMID: 26860631
23. Peters DH. The application of systems thinking in health: why use systems thinking? *Health Res Policy Syst*. 2014; 12(1):1–6. <https://doi.org/10.1186/1478-4505-12-51> PMID: 25160707
24. Yourkavitch J, Hassmiller Lich K, Flax VL, Okello ES, Kadzandira J, Katahoire AR, et al. Interactions among poverty, gender, and health systems affect women's participation in services to prevent HIV transmission from mother to child: A causal loop analysis. *PLoS One*. 2018; 13(5):e0197239. <https://doi.org/10.1371/journal.pone.0197239> PMID: 29775467
25. BeLue R, Carmack C, Myers KR, Weinreb-Welch L, Lengerich EJ. Systems thinking tools as applied to community-based participatory research a case study. *Health Educ Behav*. 2012; 39(6):745–51. <https://doi.org/10.1177/1090198111430708> PMID: 22467637
26. Owen B, Brown AD, Kuhlberg J, Millar L, Nichols M, Economos C, et al. Understanding a successful obesity prevention initiative in children under 5 from a systems perspective. *PLoS One*. 2018; 13(3):e0195141. <https://doi.org/10.1371/journal.pone.0195141> PMID: 29596488
27. Jalali MS, Rahmandad H, Bullock SL, Lee-Kwan SH, Gittelsohn J, Ammerman A. Dynamics of intervention adoption, implementation, and maintenance inside organizations: The case of an obesity prevention initiative. *Soc Sci Med*. 2019; 224:67–76. <https://doi.org/10.1016/j.socscimed.2018.12.021> PMID: 30763824
28. Fredericks KA, Deegan M, Carman JG. Using System Dynamics as an Evaluation Tool: Experience From a Demonstration Program. *Am J Eval*. 2008; 29(3):251–67. <https://doi.org/10.1177/1098214008319446>
29. Biroscak BJ. *Use of System Dynamics Modeling to Explicate the Theory-of-Change of a Social Marketing Innovation*: University of South Florida; 2014.
30. Brown G, Reeders D, Cogle A, Madden A, Kim J, O'Donnell D. A Systems Thinking Approach to Understanding and Demonstrating the Role of Peer-Led Programs and Leadership in the Response to HIV and Hepatitis C: Findings From the W3 Project. *Front Public Health*. 2018; 6(231):1–11. <https://doi.org/10.3389/fpubh.2018.00231> PMID: 30234083
31. Tobin R, Hallett J, Lobo R, Maycock BR. Taking a systems approach to explore the impacts and outcomes of a research and evaluation capacity building partnership: a protocol. *BMJ Open*. 2019; 9(9):e026706. <https://doi.org/10.1136/bmjopen-2018-026706> PMID: 31542735

32. Chen HT. Interfacing theories of program with theories of evaluation for advancing evaluation practice: Reductionism, systems thinking, and pragmatic synthesis. *Eval Program Plann.* 2016; 59:109–18. <https://doi.org/10.1016/j.evalprogplan.2016.05.012> PMID: 27346429.
33. Hassmiller Lich K, Frerichs L, Fishbein D, Bobashev G, Pentz MA. Translating research into prevention of high-risk behaviors in the presence of complex systems: definitions and systems frameworks. *Transl Behav Med.* 2016; 6(1):17–31. <https://doi.org/10.1007/s13142-016-0390-z> PMID: 27012250
34. Hummelbrunner R. Systems thinking and evaluation. *Eval.* 2011; 17(4):395–403. <https://doi.org/10.1177/1356389011421935>
35. Renger R, Atkinson L, Renger J, Renger J, Hart G. The connection between logic models and systems thinking concepts. *Eval J Australas.* 2019; 19(2):79–87. <https://doi.org/10.1177/1035719X19853660>
36. Gerritsen S, Harré S, Rees D, Renker-Darby A, Bartos AE, Waterlander WE, et al. Community Group Model Building as a Method for Engaging Participants and Mobilising Action in Public Health. *Int J Environ Res Public Health.* 2020; 17(10):3457. <https://doi.org/10.3390/ijerph17103457> PMID: 32429183
37. Asselin ME. Insider Research: Issues to Consider When Doing Qualitative Research in Your Own Setting. *J Nurses Staff Dev.* 2003; 19(2):99–103. <https://doi.org/10.1097/00124645-200303000-00008> PMID: 12679662
38. Bonner A, Tolhurst G. Insider-outsider perspectives of participant observation. *Nurse Res* 2002; 9(4):7. PMID: 12149898
39. Perry C, Thurston M, Green K. Involvement and detachment in researching sexuality: Reflections on the process of semistructured interviewing. *Qual Health Res.* 2004; 14(1):135–48. <https://doi.org/10.1177/1049732303255853> PMID: 14725181
40. Hayfield N, Huxley C. Insider and Outsider Perspectives: Reflections on Researcher Identities in Research with Lesbian and Bisexual Women. *Qual Res Psychol.* 2015 12(2):91–106. <https://doi.org/10.1080/14780887.2014.918224>
41. LaSala MC. When interviewing “Family” maximizing the insider advantage in the qualitative study of lesbians and gay men. *J Gay Lesbian Soc Serv.* 2003; 15(1–2):15–30. https://doi.org/10.1300/J041v15n01_02
42. Phillippi J, Lauderdale J. A Guide to Field Notes for Qualitative Research: Context and Conversation. *Qual Health Res.* 2017; 28(3):381–8. <https://doi.org/10.1177/1049732317697102> PMID: 29298584
43. Kim H, Andersen DF. Building confidence in causal maps generated from purposive text data: mapping transcripts of the Federal Reserve. *Syst Dyn Rev.* 2012; 28(4):311–28. <https://doi.org/10.1002/sdr.1480>
44. Rwashana AS, Nakubulwa S, Nakakeeto-Kijambu M, Adam T. Advancing the application of systems thinking in health: understanding the dynamics of neonatal mortality in Uganda. *Health Res Policy Syst.* 2014; 12(36). <https://doi.org/10.1186/1478-4505-12-36> PMID: 25104047
45. Brennan LK, Sabounchi NS, Kemner AL, Hovmand P. Systems thinking in 49 communities related to healthy eating, active living, and childhood obesity. *J Public Health Manag Pract.* 2015; 21:S55–S69. <https://doi.org/10.1097/PHH.0000000000000248> PMID: 25828223
46. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care.* 2007; 19(6):349–57. <https://doi.org/10.1093/intqhc/mzm042> PMID: 17872937
47. Caretta MA, Vacchelli E. Re-thinking the boundaries of the focus group: A reflexive analysis on the use and legitimacy of group methodologies in qualitative research. *Social Res Online.* 2015; 20(4):58–70. <https://doi.org/10.5153/sro.3812>
48. Microsoft Corporation. Microsoft Teams. Redmond, Washington; 2020.
49. QSR International. NVivo 12. Melbourne, Australia. 2018.
50. Bengtsson M. How to plan and perform a qualitative study using content analysis. *NursingPlus Open.* 2016; 2:8–14. <https://doi.org/10.1016/j.npls.2016.01.001>
51. Bureš V. A Method for Simplification of Complex Group Causal Loop Diagrams Based on Endogenisation, Encapsulation and Order-Oriented Reduction. *Systems.* 2017; 5(3):46. <https://doi.org/10.3390/systems5030046>
52. Green L. Closing the chasm between research and practice: Evidence of and for change. *Health Promot J Austr.* 2014; 25(1):25–9. <https://doi.org/10.1071/HE13101> PMID: 24666557.
53. Lasker RD, Weiss ES, Miller R. Partnership synergy: a practical framework for studying and strengthening the collaborative advantage. *Milbank Q.* 2001; 79(2):179–205. <https://doi.org/10.1111/1468-0009.00203> PMID: 11439464
54. Hovland CI, Weiss W. The Influence of Source Credibility on Communication Effectiveness. *Public Opin Q.* 1951; 15(4):635. <https://doi.org/10.1086/266350>

55. Ling L. Universities and research in times of crisis: the getting of wisdom. *Qualitative Research Journal*. 2020; 20(4):361–71. <https://doi.org/10.1108/qrj-06-2020-0055>
56. Murphy D, McGrath D. A success/failure paradox: reflection on a university-community engagement in Australia. *J High Educ Policy Manag*. 2018; 40(4):321–41. <https://doi.org/10.1080/1360080x.2018.1482102>
57. Wilkinson J, Goff M, Rusoja E, Hanson C, Swanson RC. The application of systems thinking concepts, methods, and tools to global health practices: an analysis of case studies. *J Eval Clin Pract*. 2018; 24(3):607–18. <https://doi.org/10.1111/jep.12842> PMID: 29152819
58. Teece DJ, Pisano G, Shuen A. Dynamic capabilities and strategic management. *Strateg Manag J*. 1997; 18(7):509–33.
59. Schulze JH, Pinkow F. Leadership for Organisational Adaptability: How Enabling Leaders Create Adaptive Space. *Adm Sci*. 2020; 10(3):37. <https://doi.org/10.3390/admsci10030037>
60. Teece DJ. A dynamic capabilities-based entrepreneurial theory of the multinational enterprise. *J Int Bus Stud*. 2014; 45(1):8–37. <https://doi.org/10.1057/jibs.2013.54>
61. Paina L, Peters DH. Understanding pathways for scaling up health services through the lens of complex adaptive systems. *Health Policy Plan*. 2011; 27(5):365–73. <https://doi.org/10.1093/heapol/czr054> PMID: 21821667
62. Rosas SR. Systems thinking and complexity: considerations for health promoting schools. *Health Promot Int*. 2017; 32(2):301–11. Epub 2015/12/02. <https://doi.org/10.1093/heapro/dav109> PMID: 26620709.
63. Hawe P, Shiell A, Riley T. Theorising interventions as events in systems. *Am J Comm Psych*. 2009; 43(3–4):267–76. <https://doi.org/10.1007/s10464-009-9229-9> PMID: 19390961
64. Wye L, Cramer H, Beckett K, Farr M, Le May A, Carey J, et al. Collective knowledge brokering: the model and impact of an embedded team. *Evidence & Policy: A Journal of Research, Debate and Practice*. 2020; 16(3):429–52. <https://doi.org/10.1332/174426419x15468577044957>
65. Rushmer R, Ward V, Nguyen T, Kuchenmüller T. *Knowledge Translation: Key Concepts, Terms and Activities*. Springer International Publishing; 2019. p. 127–50.
66. Corbin JH, Jones J, Barry MM. What makes intersectoral partnerships for health promotion work? A review of the international literature. *Health Promot Int*. 2016; 33(1):4–26. <https://doi.org/10.1093/heapro/daw061> PMID: 27506627
67. Jull J, Giles A, Graham ID. Community-based participatory research and integrated knowledge translation: advancing the co-creation of knowledge. *Implementat Sci*. 2017; 12(1). <https://doi.org/10.1186/s13012-017-0696-3> PMID: 29258551
68. McGill E, Marks D, Er V, Penney T, Petticrew M, Egan M. Qualitative process evaluation from a complex systems perspective: A systematic review and framework for public health evaluators. *PLoS Med*. 2020; 17(11):e1003368. <https://doi.org/10.1371/journal.pmed.1003368> PMID: 33137099
69. Haraldsson HV. Introduction to systems and causal loop diagrams. 2000.
70. Richardson GP, Andersen DF. Teamwork in group model building. *Syst Dyn Rev*. 1995; 11(2):113–37. <https://doi.org/10.1002/sdr.4260110203>
71. Clarke B, Kwon J, Swinburn B, Sacks G. Understanding the dynamics of obesity prevention policy decision-making using a systems perspective: A case study of Healthy Together Victoria. *PLoS One*. 2021; 16(1):e0245535. <https://doi.org/10.1371/journal.pone.0245535> PMID: 33481898

To view the supplementary material referred to in this publication, please refer to the corresponding appendices.

Supplementary file 1:

SiREN staff interview schedule. Refer to [Appendix H](#).

Supplementary file 2:

Description of CLD variables. Refer to [Appendix W](#).

4.2. Summary

Understanding how capacity building partnerships are operationalised can strengthen their design, implementation and, ultimately, their effectiveness. This chapter is linked to [Objective 2](#) and used systems concepts and methods to examine factors critical to the operation of SiREN. Identified factors included SiREN's ability to adapt to the changing context in which it operates and its ability to demonstrate its credibility and capability to strengthen its partnerships and obtain new funding sources. These supported its sustainability.

The application of systems concepts and methods was an effective approach to elucidating key factors that affected the operation of SiREN. The participatory and iterative approach to the development of the CLDs added depth and richness to the diagrams and strengthened stakeholders' understanding of SiREN.

The following chapter ([Chapter 5](#)) utilises systems concepts and methods to examine factors that affect engagement with SiREN and the impacts and outcomes that have occurred as a result.

5. Examination of the impacts and outcomes of SiREN

In this chapter, findings are presented from a study that developed two CLDs to examine the factors that influence engagement with SiREN and the impacts and outcomes that occur as a result. These are presented in the form of the following peer-reviewed publication.

Tobin, R., Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2022). Utilizing causal loop diagramming to understand a research and evaluation capacity building partnership. *Frontiers in Public Health*. 10: 857918. <https://doi:10.3389/fpubh.2022.857918>
(Impact factor: 3.709)

This chapter relates to the following objective:

2. Explore the application of systems approaches to examine the functioning, impacts and outcomes of SiREN.

5.1. Publication 4: Impacts and outcomes of SiREN

Publication 4: Utilising causal loop diagramming to explore a research and evaluation capacity building partnership.



Utilizing Causal Loop Diagramming to Explore a Research and Evaluation Capacity Building Partnership

Rochelle Tobin^{1*}, Gemma Crawford¹, Jonathan Hallett¹, Bruce Maycock² and Roanna Lobo¹

¹ Collaboration for Evidence, Research and Impact in Public Health, School of Population Health, Curtin University, Perth, WA, Australia, ² European Centre for Environment and Human Health, College of Medicine and Health, University of Exeter, Exeter, United Kingdom

OPEN ACCESS

Edited by:

María Del Rocío Saenz,
University of Costa Rica, Costa Rica

Reviewed by:

Vladimír Bureš,
University of Hradec Králové, Czechia
Erin S. Kenzie,
Portland State University,
United States

*Correspondence:

Rochelle Tobin
rochelle.tobin@curtin.edu.au

Specialty section:

This article was submitted to
Public Health Policy,
a section of the journal
Frontiers in Public Health

Received: 19 January 2022

Accepted: 12 April 2022

Published: 31 May 2022

Citation:

Tobin R, Crawford G, Hallett J,
Maycock B and Lobo R (2022)
Utilizing Causal Loop Diagramming to
Explore a Research and Evaluation
Capacity Building Partnership.
Front. Public Health 10:857918.
doi: 10.3389/fpubh.2022.857918

The capacity to engage in research, evaluation and evidence-informed decision-making supports effective public health policy and practice. Little is known about partnership-based approaches that aim to build capacity across a system or how to evaluate them. This study examines the impacts of a research and evaluation capacity building partnership called the Western Australian Sexual Health and Blood-borne Virus Applied Research and Evaluation Network (hereafter, SiREN). SiREN aims to strengthen capacity across a system of clinical and medical services and government and non-government organizations. These organizations are connected through their shared aim of preventing and managing sexually transmissible infections and blood-borne viruses. To examine SiREN, systems concepts and methods were used. Data were collected from SiREN organizational documents ($n = 42$), a survey tool ($n = 104$), in-depth interviews ($n = 17$), a workshop and three meetings with SiREN stakeholders and used to develop two causal loop diagrams. Findings show engagement with SiREN was influenced by a complex interplay of contextual (e.g., organizational capacity) and process (e.g., presence of trusting relationships) factors. SiREN contributed to system level changes, including increased resources for research and evaluation, the development of networks and partnerships that led to more efficient responses to emerging health issues, evidence sharing, and sustainable research and evaluation practice. The use of causal loop diagrams enabled the identification of key leverage points that SiREN can use for continuous improvement or evaluation. The focus on how contextual factors influenced SiREN's ability to create change provides valuable information for researchers, policymakers or practitioners seeking to develop a similar partnership.

Keywords: partnership, public health, research capacity, evaluation capacity, evidence-informed decision-making, systems thinking, causal loop diagram

INTRODUCTION

The capacity to engage in research, evaluation and evidence-informed decision-making supports effective public health policy and practice (1). Research and evaluation capacity building can be collectively defined as the intentional process of improving the motivation, knowledge, skills, and structures to engage in sustainable research and evaluation practice and

apply research and evaluation evidence to decision-making (2–4). Evidence is acquired from multiple sources in public health, including research, evaluation, professional experience, surveillance data, and community perspectives, and then synthesized to guide decision making (5, 6). Capacity building can be theorized as a catalyst that releases potential from within individuals and organizations (7). For capacity building to be effective, it requires those involved to see the benefit and be committed to the process (7, 8). Strategies to build research, evaluation, and evidence-informed decision-making capacity in public health can target the individual, organization or system level. These strategies include training, tailored support, partnerships between researchers and decision-makers, the provision of resources (e.g., funding) and the development of infrastructure (e.g., research practice networks) (1–3, 9). Despite investment in capacity building strategies (7, 9, 10), little is known about developing and implementing them in different contexts, the kinds of impacts and outcomes they can achieve and the mechanisms by which change is achieved (7, 9, 11–14). A systems approach has been identified as a means to enhance understanding of capacity building initiatives (15). This paper describes a study using a systems approach to examine a research and evaluation capacity building project and inform its evaluation.

The capacity building project examined in this paper is called the Western Australian Sexual Health and Blood-borne Virus Applied Research and Evaluation Network (hereafter, SiREN). SiREN is a long-term partnership between sexual health and blood-borne virus (SHBBV) researchers, service providers and policymakers in Western Australia (WA) formally established in 2012 to strengthen evidence-informed policy and practice within the SHBBV sector in WA by developing research and evaluation capacity. A team of senior researchers coordinates SiREN within a large, global and highly ranked university (16). In Australia, the large majority of SHBBV research is generated by national centers located on the east coast and does not always address the specific SHBBV issues relevant to WA. The epidemiology of sexually transmissible infections (STIs) and blood-borne viruses (BBVs) in WA differs when compared to other parts of Australia (17, 18). This is in part due to the large land area, geographical isolation and differences in demographics. These factors have impacted on the availability of local SHBBV evidence for use by public health professionals. Compounding this, a recent survey of SiREN's stakeholders (individuals and organizations working to address SHBBVs) identified a perceived lack of research and evaluation capacity and insufficient access to relevant research as barriers to engaging in research, evaluation and evidence-informed decision-making (19). In response to WA specific needs, SiREN seeks to build stakeholder capacity to engage in research and evaluation and to build an evidence base relevant to WA SHBBV issues.

SiREN is embedded in a complex system composed of universities, clinical and medical services, and government and non-government organizations working toward the shared aim of preventing and managing STIs and BBVs in WA. The workforce composition is diverse and includes those in clinical, health promotion, peer-support, education, policymaking, and

research-based positions. The system structure, activities and stakeholders constantly change in response to the social and political climate, variations in epidemiology, and developments in prevention and treatments (20, 21). The system is conceptualized as complex as it is composed of many interacting elements (individuals, organizations, relationships) that are dynamic and adapting, often in unpredictable ways (22, 23). SiREN can be considered as a series of ongoing events within the system that aims to influence the behavior and structure of the system, e.g., relationships, resources (24). SiREN aims to create change within the system through multiple strategies that include: delivering personalized research and evaluation support; providing tools, resources and evidence to guide program planning, research and evaluation; hosting a biennial research symposium; seeking grant funding; undertaking collaborative applied research and evaluation projects; facilitating and participating in research collaborations; and sharing the latest evidence, news and events with a network of over 430 individuals. The size of SiREN limits the scale of change; currently, it employs 1.4 full-time equivalent (FTE) staff as part of core funding and a further 4.0 FTE staff through additional grants. Additional descriptions of SiREN are available in previous publications (25–27).

Taking this complexity into account, a systems approach was employed in this research. Systems approaches are particularly suited to examining capacity building programs, like SiREN, that aim to create change across a system (15). This approach can also support the identification of indicators for ongoing monitoring and evaluation purposes (21). A systems approach can be used to understand a program by exploring the context in which it is implemented, the relationships between program and system elements, and patterns of change that occur over time (28, 29). Using such an approach can provide insight into how SiREN reshapes the system in beneficial ways including developing new capabilities, relationships and structures (28, 30). This study utilized causal loop diagrams, a type of qualitative systems modeling method that originated in the field of system dynamics (31, 32). This method uses word and arrow diagrams to visually represent stakeholder perspectives of the functioning of a system or program (33). They include feedback loops which are circular relationships between variables that can reinforce or balance change. Causal loop diagrams can provide insight into factors that influence a program's effectiveness and the kinds of changes it can achieve (34, 35).

While a solid evidence base supports partnerships and capacity building programs (4, 13, 36), little is known about how and in what ways they contribute to change (4, 36). Systems approaches to evaluation provide insight into the mechanisms of action and the identification of leverage points. These are crucial points within the system that can be influenced to effect change, enhance a program's effectiveness, and be used for monitoring and evaluation purposes (21, 37, 38). This study aimed to use systems concepts and methods to explore perceptions of (1) factors that influence engagement with SiREN, (2) the impacts and outcomes achieved by SiREN and the interactions between them, and (3) the use of causal loop diagrams as a method to understand SiREN and inform evaluation.

MATERIALS AND METHODS

This mixed-methods study used causal loop diagrams to examine factors that influence engagement with SiREN and the subsequent impacts and outcomes that occurred. The Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist (39) guided reporting. Ethical approval was obtained for the study (approval number: HRE2017-0090). Informed consent was obtained from all subjects involved in the study. This study forms part of a larger project described in a previously published study protocol (26).

Theoretical Framework

This research investigated how SiREN interacted with the system in which it is embedded and the impacts and outcomes that were achieved. Several different but overlapping areas of systems thinking were used (32, 40–42). Consistent with Checkland (39), the research study viewed a system as a mental model, built through drawing on multiple perspectives to facilitate understanding of the system. The study design used three principles from across the diverse field of systems methodologies and methods (40, 43), boundaries, perspectives and relationships. Boundaries determine what lies inside and outside a system (44) and are used to focus the inquiry (40, 44). In this study, the bounded system was the SHBBV virus prevention and management system, including SiREN and other organizations working to address SHBBVs in WA. Perspectives reflect an individual's point of view (40). The principle of perspectives acknowledges the plurality of views held by system stakeholders. Therefore, to enable a complete understanding of the system, multiple perspectives should be included (37, 45). In this study, a diverse range of views was sought along the spectrum of engagement with SiREN. Relationships are defined as causal connections between parts of a system (40). The principle of relationships focuses on how system variables interact and influence each other to achieve a purpose (46).

In this paper, relationships were explicated through causal loop diagrams (described above). This method is useful to describe how a program functions within the system it operates and enables program evaluation to move beyond individual project strategies to a more systemic view of changes over time (47, 48). Causal loop diagrams can act as a complexity sensitive theory of change (49–51). Causal loop diagrams have been used in other studies seeking to understand public health programs including prevention marketing (51), policy adoption (52), peer-based programs (21) and obesity prevention (35). However, they have not been used to evaluate a research or evaluation capacity building program (33). To date, the majority of studies exploring research and evaluation capacity building projects have applied more traditional approaches such as case studies and action research (8, 12, 53, 54). Lawrenz et al. (55) and Grack Nelson et al. (15) applied a complex adaptive systems lens to explore evaluation capacity building within a network. Other studies have applied a realist approach to research capacity building (7, 56). Cooke et al. (7) and Lawrenz et al. (55) concluded that complexity sensitive methods provide insight into how, and in what contexts, capacity building interventions work.

Research Team and Reflexivity

During the time this study was undertaken, four research team members (RT, RL, JH, and GC) were employed by SiREN or members of the SiREN management team. The SiREN management team consists of five university-based staff with experience working in research, government, and policy involved in SiREN's operational and strategic management. The research team had extensive experience in public health, qualitative research evaluation, and capacity building. All members of the team have experience working with, or within, community-based blood-borne virus organizations.

Most research team members are considered insider researchers (RT, RL, GC, JH) (57), with implications for data collection and analysis. In other ways they can be considered outsiders, e.g., they have not received support from, or partnered with, SiREN, and they are not currently working in a government or non-government organization. Insider researchers bring with them knowledge of the research problem and access to participants (58). In contrast, outsider researchers may notice aspects of the data that an insider may overlook as they appear ordinary to them (59–61). Researchers used a reflexive approach during data collection and analysis to identify and address bias, including regular meetings with the research team and reflective journaling (62). To validate findings, participants were invited to participate in a workshop to refine the study findings.

Data Collection

Data were collected from SiREN organizational documents ($n = 42$) created between 2012 and 2020, a survey tool ($n = 104$) and in-depth interviews ($n = 17$) and used to inform the development of a draft causal loop diagram. Subsequently, the causal loop diagram was refined through a face-to-face workshop and three meetings with SiREN stakeholders ($n = 4$).

SiREN Organizational Documents

The following SiREN organizational documents ($n = 42$) were examined: biannual reports of activities and outputs ($n = 18$), reports evaluating SiREN activities ($n = 6$), needs assessment reports ($n = 3$), stakeholder emails describing impacts or outcomes of SiREN ($n = 3$), and stakeholder meeting minutes ($n = 12$). These documents provided an understanding of SiREN's activities, processes, impacts and outcomes.

Survey Tool

Every two years, the SiREN network is invited to participate in a needs assessment to inform SiREN activities and resource development. The SiREN network is a database of individuals across Australia with interest in SHBBVs. Summaries of relevant research and evaluation evidence, news, funding opportunities, and events are distributed *via* electronic mail. For this study, items were added to the needs assessment, and existing items were refined, using previous research and questionnaires (63–67). The survey tool was designed using Qualtrics survey-building software (68) and refined in consultation with three research team members (RT, GC, and RL). The final survey contained a combination of 43 open and closed questions, including factors that influence research, evaluation, and evidence-informed

decision-making practices, details of engagement with SiREN, and the influence engagement had on practice. The survey was estimated to take 15 min. The survey was published as part of the study protocol (26). A link to the survey was emailed to WA-based SiREN network members ($n = 204$); just over 50% ($n = 104$) responded.

In-depth Interviews

In-depth, semi-structured, qualitative interviews were undertaken with SiREN partners and service users ($n = 17$), purposively selected stakeholders based on engagement with SiREN in the past 2 years. SiREN partner engagement was defined as one or more of the following: worked in partnership with SiREN to undertake a research or evaluation project; applied for research or evaluation funding with SiREN; or took part in the SiREN steering group. Participants were selected across different levels of engagement, including those who had engaged once to multiple times. The steering group is composed of key SiREN stakeholders from WA non-government organizations, government organizations, hospitals and research organizations who provide input into the strategic management of SiREN. Service user engagement was defined as having received tailored project planning, evaluation or research support, e.g., developing an evaluation framework. Participants were predominantly from WA-based government, non-government and research organizations, with the exception of one interstate research organization. Employment roles included managers, educators, project officers, clinical trainers, and researchers.

Interviews sought to explore participant experiences of engaging in research, evaluation and evidence-informed decision-making within the system and engagement with SiREN. The interview guide [see the published study protocol (26)] was developed in consultation with the research team (RT, RL, JH, and BM) and pilot tested with a SiREN staff member. Questions examined the contextual factors influencing research, evaluation and evidence-informed decision-making practices, details of engagement with SiREN, and how and in what ways engagement with SiREN influenced practice.

Twenty-two individuals were invited *via* email to participate. Three did not respond to the invitation and two declined citing conflict of interest as SiREN's main funder employed them. Face-to-face interviews were undertaken with metropolitan participants at their workplace and *via* telephone with regional and interstate participants. The duration of the interviews ranged from 30 to 90 min. Interviews were digitally recorded, transcribed verbatim and reviewed for accuracy by RT. Transcripts were not member checked.

Draft Causal Loop Diagram Development

To develop the causal loop diagram, data from organizational documents, surveys and interviews were open-coded using NVivo 11 software (69) by RT similar to the grounded theory-informed approach recommended by Kim and Andersen (70). Coding was guided by the areas addressed in survey and interview questions including contextual factors that influence research, evaluation, and evidence-informed decision-making practices, factors that affect engagement with SiREN, and

outcomes achieved by SiREN. Data were coded into categories until no new variables were identified and superordinate categories emerged. The second phase of coding identified system variables, causal relationships, feedback loops and time lags to inform the structure of the causal loop diagram. As part of this process, emerging variables and relationships were discussed and refined in consultation with members of the research team (RT, RL, JH, BM).

To link the causal loop diagram variables and relationships to their data source, a reference table modified from Kim and Andersen (70) was created using Microsoft Excel (Version 2105). This table included all variables, their relationships and supporting data. An example is provided in **Table 1**.

Identified variables and their relationships were transformed into a causal loop diagram using Vensim (71), a software program used for creating and presenting causal loop diagrams. The process of data collection, analysis and diagram building occurred concurrently.

Validating the Causal Loop Diagram

A 2-h workshop was held to validate the causal loop diagram. Participatory processes strengthens the validity of the causal loop diagrams and was used in similar studies (34, 72). In-depth interview participants ($n = 17$) and SiREN management team members ($n = 5$) were invited by email to participate. Workshop participants included in-depth interview participants ($n = 5$), SiREN management team ($n = 3$) and an observer from the research team (BM).

The workshop was facilitated by a researcher (RT). In the workshop, the facilitator provided a brief overview of systems thinking, guidance on how to interpret causal loop diagrams and a description of the diagram. Questions were then posed to the group including: if the diagram reflected their experience of SiREN, if there were any aspects not represented and if they had any comments on the terms used to describe the variables. Participants were seated around a square table, and in the center of the table was a laminated copy of the diagram (A0 size) and whiteboard markers. This format enabled the alteration of the variables and relationships as the group discussed them. The role of the management team in the validation process was not to provide their perception of the changes that SiREN had achieved but to support the interrogation of the diagram by asking questions, for example, seeking clarification on the meaning of variables and the nature of the relationships between them.

Following the workshop, three meetings of 30–60 min were held. Two meetings were held with individual members of the management team who could not attend the workshop and a meeting with members of the research team ($n = 4$) to refine the diagram. RT further developed diagrams in consultation with the research team to ensure they were able to be easily interpreted in published form and when the process of writing revealed new relationships and variables. One of these changes involved splitting the diagram into two, leaving the central variable of engagement with SiREN in both diagrams. This enabled the processes that influence engagement and the subsequent impacts and outcomes that occur to be clearly depicted.

TABLE 1 | Coding table example.

Variable	Effect variable	Relationship type	Supporting data and source
Trust built	Engagement with SiREN	Positive	<i>(SiREN's) got a nice connection with NGOs (non-government organizations), and I think there's a lot of trust between NGOs and the Government Department of Health with SiREN. And I think that helps facilitate it (engagement) as well. Source: Interview (P14).</i>

RESULTS

Two causal loop diagrams illustrate 1. factors affecting engagement and 2. impacts and outcomes. Diagrams are presented, followed by a table that describes the corresponding variables in alphabetical order. An explanatory narrative supports the diagrams and table, and deidentified participant quotes illustrate findings. The narrative discusses diagram variables and relationships under related topic headings.

To read the diagrams, select a variable of interest and follow the causal connections. Relationships between variables are either positive (represented as “+”) or negative (represented with “-”). The system variables and relationships join to form feedback loops. Feedback loops illustrate circular cause and effect relationships that can be reinforcing where they amplify change (represented with an “R”) or balancing where they attenuate change by driving change in the opposite direction from where it started (represented with “B”) (48). Time delays (represented by a “//”) occur where there is a delay in a change occurring (48).

Engagement

Analysis identified two types of engagement, transactional and synergistic. These are important determinants of the kinds of impacts and outcomes that were achieved. Transactional engagement was identified as brief, addressing a specific question within one or two interactions with SiREN. Examples of transactional engagement included support for writing a conference abstract or refining an existing evaluation tool. Transactional engagement led to increased research and evaluation confidence, knowledge and skills. Synergistic engagement was identified as occurring over multiple interactions with SiREN across an extended period of time, (e.g., months, years) and led to the development of trusting relationships. It involved both parties combining their knowledge to address research and evaluation issues, such as developing a program evaluation plan or research proposal and had the potential to lead to all identified impacts and outcomes.

The first causal loop diagram (**Figure 1**) illustrates factors that influenced engagement with SiREN. Diagram variables are defined in **Table 2**. The diagram indicates that engagement with SiREN is dynamic and changed in response to factors within the control, (e.g., presence of trusting relationships) and outside SiREN's control, (e.g., organizational evaluation capacity).

Existing Relationships Act as a Springboard

The presence of a *collaborative culture* within the system increased engagement with SiREN. This culture predated SiREN and was traced back by interview participants to

Australia's partnership-based response to the HIV epidemic (75). Participants reported that this legacy of collaborative working continues to influence how connected they are. In addition, the SiREN management team had a decades-long history of working with, and within, government and non-government organizations. The relationships formed during this time included those of research partners, colleagues, and friends. These relationships acted as a springboard to generate awareness of SiREN, support its credibility, and develop the partnerships and networks that underpin its approach:

(SiREN is) a reliable source of support, it comes from the SiREN team as I said, I suppose, being embedded within (the University), those past relationships that I, we, the sector has had with (the University) over many, many years. (P10)

Support From Funders

The funding environment had a dual effect on engagement. On the one hand, *funding policy* increased engagement as the main funding body encourages funded organizations to actively work with research-based organizations, like SiREN, for research and evaluation purposes. On the other hand, the main funding body recently transitioned its funding model from a preferred service provider status to a *competitive tendering process*. This model resulted in some organizations competing with one another for funding. Participants suggested this transition had a detrimental effect on the *collaborative culture* and resulted in a lack of clarity regarding whether SiREN could be trusted to provide confidential support to all applicants for competitive funding.

Perceptions of SiREN

Engagement increased when stakeholders perceived SiREN to be trustworthy and credible. Credibility was enhanced by SiREN's association with the University, which gave SiREN source credibility (76) and its relationships to other organizations working within the system which provided credibility by association (77). Other factors that enhanced perceived credibility included the visibility of SiREN, (e.g., presentations at events and publications) and the view that SiREN is a “storehouse” of knowledge for the sector:

I think it was the backing of a university... that I think makes (SiREN) a really credible source for that type of advice... it's SiREN acting as more of the point of contact for lots of other organizations that may have contacted them for the same thing. (P4)

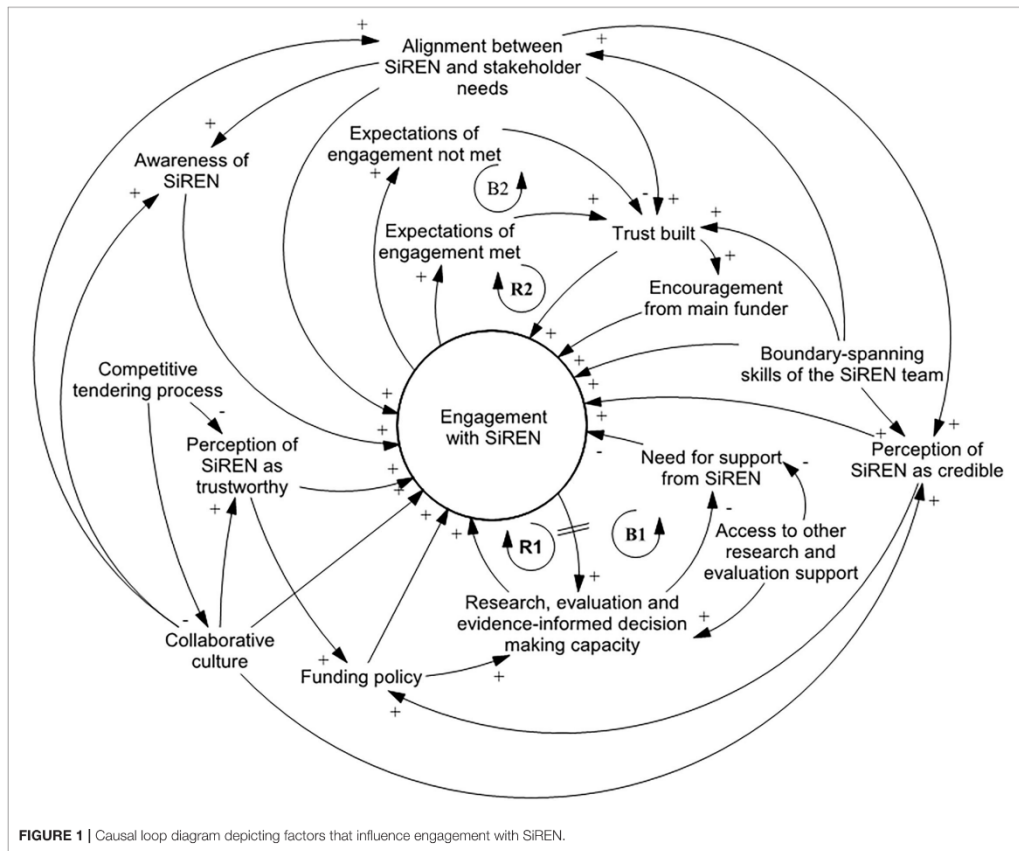


FIGURE 1 | Causal loop diagram depicting factors that influence engagement with SiREN.

The Relationship Between Capacity and Need for Support

Research and evaluation capacity and the need for research and evaluation support was dynamic and varied across the system. Participants identified a range of factors that influenced their capacity to engage in research and evaluation including: level of knowledge and skills, attitudes and values, accessibility of target groups and data, access to resources, (e.g., funding and time), requirements of funding bodies, and the availability of internal and external research and evaluation support. Participants required the capacity to engage in research and evaluation to engage with SiREN, e.g., through time or support from management. Engaging with SiREN increased research and evaluation capacity. In some cases, this boosted engagement with SiREN as awareness of, and ability to, engage in new research and evaluation opportunities (e.g., developing new evaluation methods, research projects) increased [Figure 1,

reinforcing loop 1 (R1)]. This was explained by a service user who had recently commenced a research project in partnership with SiREN:

(SiREN team member has) been encouraging me to find these sort of research projects, you know, and so I'm starting to kind of now see opportunities which is great... and I know that when I take that step I'll have the support I need. (P6)

However, when research and evaluation capacity increased due to receiving support from SiREN, it could also lead to a decrease in engagement. This is because the need for research and evaluation support decreased, leading to a reduction in engagement with SiREN as service users felt they had the resources and skills to meet the requirements of their role [Figure 1, Balancing loop 1 (B1)]. A non-government organization staff member reflected on why they had not engaged

TABLE 2 | A description of variables that influence engagement with SiREN.

Variable	Description
Access to other research and evaluation support	Support available beyond the support provided by SiREN, e.g., relationships with other research centers.
Alignment between SiREN and stakeholder needs	SiREN's services were compatible with the research, evaluation, and evidence-informed decision-making needs of stakeholders.
Awareness of SiREN	Stakeholders understood what SiREN is and the kinds of services and support it can offer.
Boundary-spanning skills of the SiREN team	Ability to build relationships and facilitate learning across diverse groups (73), e.g., research and service delivery.
Collaborative culture	Stakeholders had a history of working together, as well as with SiREN team members, to address SHBBV issues.
Competitive tendering process	Organizations needed to compete for funding from the main funding body.
Encouragement from main funder	The main funder encouraged funded organizations to engage with SiREN when they require research and evaluation support.
Engagement with SiREN	Occurred when a partner or service user participated in a SiREN advisory group; partnered with SiREN to undertake research, evaluation or apply for a grant; or received program planning, research, evaluation, or evidence-informed decision-making support.
Expectations of engagement met	When SiREN met partner or service user expectations of what SiREN will do, e.g., develop an evaluation tool.
Expectations of engagement not met	When SiREN did not meet partner or service user expectations of what SiREN will do.
Funding policy	The main funding body stipulated that some funded organizations must engage with research organizations for research and evaluation purposes. Funded programs were contractually obligated to be evaluated.
Need for support from SiREN	The need for support from SiREN arose when an individuals or organization's capacity did not meet their requirements of their role.
Perception of SiREN as credible	Stakeholders perceive the information provided by SiREN as reliable.
Perception of SiREN as trustworthy	Stakeholders felt that information shared with SiREN will be kept confidential. This view can be held because of an interaction with SiREN or because of SiREN's reputation.
Research, evaluation and evidence-informed decision-making capacity	The motivation, knowledge, skills, and resources to undertake research and evaluation and apply evidence to decision-making (2–4).
Trust built	Developed through repeated interactions over time. Trust enabled partners and service users to know SiREN will act in a trustworthy way (74).

with SiREN since receiving support to develop a logic model program plan:

I've been able to keep the ball rolling and rather confidently go through my project... Knowing I'm doing the right thing that I'm supposed to be doing in exactly the right way, with the knowledge I'm supposed to have that's up to date. (P5)

Need for support from SiREN also decreased when participants had access to other research and evaluation support, e.g., a new research officer working within their organization.

The Effect of Trust

When trusting relationships were built between SiREN and its partners or service users, it increased engagement [Figure 1, reinforcing loop 2 (R2)]. Because of the reinforcing effect between trust and engagement, there was increased potential for impacts and outcomes. Trust was identified in analysis as a leverage point due to its central role in strengthening relationships and its potential to enhance the impacts of SiREN. The development of trust was a social process whereby partners and service users learn through experience that SiREN will act reliably (74):

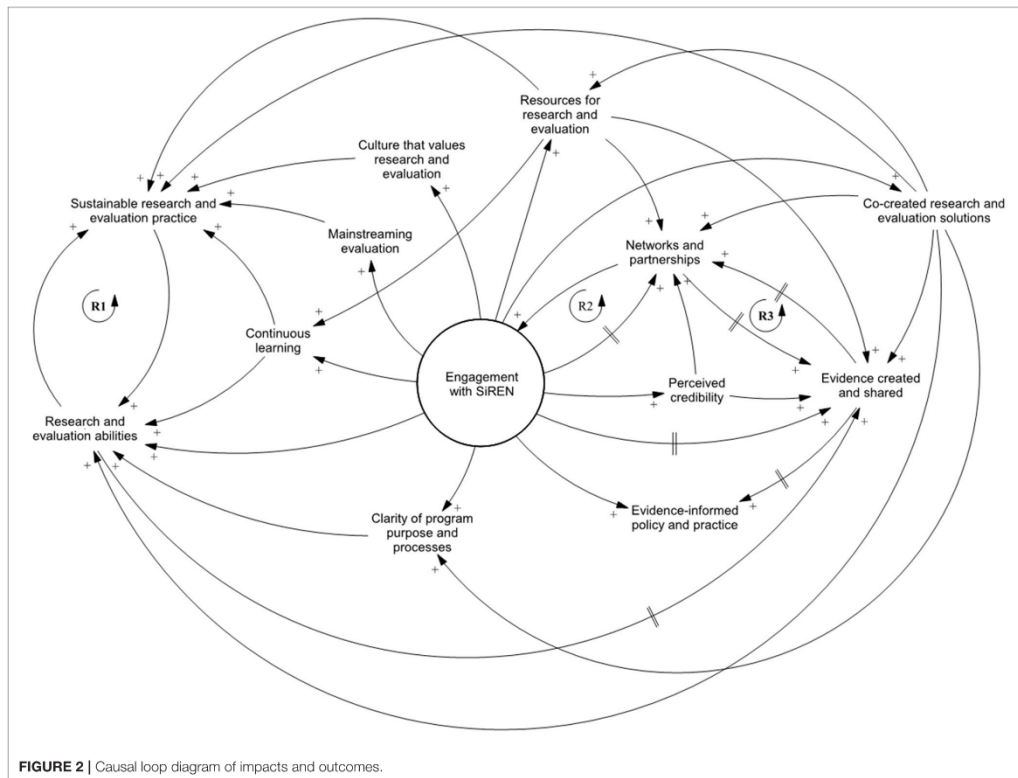
I think it's about showing credibility, following through with promises. So, saying they'll do something and actually doing it. (P9)

As highlighted in the quote, credibility, integrity, capability, and meeting expectations were important components of trust related to SiREN. Trust was dynamic and could be affected. For example, as reflected in Balancing Loop 2 (Figure 1, B2), one participant reported that their *expectations of engagement were not met*. In this instance, engagement decreased but did not cease indicating that *trust* was reduced but not lost.

Positioning of SiREN

Another leverage point was the *boundary-spanning skills of the SiREN team* which boosted engagement. These qualities were attributed, in part, to the past and current experience of the team working across research, clinical, government and non-government organizations. These experiences furnished team members with an understanding of how to undertake and support research and evaluation in policymaking and service delivery contexts and how to communicate with diverse groups of people. Participants described these qualities as being approachable, understanding, having expertise, and supporting the exchange of knowledge:

(SiREN Team Member was) so forthcoming and it was so quick for her to identify where I was at and was easy for me to understand where she's at, that compatibility of how we could share knowledge. (P12)



The boundary-spanning skills of the SiREN team facilitated alignment between SiREN activities and stakeholder needs. Boundary-spanning skills supported the transfer of knowledge (78) from stakeholders to SiREN. SiREN subsequently used this knowledge used to align its services to their research and evaluation needs. The alignment process was aided by SiREN's governance structure, as both the management team and steering group members contributed their understanding of the system into decisions of how SiREN delivered its services. Other processes that increased alignment between SiREN and stakeholder needs included a biennial stakeholder needs assessment and a research priority-setting process. The needs assessment sought to understand the research and evaluation needs of stakeholders to inform SiREN activities. The research priority-setting process involved working with the sector to establish key research priority areas and support the development of collaborative research grant applications to address agreed topics. SiREN also informally exchanged knowledge with stakeholders at meetings and events which informed alignment. Alignment strengthened trust between SiREN and its partners and service users and provided SiREN with the insight required to develop solutions to research and evaluation challenges:

I do feel that the sector has grown. I feel that SiREN's grown, and I think they've actually grown together... (SiREN) understanding the sector more, and the challenges that come, but also having some great ideas on ways to deal with those challenges as well. (P9)

Impacts and Outcomes

The second causal loop diagram (Figure 2) explores the impacts and outcomes that have resulted from engagement between SiREN, its partners and service users. The diagram shows that an occurrence of an impact or outcome does not mean an end point has been reached; rather it is feedback into the system as an input and continues to create change. The variables for this diagram are defined in Table 3.

Impacts are defined as short-term changes that generally occur before outcomes, such as increased research and evaluation confidence, knowledge and skills. Outcomes are longer-term changes, an example being the application of evidence to policy and practice decision-making (80).

Clarity, Ability and Credibility

When SiREN provided program planning and evaluation support, a logic model program plan was often developed that

TABLE 3 | A description of impact and outcome variables.

Variable	Description
Clarity of program purpose and processes	Understanding what a program is aiming to achieve, how it will achieve it, and how it fits within the broader SHBBV prevention and management system.
Co-created research and evaluation solutions	SiREN, its partners and/or service users combined knowledge to co-create research and evaluation solutions, e.g., evaluation method or a research grant application.
Continuous learning	SiREN provided a range of opportunities to engage in ongoing learning, e.g., workshops, online resources, post graduate research.
Culture that values research and evaluation	Value the contribution that research and evaluation makes to their practice and is open to participating in new research and evaluation opportunities.
Engagement with SiREN	Engagement occurred when a SiREN partner or service user participated in a SiREN advisory group; partnered with SiREN to undertake research, evaluation or apply for a grant; or received program planning, evaluation or research support.
Evidence created and shared	SiREN worked collaboratively to create and share an evidence base that is relevant to local issues, e.g., journal article or report.
Evidence-informed policy and practice	Involves combining the best available evidence from research and evaluation, experiential knowledge and contextual factors to inform decision-making (5).
Mainstreaming evaluation	Integrating evaluation as part of routine practice (79), e.g., the development of evaluation plans.
Networks and partnerships	Formal and informal relationships between researchers (including SiREN), service providers and/or government to create and share evidence and knowledge.
Perceived credibility	Perceived the credibility of the evidence created or their program and/or organization increased after receiving support from SiREN.
Research and evaluation abilities	The confidence, knowledge and skills to undertake research and evaluation and apply evidence to decision-making.
Resources for research and evaluation	Resources included financial and human resources, e.g., research grant funding or opportunities for postgraduate research students.
Sustainable research and evaluation practice	Research and evaluation capacity is maintained or increased over an extended period.

outlined objectives, strategies, and evaluation measures. Several participants explained the process of creating this plan increased clarity around their program:

That was the biggest thing that I got out of it (working with SiREN), was having that really clear understanding of this is exactly what I'm trying to do, and this is how I need to do it. (P5)

Engagement with SiREN and clarity of program purpose and processes increased *research and evaluation abilities* at an individual level. Some participants described losing confidence in their evaluation skills in their initial engagement with SiREN as they developed more comprehensive knowledge and capability. The ongoing and flexible support provided by SiREN provided individuals with an opportunity to engage in *continuous learning*. This iterative, action-oriented process of learning and doing while supported by SiREN, enabled participants to put new knowledge and skills into practice and re-build their confidence:

I had thought that I had a handle on exactly what I was trying to achieve in my project at that particular time and how I would measure it. It wasn't until I went through this formal process of having to strip it back, that I realised that maybe I didn't quite have the handle that I thought I had. (P5)

Several participants reported that engaging with SiREN increased the credibility of their program and research or evaluation findings. This increased confidence to share their work

at conferences and events and work in partnership with other organizations.

Building Sustainable Research and Evaluation Practice

SiREN contributed to building *sustainable research and evaluation practices* by increasing *research and evaluation abilities* [Figure 2, reinforcing loop 1 (R1)]. As abilities developed, individuals and organizations were more likely to engage in research and evaluation activities, thus increasing research and evaluation practice sustainability. SiREN has also supported *sustainable research and evaluation practices* by developing a *culture that values research and evaluation*. Participants spoke about how they placed more value on evaluation and research due to engaging with SiREN. One participant reflected on how they now felt comfortable taking risks, e.g., pursuing a new research project, knowing they had the support of SiREN. This growth in research and evaluation culture built sustainability by increasing research and evaluation activity as service users saw the benefits it brought to their work:

It's not something you just tag on the end of something. I've learned a lot about the importance of evaluation... now I want to spend more time on evaluation... But it's not because I have to do it, it's because I need to do it. Because at the end of the day, that's so important for funding... I can see the impact that this training could really have if I evaluate it properly. (P11)

SiREN has also supported *sustainable research and evaluation practice* by working with individuals and organizations to develop logic model program plans that contributed to *mainstreaming evaluation* in their organizations. Furthermore, it provided *continuous learning opportunities* such as the supervision of postgraduate research students; the provision of online resources such as evaluation toolkits; and the delivery of personalized research and evaluation support. These changes begin at the individual level. Over a period of several years, SiREN has been able to build capacity within multiple organizations leading to these changes being evident across the system. However, the dynamic nature of the system, e.g., funding and staffing changes, can disrupt this.

Relationships and the Co-creation and Sharing of Evidence

SiREN worked with its partners and service users to *co-create research and evaluation solutions*. These solutions included creating evaluation plans, designing evaluation tools, and developing research grant applications to address gaps in the evidence base. As part of this process, knowledge of contextual factors, (e.g., target group, setting) and research and evaluation methods, (e.g., survey development) was combined to develop practical solutions:

Everything we did, we tested and then (SiREN staff member) and I would have a discussion about it, and then... so, it went through several changes before we got an assessment tool (evaluation survey) ready to use... It meant I knew the assessment tool was going to be appropriate. The process was rigorous, we had thought of everything. (P12)

The ability of SiREN to connect stakeholders from diverse backgrounds to address challenges is an indicator of effectiveness at the system level (77). Between 2012 and 2020, SiREN has led and supported over 14 collaborative research and evaluation projects that have brought together researchers, practitioners and policymakers from around Australia, including a large national competitive grant. This has generated \$1.5 million in additional financial resources for research and evaluation within the system. SiREN acted as a relationship facilitator by connecting researchers across Australia with WA based organizations to support the development and implementation of applied research projects. The benefits of SiREN's connections were noted by one of its research partners:

The thing that's probably allowed us to consider WA more often, has been that not only having SiREN, but people who get that approach (applied research) and can kind of be the people that work directly with some of the agencies... what it means is it is a much more genuinely and true collaborative relationship... it's just really difficult to maintain a true collaborative project with that kind of distance. (P15)

The development of *networks and partnerships* has a reinforcing relationship with engagement; increased connections within the system led to new stakeholders engaging with SiREN [Figure 2, reinforcing loop 2 (R2)]. *Networks and partnerships* also had

TABLE 4 | Summary of SiREN's evidence and capacity building outputs from 2012 to 2020.

Activity	Output
Evidence building and translational research	
Peer reviewed journal articles	48
Reports / other publications	17
Conference abstracts, presentations, workshops, or posters	57
Workforce development and capacity building	
Hours of tailored research and evaluation support provided to 23 organizations	1,137
Events delivered or co-facilitated by SiREN	32
Post graduate students supervised (Honors, Masters and PhD)	33

a reinforcing relationship with creating and sharing evidence [Figure 2, reinforcing loop 3 (R3)]. A lack of contextually relevant research is acknowledged as a barrier to evidence-informed decision-making (81). To address this, SiREN has supported creating an evidence base relevant to WA's SHBBV unique priorities and challenges. This was achieved through two main strategies: building the capacity of stakeholders to generate research and evaluation evidence; and participating in, and facilitating collaborative partnerships between researchers, service providers and policymakers to create and share evidence. Knowledge sharing occurred at a system level and was facilitated by disseminating evidence, (e.g., learning resources, findings from research and evaluation projects) through its website, social media accounts, video case studies, regular electronic communications to its member network, (e.g., evidence summaries), and biennial 2-day research symposium. In addition, SiREN supported knowledge sharing by providing training, support, and resources to build confidence and skills of the SHBBV workforce to share research and evaluation findings at conferences and other fora. Table 4 presents a summary of SiREN's tangible evidence and capacity building outputs which support the study findings.

The Application of Evidence to Decision-Making

Evidence created by SiREN and its stakeholders has been used by government to inform policy decisions at both the state and national levels. For example, SiREN recently completed an evidence review which informed the development of strategies that guide the response to SHBBV issues across the state of WA (82). In addition, organizations have used evidence created by SiREN to inform how their services are delivered. An example is the use of a report written by SiREN (83), which a participant described:

Staff refer to it (a report produced by SiREN) to inform the work they're doing around culturally and linguistically diverse communities... So that report certainly drove both local programs but also I think a lot of the advocacy work of WA to the rest of the country. (P14)

Another way SiREN has supported evidence-informed decision-making is by assisting organizations to evaluate their programs. Evaluation findings were then combined with other sources of evidence, (e.g., research and experiential knowledge) to inform program delivery. This was explained by a manager whose non-government organization had received support to plan and evaluate each of their programs, including support to deliver focus groups:

We've increased the amount of evaluation that we've done to justify being able to do the things that we need to do to increase the services. We've got that (new service), and that's a genuine, direct result of the research that's been out there around the importance of taking services to people and also from us doing focus groups. (P9)

DISCUSSION

A systems approach explored how and in what ways a research and evaluation capacity building project (SiREN) supported research, evaluation, and evidence-informed decision-making capacity within a system focusing on the prevention and management of STIs and BBVs (the system). Situating SiREN within the system enabled the research to address gaps in the existing capacity building literature. Including examining how contextual factors interacted with SiREN's ability to create change, how SiREN contributed to change across multiple levels, and the kinds of change it achieved (14).

Synergistic Engagement to Create Change

Synergistic (extended) engagement between SiREN, its service users and partners led to more impacts and outcomes than transactional (brief) engagement. While these different types of engagement are not depicted in the causal loop diagrams, describing them provides insight into the kinds of changes different capacity building strategies can achieve (7, 84). In the partnership literature, synergy occurs when partners combine their knowledge, skills and resources to develop effective solutions (77). Synergy is based on trusting relationships (85), which, once established, lead to more significant change. In this study, the effects seen from synergistic engagement are attributed to the presence of trust, adapting support to the service user's needs, and/or providing them opportunities to learn by doing. This aligns with theories of capacity building, highlighted in the introduction, that emphasize the importance of those involved being committed and seeing value in the capacity building process (7, 8). While this study and others (84, 86) acknowledge the benefits of transactional engagement strategies as part of a multi-component approach to building capacity, synergistic engagement had the ability to create sustainable change, (e.g., from increased individual research and evaluation skills to sustainable research and evaluation practice). These findings align with recent studies (7, 55, 84, 86), which found strategies that are needs-based and provide practical opportunities to apply learnings are an effective and meaningful way to build capacity.

Leverage Points

One of the most valuable insights gained through the use of causal loop diagrams was identifying key points of influence within the system. The development of trusting relationships between SiREN, its partners, and service users was identified as a point essential to SiREN's success. Trust had a reinforcing effect on engagement with SiREN [Figure 1, reinforcing loop 2 (R2)]. While trust is widely accepted as a fundamental component of effective partnerships (36, 77) and research capacity building efforts (7, 87, 88), it has not been explored within the evaluation capacity building literature (89). This research suggests that development of trust in evaluation capacity building parallels the research capacity building and broader partnership literature. The findings indicate trust was predicated on credibility, reliability, and power-sharing to define problems and shape solutions (85, 90). The role these factors played was evident in the trust-building effects of meeting expectations, boundary-spanning skills of the SiREN team, and the collaborative processes of aligning SiREN to stakeholder needs. Identifying leverage points enables action on these points of influence to strengthen its functioning (91).

Change Across the Individual, Organizational, and System Level

There is a need for capacity building programs to focus on change at a system level (e.g., creation of shared research priorities, priorities of funders, partnerships, and sustainability) (92). An evaluation of SiREN, undertaken 2 years after initial funding, identified individual-level improvements to research and evaluation attitudes, knowledge, skills and confidence (25). For the present study, data were collected up to 8 years after SiREN was established and showed these individual-level changes had continued and identified further changes evident across individual, organizational and system levels. Organizational level changes were co-created research and evaluation solutions, mainstreaming evaluation, and evidence-informed decision making. System level changes included increased resources for research and evaluation (e.g., funding), the development of networks and partnerships that led to more efficient responses to emerging issues (e.g., collaborative research priority setting), evidence sharing, and sustainable research and evaluation practice. While many system level changes begin at the individual level (e.g., support to undertake a research project), they can reverberate across the system over time when they occur through synergistic engagement. This "ripple effect" theory has been identified previously in the research partnership literature (88). The sustained investment in SiREN by its primary funder provided the resources to achieve these valuable longer-term changes. Supported by this research is the need for greater awareness that capacity building initiatives may not yield outcomes in the first few years. This finding is important to manage stakeholder expectations of what can be achieved and identify appropriate evaluation time points. This is a valuable consideration for groups interested in implementing capacity building initiatives, particularly in negotiating key performance indicators with funding organizations or the timing of evaluation.

The authors acknowledge that SiREN is just one of many influences on research and evaluation practices within the system. While SiREN elicited meaningful change at an individual and organizational level, which has rippled outwards to system level change, its ability to produce change directly at the system level is limited by its scope and size. Adding to this challenge is that complex systems exist in a permanent state of change (93). In this system, there is a perpetual movement of staff in and out, there are changes to funding, and epidemiological variations occur requiring new resources and evidence to respond. There is need for continuous capacity building in public health (94), yet how to achieve sustained change from capacity building strategies requires further exploration (84). SiREN's continued investment in aligning its services and resources to the needs of stakeholders support its ability to address emerging changes. Furthermore, its contribution to embedding evaluation as part of regular practice in the system and the continuous learning opportunities it provides increase sustainability by ensuring that the impacts of its capacity building strategies efforts do not diminish over time (2). Therefore, system level capacity building projects need to be flexible and responsive to change within the system they operate and approach capacity building as a continual process rather than an end point.

Many of the impacts and outcomes achieved align with what is widely known in the capacity building literature, e.g., changes to knowledge and skills, the establishment of networks and partnerships (2, 86, 87). However, unexpected changes were also identified, including increased clarity amongst SiREN service users of their program purpose, processes and credibility of programs. Identifying unanticipated outcomes demonstrates the benefit that a systems approach contributed to understanding SiREN's changes. Systems approaches go beyond measuring the extent to which pre-determined objectives or goals are met, which is a common end-point in more traditional evaluation approaches. The detection of unexpected outcomes suggests the evaluation of capacity building projects can be strengthened through approaches that are sensitive to their complexities (43).

Development of Practical Indicators

One of the aims of creating the causal loop diagrams was to gain an in-depth understanding of SiREN to inform the subsequent development of a comprehensive evaluation framework. Causal loop diagrams can support the identification of high quality and useful indicators (21). Insights from this study have since been used to develop specific indicators to monitor SiREN's processes, impacts and outcomes. For example, the presence of trusting relationships has been identified as an important indicator due to its reinforcing effect on engagement. In addition to an evaluation framework, a questionnaire for SiREN service users was subsequently developed based on findings (described in a forthcoming publication).

Strengths and Limitations

The use of causal loop diagrams and supporting quotes provided credible explanatory links between SiREN and

changes that occurred (95). In addition, the causal loop diagram illustrating factors that influence engagement with SiREN strengthens understanding of how contextual variables interact and affect implementation and effectiveness. Explaining contextual factors and their relationship to the functioning of SiREN avoided over or under-stating causality and ensured key elements that influence functioning were not obscured.

In public health, many causal loop diagram studies are created only by the researcher team, without input from stakeholders (96). Collaborative model building processes can help stakeholders overcome difficulties with interpretation (97), develop a shared understanding of how systems variables and relationships drive change (21) and create consensus on how to address the issue illustrated by the diagram (97). The process and value of the collaborative model building was not assessed in this study. Most protocols for developing causal loop diagrams focus on the early stages of group model development (98, 99). Guidance on validating diagrams at later stages of development is limited to individual interviews (33, 100). Refining diagrams using individual interviews may be better at clarifying and capturing different perspectives when compared to group methods (101). Future causal loop diagram studies could examine group processes of model development at the later stages of model development.

As staff employed by SiREN's primary funder declined to participate, the study findings do not include their perspectives. This may mean that some impacts and outcomes were not identified. As with any modeling, simplification was required. Not all feedback loops were reported for the diagram depicting impacts and outcomes as they were too numerous and would overcomplicate the presentation of study results. Instead, the diagrams are supported through additional detail provided by the narrative description.

As members of the research team are involved with SiREN, social desirability bias may have occurred during data collection (102). This was reduced by utilizing a variety of data collection methods, providing participants with assurances of confidentiality, probing to clarify in-depth interview responses, and discussing data collection processes with the SiREN team (102). Several strategies addressed the limitations associated with insider research and a single researcher collecting data and conducting primary analysis. Trustworthiness was increased through data triangulation, reflective journaling and regular meetings with the research team during data collection and analysis to discuss and refine emerging findings (103). During these meetings, a team member who was not involved in SiREN was present to enhance objectivity (103). In addition, diagram elements were linked to data sources in a reference table (70), and the diagram was validated with participants, a form of member checking (104, 105). The diagram was modified for publication after this validation process. The changes were based on data collected and included splitting the diagram into two and adding additional variables and relationships. These changes

were intended to increase the accuracy of the diagram and support its interpretation in published form. Refining diagrams after data collection has ceased has been used in previous studies and aligns with good model building practice (106). Furthermore, developing “reader friendly” casual loop diagrams requires considering how the diagram functions as an effective tool for communicating findings (96). However, changes were not checked with original participants, which may have reduced the trustworthiness of the diagrams. Data collection occurred up to 2 years after some participants engaged with SiREN resulting in potential recall bias. However, this longer-term follow-up enabled the identification of outcomes that would not have been distinguishable immediately after engagement had occurred.

CONCLUSION

This study used causal loop diagrams to provide new insight into how a partnership-based project contributed to building research and evaluation capacity. Findings suggest a complex interplay of contextual and process factors promoted engagement with SiREN, which resulted in research, evaluation, and evidence-informed decision-making capacity improvements within the system. The use of causal loop diagrams highlighted key leverage points that may be exploited to facilitate improvement and evaluation. The focus on contextual factors and their relationship to engagement provide valuable guidance for researchers, policymakers or practitioners seeking to develop or evaluate a similar capacity building partnership.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

REFERENCES

- Brownson RC, Fielding JE, Maylahn CM. Evidence-based public health: a fundamental concept for public health practice. *Annu Rev Public Health*. (2009) 30:175–201. doi: 10.1146/annurev-publhealth.031308.100134
- Preskill H, Boyle S. A multidisciplinary model of evaluation capacity building. *Am J Eval*. (2008) 29:443–59. doi: 10.1177/1098214008324182
- Cooke J. A framework to evaluate research capacity building in health care. *BMC Fam Pract*. (2005) 6:1. doi: 10.1186/1471-2296-6-44
- Labin SN, Duffy JL, Meyers DC, Wandersman A, Lesesne CA. A research synthesis of the evaluation capacity building literature. *Am J Eval*. (2012) 33:307–38. doi: 10.1177/1098214011434608
- Armstrong R, Waters E, Moore L, Dobbins M, Pettman T, Burns C, et al. Understanding evidence: a statewide survey to explore evidence-informed public health decision-making in a local government setting. *Implement Sci*. (2014) 9:188. doi: 10.1186/s13012-014-0188-7
- Dobbins M, Jack S, Thomas H, Kothari A. Public health decision-makers' informational needs and preferences for receiving research evidence. *Worldviews Evid Based Nurs*. (2007) 4:156–63. doi: 10.1111/j.1741-6787.2007.00089.x
- Cooke J, Gardois P, Booth A. Uncovering the mechanisms of research capacity development in health and social care: a realist synthesis. *Health Res Policy Syst*. (2018) 16:93. doi: 10.1186/s12961-018-0363-4
- Bourgeois I, Simmons L, Buetti D. Building evaluation capacity in Ontario's public health units: promising practices and strategies. *Public Health*. (2018) 159:89–94. doi: 10.1016/j.puhe.2018.01.031
- Leeman J, Calancie L, Hartman MA, Escoffery CT, Herrmann AK, Tague LE, et al. What strategies are used to build practitioners' capacity to implement community-based interventions and are they effective?: a systematic review. *Implement Sci*. (2015) 10:80. doi: 10.1186/s13012-015-0272-7
- Punton M, Vogel I, Lloyd R. *Reflections from a Realist Evaluation in Progress: Scaling Ladders and Stitching Theory*. (2016). Available online at: <http://opendocs.ids.ac.uk/opendocs/handle/123456789/11254> (accessed January 19, 2021).
- Punton M. *How Can Capacity Development Promote Evidence-Informed Policy Making? Literature Review for the Building Capacity to Use Research Evidence (BCURE) Programme*. East Sussex: Itad Ltd. (2016). Available online at: <http://www.itad.com/wp-content/uploads/2016/04/BCURE-Literature-Review-FINAL-010416.pdf> (accessed July 17, 2018).
- Lindeman PT, Bettin E, Beach LB, Adames CN, Johnson AK, Kern D, et al. Evaluation capacity building—Results and reflections across two years of a multisite empowerment evaluation in an HIV prevention context. *Eval Program Plann*. (2018) 71:83–8. doi: 10.1016/j.evalprogplan.2018.09.001
- Preskill H. Now for the hard stuff: next steps in ECB research and practice. *Am J Eval*. (2014) 35:116–9. doi: 10.1177/1098214013499439
- DeCorby-Watson K, Mensah G, Bergeron K, Abdi S, Rempel B, Manson H. Effectiveness of capacity building interventions relevant to

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Curtin University Human Research Ethics Committee. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

The study was conceptualized by RT, JH, BM, and RL. RT undertook recruitment, data collection and analysis with input and supervision from RL, JH, and BM. RT drafted and edited the manuscript. RL, JH, BM, and GC provided critical feedback. All authors have approved the final manuscript.

FUNDING

This study was undertaken as part of RT doctoral studies. To undertake their doctoral studies RT was supported by an Australian Government Research Training Program Scholarship, a completion scholarship from the Graduate Research School at Curtin University, and a scholarship from SiREN which was supported by the Sexual Health and Blood-Borne Virus Program, Government of Western Australia Department of Health.

ACKNOWLEDGMENTS

The authors would like to acknowledge the contribution of time and insight provided by members of the SiREN steering group and management team which supported the development of this study. We would also like to thank participants for taking the time to provide their perspectives and experiences of SiREN.

- public health practice: a systematic review. *BMC Public Health*. (2018) 18:684. doi: 10.1186/s12889-018-5591-6
15. Grack Nelson A, King JA, Lawrenz F, Reich C, Bequette M, Pattison S, et al. Using a complex adaptive systems perspective to illuminate the concept of evaluation capacity building in a network. *Am J Eval*. (2018) 40:109821401877387 doi: 10.1177/1098214018773877
 16. Times Higher Education. *World University Rankings 2021*. (2021). Available online at: https://www.timeshighereducation.com/world-university-rankings/2021/world-ranking#!page/0/length/25/sort_by/rank/sort_order/asc/cols/stats (accessed January 19, 2021).
 17. Crawford G, Lobo R, Brown G, Maycock B. The influence of population mobility on changing patterns of HIV acquisition: lessons for and from Australia. *Health Promot J Austr*. (2016) 27:153–4. doi: 10.1071/HE15042
 18. Kirby Institute. *National Update on HIV, Viral Hepatitis and Sexually Transmissible Infections in Australia: 2009–2018*. Sydney: UNSW Sydney (2020). Available online at: <https://kirby.unsw.edu.au/sites/default/files/kirby/report/National-update-on-HIV-viral-hepatitis-and-STIs-2009-2018.pdf> (accessed January 19, 2021).
 19. Sexual Health and Blood-borne Virus Applied Research and Evaluation Network. *SIREN Sector Needs Assessment Survey*. Perth: Curtin University (2018). Available online at: <https://siren.org.au/wp-content/uploads/2019/07/2018-SIREN-SHBBV-Sector-Needs-Assessment-Survey-Report.pdf> (accessed January 19, 2021).
 20. Brown G, Johnston K, Ellard J, Carman M. *Evidence Synthesis and Application for Policy and Practice Project Full Report, ARCSHS Monograph Series No. 89*. Melbourne: Australian Research Centre in Sex, Health and Society, La Trobe University (2013). Available online at: <https://whatworkshyproject.files.wordpress.com/2016/08/esapp-full-report-july-2013.pdf> (accessed March 18, 2021).
 21. Brown G, Reeders D, Cogle A, Madden A, Kim J, O'Donnell D. A systems thinking approach to understanding and demonstrating the role of peer-led programs and leadership in the response to HIV and hepatitis C: findings from the W3 project. *Front Public Health*. (2018) 6:231. doi: 10.3389/fpubh.2018.00231
 22. Eoyang G, Berkas T. *Evaluating performance in a CAS*. (1998). Available online at: https://www.researchgate.net/publication/237571019_Evaluation_in_a_Complex_Adaptive_System (accessed January 19, 2021).
 23. Paina L, Peters DH. Understanding pathways for scaling up health services through the lens of complex adaptive systems. *Health Policy Plan*. (2011) 27:365–73. doi: 10.1093/heapol/czr054
 24. Foster-Fishman PG, Nowell B, Yang H. Putting the system back into systems change: a framework for understanding and changing organizational and community systems. *Am J Community Psychol*. (2007) 39:197–215. doi: 10.1007/s10464-007-9109-0
 25. Lobo R, Crawford G, Hallett J, Laing S, Mak DB, Jancey J, et al. A research and evaluation capacity building model in Western Australia. *Health Promot Int*. (2016) 33:468–78. doi: 10.1093/heapro/daw088
 26. Tobin R, Hallett J, Lobo R, Maycock BR. Taking a systems approach to explore the impacts and outcomes of a research and evaluation capacity building partnership: a protocol. *BMJ Open*. (2019) 9:e026706. doi: 10.1136/bmjopen-2018-026706
 27. Tobin R, Crawford G, Hallett J, Maycock BR, Lobo R. Critical factors that affect the functioning of a research and evaluation capacity building partnership: a causal loop diagram. *PLoS ONE*. (2022) 17:e0262125. doi: 10.1371/journal.pone.0262125
 28. Hawe P, Shiell A, Riley T. Theorising interventions as events in systems. *Am J Community Psychol*. (2009) 43:267–76. doi: 10.1007/s10464-009-9229-9
 29. Chen HT. Interfacing theories of program with theories of evaluation for advancing evaluation practice: reductionism, systems thinking, and pragmatic synthesis. *Eval Program Plann*. (2016) 59:109–18. doi: 10.1016/j.evalprogplan.2016.05.012
 30. Rosas S, Knight E. Evaluating a complex health promotion intervention: case application of three systems methods. *Critical Public Health*. (2019) 29:337–52. doi: 10.1080/09581596.2018.1455966
 31. Sterman J. *Business Dynamics: Systems Thinking and Modeling for a Complex World* Boston: Irwin/McGraw-Hill (2000).
 32. Forrester JW. *Industrial Dynamics*. Cambridge, MA: Productivity Press (1961).
 33. Kenzie ES. *Get Your Model Out There: Advancing Methods for Developing and Using Causal-Loop Diagrams* (Doctoral Thesis). Portland State University, Portland (2021).
 34. Fredericks KA, Deegan M, Carman JG. Using system dynamics as an evaluation tool: experience from a demonstration program. *Am J Eval*. (2008) 29:251–67. doi: 10.1177/1098214008319446
 35. Jalali MS, Rahmandad H, Bullock SL, Lee-Kwan SH, Gittelsohn J, Ammerman A. Dynamics of intervention adoption, implementation, and maintenance inside organizations: the case of an obesity prevention initiative. *Soc Sci Med*. (2019) 224:67–76. doi: 10.1016/j.socscimed.2018.12.021
 36. Corbin JH, Jones J, Barry MM. What makes intersectoral partnerships for health promotion work? A review of the international literature. *Health Promot Int*. (2016) 33:4–26. doi: 10.1093/heapro/daw061
 37. Gates EF. Making sense of the emerging conversation in evaluation about systems thinking and complexity science. *Eval Program Plann*. (2016) 59:62–73. doi: 10.1016/j.evalprogplan.2016.08.004
 38. Meadows DH. *Leverage Points: Places to Intervene in a System*. Hartland: Sustainability Institute (1999). Available online at: http://drbalcom.pbworks.com/w/file/attach/35173014/Leverage_Points.pdf (accessed January 19, 2021).
 39. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care*. (2007) 19:349–57. doi: 10.1093/intqhc/mzm042
 40. Cabrera D, Colosi L, Lobdell C. Systems thinking. *Eval Program Plann*. (2008) 31:299–310. doi: 10.1016/j.evalprogplan.2007.12.001
 41. Checkland P. Systems thinking. In: *Rethinking Management Information Systems: An Interdisciplinary Perspective*. New York, NY: Oxford University Press (1999). Available online at: https://books.google.com.au/books?id=QJJE-p5LdG4C&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false (accessed April 29, 2021).
 42. Midgley G. Systems thinking for evaluation. In: Williams B, Imam I, editors. *Systems Concepts in Evaluation: An Expert Anthology*. California: EdgePress of Inverness (2006), p. 11–33.
 43. Williams B, Imam I. *Systems Concepts in Evaluation: An Expert Anthology*. California: EdgePress of Inverness (2006).
 44. Hummelbrunner R. Systems thinking and evaluation. *Evaluation*. (2011) 17:395–403. doi: 10.1177/1356389011421935
 45. Hargreaves MB. *Evaluating System Change: A Planning Guide*. Princeton: Mathematica (2010). Available online at: [https://www.mathematica.org/-/media/publications/PDFs/health/eval_system_change_methodbr.pdf#:~:sim\\$=text=Evaluating%20System%20Change%3A%20A%20Planning%20Guide%20Interest%20among%28Brest%20and%20Harvey%202008%3B%20Leischow%20et%20al.%202008%29](https://www.mathematica.org/-/media/publications/PDFs/health/eval_system_change_methodbr.pdf#:~:sim$=text=Evaluating%20System%20Change%3A%20A%20Planning%20Guide%20Interest%20among%28Brest%20and%20Harvey%202008%3B%20Leischow%20et%20al.%202008%29) (accessed March 19, 2021).
 46. Renger R, Atkinson L, Renger J, Renger J, Hart G. The connection between logic models and systems thinking concepts. *Eval J Australas*. (2019) 19:79–87. doi: 10.1177/1035719X19853660
 47. Owen B, Brown AD, Kuhlberg J, Millar L, Nichols M, Economos C, et al. Understanding a successful obesity prevention initiative in children under 5 from a systems perspective. *PLoS ONE*. (2018) 13:e0195141. doi: 10.1371/journal.pone.0195141
 48. Williams B, Hummelbrunner R. *Systems Concepts in Action: A Practitioner's Toolkit*. California: Stanford University Press (2010). doi: 10.1515/9780804776554
 49. Hassmiller Lich K, Urban JB, Frerichs L, Dave G. Extending systems thinking in planning and evaluation using group concept mapping and system dynamics to tackle complex problems. *Eval Prog Plan*. (2017) 60:254–64. doi: 10.1016/j.evalprogplan.2016.10.008
 50. Wilkinson H, Hills D, Penn A, Barbrook-Johnson P. Building a system-based theory of change using participatory systems mapping. *Evaluation*. (2021) 27:80–101. doi: 10.1177/1356389020980493
 51. Biroscak BJ. Use of system dynamics modeling to explicate the theory-of-change of a social marketing innovation. *Soc Mar Q*. (2014) 20:247–67. doi: 10.1177/1524500414556649
 52. Clarke B, Kwon J, Swinburn B, Sacks G. Understanding the dynamics of obesity prevention policy decision-making using a systems perspective: a case study of Healthy Together Victoria. *PLoS ONE*. (2021) 16:e0245535. doi: 10.1371/journal.pone.0245535

53. Brownson RC, Fielding JE, Green LW. Building capacity for evidence-based public health: reconciling the pulls of practice and the push of research. *Annu Rev Public Health*. (2018) 39:27–53. doi: 10.1146/annurev-publhealth-040617-014746
54. Edwards B, Stickney B, Milat A, Campbell D, Thackway S. Building research and evaluation capacity in population health: the NSW Health approach. *Health Promot J Austr*. (2016) 27:264–7. doi: 10.1071/HE16045
55. Lawrenz F, Kollmann EK, King JA, Bequette M, Pattison S, Nelson AG, et al. Promoting evaluation capacity building in a complex adaptive system. *Eval Program Plann*. (2018) 69:53–60. doi: 10.1016/j.evalprogplan.2018.04.005
56. Rycroft-Malone J, Burton CR, Wilkinson J, Harvey G, McCormack B, Baker R, et al. Collective action for implementation: a realist evaluation of organisational collaboration in healthcare. *Implement Sci*. (2015) 11:17. doi: 10.1186/s13012-016-0380-z
57. Asselin ME. Insider research: issues to consider when doing qualitative research in your own setting. *J Nurs Staff Dev*. (2003) 19:99–103. doi: 10.1097/00124645-200303000-00008
58. Bonner A, Tolhurst G. Insider-outsider perspectives of participant observation. *Nurse Res*. (2002) 9:7. doi: 10.7748/nr2002.07.9.4.7.c6194
59. Perry C, Thurston M, Green K. Involvement and detachment in researching sexuality: reflections on the process of semistructured interviewing. *Qual Health Res*. (2004) 14:135–48. doi: 10.1177/1049732303255853
60. Hayfield N, Huxley C. Insider and outsider perspectives: reflections on researcher identities in research with lesbian and bisexual women. *Qual Res Psychol*. (2015) 12:91–106. doi: 10.1080/14780887.2014.918224
61. LaSala MC. When interviewing “Family” maximizing the insider advantage in the qualitative study of lesbians and gay men. *J Gay Lesbian Soc Serv*. (2003) 15:15–30. doi: 10.1300/J041v15n01_02
62. Ortlipp M. Keeping and using reflective journals in the qualitative research process. *Qual Rep*. (2008) 13:695–705. doi: 10.46743/2160-3715/2008.1579
63. Dobbins M, Hanna SE, Ciliska D, Manske S, Cameron R, Mercer SL, et al. A randomized controlled trial evaluating the impact of knowledge translation and exchange strategies. *Implement Sci*. (2009) 4:1–16. doi: 10.1186/1748-5908-4-61
64. Lobo R, Petrich M, Burns SK. Supporting health promotion practitioners to undertake evaluation for program development. *BMC Public Health*. (2014) 14:1. doi: 10.1186/1471-2458-14-1315
65. Pager S, Holden L, Golenko X. Motivators, enablers, and barriers to building allied health research capacity. *J Multidiscip Healthc*. (2012) 5:e9. doi: 10.2147/JMDH.S27638
66. LaRocca R, Yost J, Dobbins M, Ciliska D, Butt M. The effectiveness of knowledge translation strategies used in public health: a systematic review. *BMC Public Health*. (2012) 12:751. doi: 10.1186/1471-2458-12-751
67. Holden L, Pager S, Golenko X, Ware RS. Validation of the research capacity and culture (RCC) tool: measuring RCC at individual, team and organisation levels. *Aust J Primary Health*. (2012) 18:62–7. doi: 10.1071/PY10081
68. Qualtrics. *Qualtrics*. Provo, UT (2015).
69. QSR International. *NVivo 12*. Melbourne (2018).
70. Kim H, Andersen DF. Building confidence in causal maps generated from purposive text data: mapping transcripts of the Federal Reserve. *Syst Dyn Rev*. (2012) 28:311–28. doi: 10.1002/sdr.1480
71. Ventana Systems Inc. *Vensim Software*. (2015). Available online at: <http://vensim.com/vensim-software/> (accessed January 10, 2022).
72. Rwashana AS, Nakubulwa S, Nakakeeto-Kijambu M, Adam T. Advancing the application of systems thinking in health: understanding the dynamics of neonatal mortality in Uganda. *Health Res Policy Syst*. (2014) 12:1. doi: 10.1186/1478-4505-12-36
73. Scarbrough H, D’Andreta D, Evans S, Marabelli M, Newell S, Powell J, et al. Networked innovation in the health sector: comparative qualitative study of the role of Collaborations for Leadership in Applied Health Research and Care in translating research into practice. *Health Serv Deliv Res*. (2014) 2:1–128. doi: 10.3310/hsdr02130
74. Lewicki RJ, Bunker BB. Developing and maintaining trust in work relationships. In: Kramer R, Tyler T, editors. *Trust in Organizations: Frontiers of Theory and Research*. London: SAGE Publications (1996). p. 114–39.
75. Brown G, O’Donnell D, Crooks L, Lake R. Mobilisation, politics, investment and constant adaptation: lessons from the Australian health-promotion response to HIV. *Health Promot J Austr*. (2014) 25:35–41. doi: 10.1071/HE13078
76. Hovland CI, Weiss W. The influence of source credibility on communication effectiveness. *Public Opin Q*. (1951) 15:635. doi: 10.1086/266350
77. Lasker RD, Weiss ES, Miller R. Partnership synergy: a practical framework for studying and strengthening the collaborative advantage. *Milbank Q*. (2001) 79:179–205. doi: 10.1111/1468-0009.00203
78. Ward V. Why, whose, what and how? A framework for knowledge mobilisers. *Evid Policy*. (2017) 13:477–97. doi: 10.1332/174426416X14634763278725
79. Labin SN. Developing common measures in evaluation capacity building: an iterative science and practice process. *Am J Eval*. (2014) 35:107–15. doi: 10.1177/1098214013499965
80. Bauman A, Nutbeam D. *Evaluation in a Nutshell: A Practical Guide to the Evaluation of Health Promotion Programs*. 2nd ed. Sydney: McGraw-Hill Education (2014).
81. Armstrong R, Waters E, Dobbins M, Anderson L, Moore L, Petticrew M, et al. Knowledge translation strategies to improve the use of evidence in public health decision making in local government: intervention design and implementation plan. *Implement Sci*. (2013) 8:121. doi: 10.1186/1748-5908-8-121
82. Rosenberg S, Lobo R, Hallett J. *An Evidence Review From Australia, Aotearoa/New Zealand and Canada for the WA Aboriginal Sexual Health and Blood-Borne Viruses Strategy*. Perth, WA: Curtin University (2019).
83. Crawford G, Lobo R, Brown G. *HIV and Mobility in Australia: Road Map for Action*. Australia. Western Australian Centre for Health Promotion Research and Australian Research Centre in Sex, Health and Society (2014).
84. Norton S, Milat A, Edwards B, Giffin M. Narrative review of strategies by organizations for building evaluation capacity. *Eval Program Plann*. (2016) 58:1–19. doi: 10.1016/j.evalprogplan.2016.04.004
85. Jones J, Barry MM. Exploring the relationship between synergy and partnership functioning factors in health promotion partnerships. *Health Promot Int*. (2011) 26:408–20. doi: 10.1093/heapro/dar002
86. Lamarre A, D’Avernas E, Raffoul A, Riley B, Jain R. A rapid review of evaluation capacity building strategies for chronic disease prevention. *Can J Program Eval*. (2020) 35:1–19. doi: 10.3138/cjpe.61270
87. Pulford J, Price N, Amegee Quach J, Bates I. Measuring the outcome and impact of research capacity strengthening initiatives: a review of indicators used or described in the published and grey literature. *F1000Res*. (2020) 9:517. doi: 10.12688/f1000research.24144.1
88. Jagosh J, Bush PL, Salsberg J, Macaulay AC, Greenhalgh T, Wong G, et al. A realist evaluation of community-based participatory research: partnership synergy, trust building and related ripple effects. *BMC Public Health*. (2015) 15:725. doi: 10.1186/s12889-015-1949-1
89. Wade J, Kallemeyn L. Evaluation capacity building (ECB) interventions and the development of sustainable evaluation practice: an exploratory study. *Eval Prog Plan*. (2020) 79:101777. doi: 10.1016/j.evalprogplan.2019.101777
90. Wye L, Cramer H, Beckett K, Farr M, Le May A, Carey J, et al. Collective knowledge brokering: the model and impact of an embedded team. *Evid Policy*. (2020) 16:429–52. doi: 10.1332/174426419X15468577044957
91. Wilkinson J, Goff M, Rusoja E, Hanson C, Swanson RC. The application of systems thinking concepts, methods, and tools to global health practices: an analysis of case studies. *J Eval Clin Pract*. (2018) 24:607–18. doi: 10.1111/jep.12842
92. Bowen S, Botting I, Graham ID. Re-imagining health research partnership in a post-COVID world: a response to recent commentaries. *Int J Health Policy Manage*. (2021) 10:39–41. doi: 10.34172/ijhpm.2020.69
93. Rutter H, Savona N, Glonti K, Bibby J, Cummins S, Finegood DT, et al. The need for a complex systems model of evidence for public health. *Lancet*. (2017) 390:2602–4. doi: 10.1016/S0140-6736(17)31267-9
94. World Health Organisation. *European Action Plan for Strengthening Public Health Capacities and Services*. Malta: World Health Organisation (2012). Available online at: https://www.euro.who.int/_data/assets/pdf_file/0005/171770/RC62wd12rev1-Eng.pdf (accessed March 15, 2021).

95. Gates E, Dyson L. Implications of the changing conversation about causality for evaluators. *Am J Eval.* (2017) 38:29–46. doi: 10.1177/1098214016644068
96. Baugh Littlejohns L, Hill C, Neudorf C. Diverse approaches to creating and using causal loop diagrams in public health research: recommendations from a scoping review. *Public Health Reviews.* (2021) 42:1604352. doi: 10.3389/phrs.2021.1604352
97. Siokou C, Morgan R, Shiell A. Group model building: a participatory approach to understanding and acting on systems. *Public Health Res Pract.* (2014) 25:e2511404. doi: 10.17061/phrp2511404
98. Richardson GP, Andersen DF. Teamwork in group model building. *Syst Dynam Rev.* (1995) 11:113–37. doi: 10.1002/sdr.4260110203
99. Vennix JA. Group model-building: tackling messy problems. *Syst Dynam Rev J Syst Dynam Soc.* (1999) 15:379–401. doi: 10.1002/(SICI)1099-1727(199924)15:4<379::AID-SDR179>3.0.CO;2-E
100. Andersen DL, Luna-Reyes LE, Diker VG, Black L, Rich E, Andersen DF. The disconfirmatory interview as a strategy for the assessment of system dynamics models. *Syst Dynam Rev.* (2012) 28:255–75. doi: 10.1002/sdr.1479
101. Hovmand PS, Andersen DF, Rouwette E, Richardson GP, Rux K, Calhoun A. Group model-building 'scripts' as a collaborative planning tool. *Syst Res Behav Sci.* (2012) 29:179–93. doi: 10.1002/sres.2105
102. Bergen N, Labonté R. "Everything is perfect, and we have no problems": detecting and limiting social desirability bias in qualitative research. *Qual Health Res.* (2020) 30:783–92. doi: 10.1177/1049732319889354
103. Krefling I. Rigor in qualitative research: the assessment of trustworthiness. *Am J Occup Ther.* (1991) 45:214–22. doi: 10.5014/ajot.45.3.214
104. Breen LJ. The researcher 'in the middle': negotiating the insider/outsider dichotomy. *Aust Community Psychol.* (2007) 19:163–74. Available online at: [https://groups.psychology.org.au/Assets/Files/Breen_19\(1\).pdf](https://groups.psychology.org.au/Assets/Files/Breen_19(1).pdf) (accessed May 13, 2022).
105. Kornbluh M. Combatting challenges to establishing trustworthiness in qualitative research. *Qual Res Psychol.* (2015) 12:397–414. doi: 10.1080/14780887.2015.1021941
106. Zablith N, Diaconu K, Naja F, El Koussa M, Loffreda G, Bou-Orm I, et al. Dynamics of non-communicable disease prevention, diagnosis and control in Lebanon, a fragile setting. *Conflict Health.* (2021) 15:4. doi: 10.1186/s13031-020-00337-2

Conflict of Interest: This manuscript presents a study undertaken as part of RT's PhD that examined SiREN. RT has previously been employed by SiREN. RL is the manager of SiREN. GC and JH are on SiREN management team. A scholarship from SiREN was paid to the PhD student (RT).

The remaining author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher's Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.

Copyright © 2022 Tobin, Crawford, Hallett, Maycock and Lobo. This is an open-access article distributed under the terms of the Creative Commons Attribution License (CC BY). The use, distribution or reproduction in other forums is permitted, provided the original author(s) and the copyright owner(s) are credited and that the original publication in this journal is cited, in accordance with accepted academic practice. No use, distribution or reproduction is permitted which does not comply with these terms.

5.2. Summary

This component of the research is linked to [Objective 2](#). It found that service user and partner engagement with SiREN was influenced by intersecting contextual factors, including organisational capacity and perceptions of SiREN. Process factors such as boundary spanning skills and the presence of trusting relationships were integral to SiREN's ability to strengthen research and evaluation capacity within the system. SiREN contributed to a range of impacts and outcomes related to capacity, including research and evaluation confidence, skills and knowledge, the development of networks and partnerships that led to a quicker response to SHBBV issues, increased resources for research and evaluation, evidence sharing, and sustainable research and evaluation practice.

Using CLDs, key factors were identified that SiREN could use for continuous improvement and evaluation. The findings from this study expand what is known about capacity building programs by identifying causal mechanisms and previously unexamined impacts.

The following chapter ([Chapter 6](#)) presents and describes the development of a framework that draws on the insights developed in this chapter and [Chapter 4](#).

6. Development and validation of the evaluation framework

This chapter describes and examines the final framework. A description of how the evaluation framework was developed and validated is presented in the methods section, specifically [Section 3.2.6](#).

This chapter relates to the following objective:

3. Develop and validate a framework to inform the ongoing monitoring and evaluation of SiREN.

6.1. Background

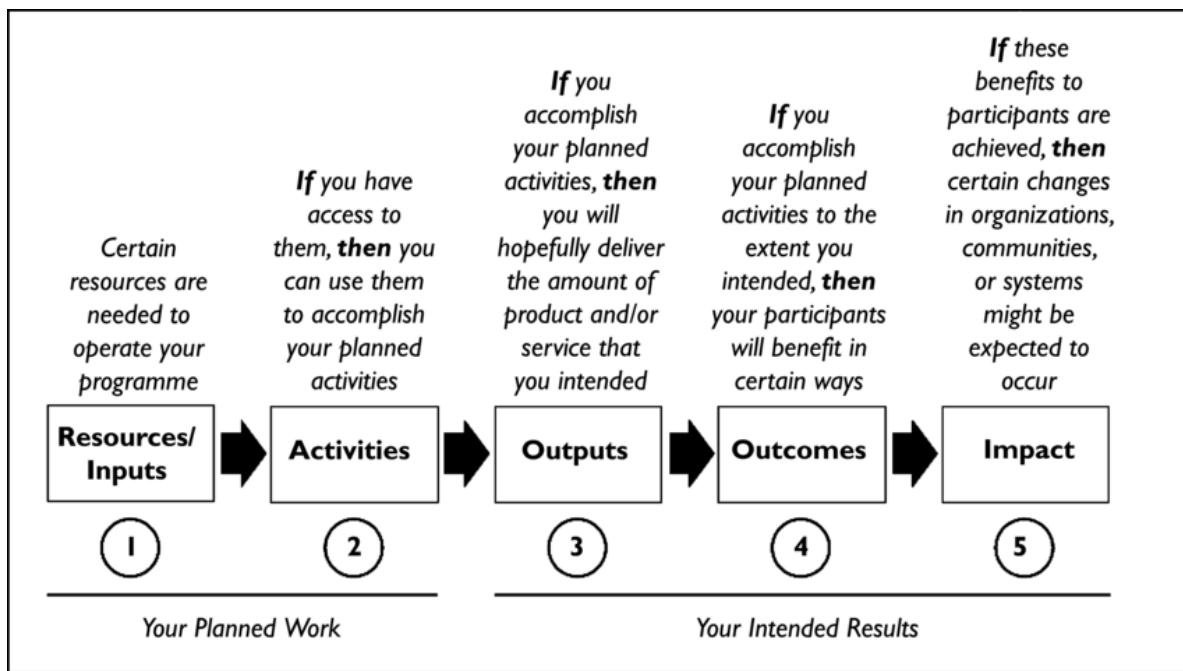
The CLDs described in [Chapters 4](#) and [5](#) illustrate the complex and dynamic relationships between SiREN's context, functioning and effects. An evaluation framework was developed and validated to operationalise the knowledge gained from the diagrams to guide the ongoing monitoring and evaluation of SiREN.

Included within this background section is a discussion of complexity sensitive evaluation frameworks and existing frameworks relevant to RECB.

6.1.1. Complexity sensitive evaluation frameworks

Evaluation frameworks shape knowledge of how to implement and evaluate a program (Arbour, 2020; Renger et al., 2019). Therefore, a framework that inadequately represents a program will be detrimental to understanding how a program contributes to change and what it can achieve. Logic models are a commonly utilised evaluation framework (Funnell & Rogers, 2011). These planning and evaluation tools visually present the resources required to deliver a program, the activities planned and the intended changes (Rogers, 2008). An overview of the components of a logic model is provided in Figure 14.

Figure 14. Components of a traditional logic model



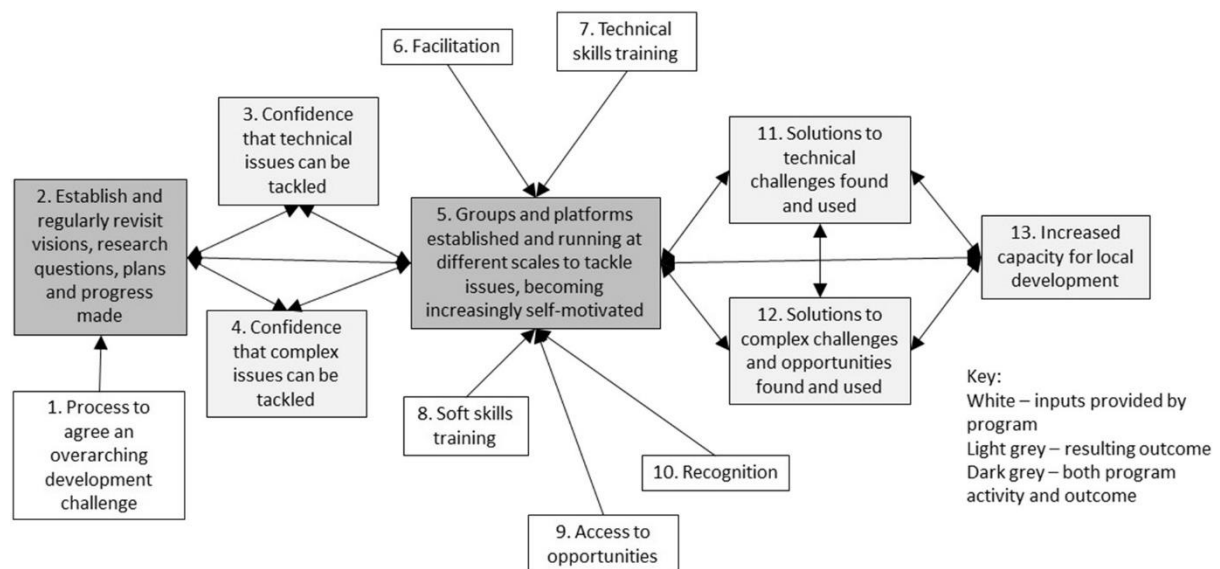
Source: WK Kellogg Foundation (2004)

The logic model has been criticised for failing to acknowledge complexity (Arkesteijn et al., 2015). Arkesteijn et al. (2015) explained that logic models are often developed prior to a program being implemented. Therefore, they are based on what is expected, rather than what has occurred. This limits their ability to support the identification of unexpected effects (Arkesteijn et al., 2015). Furthermore, logic models depict change as a linear process (e.g., activity leads directly to outcomes and impacts) and often do not place the program in context (e.g., social or political influences), thus assuming that programs 'exist in vacuums' (Cabrera et al., 2008). When taken literally, logic models can lead to inaccurate understanding of programs, impacting evaluation findings (Renger et al., 2019; Rodgers et al., 2014). Some studies have suggested modifying logic models to overcome these limitations (e.g., depicting causal relationships) (Rogers, 2008). However, Renger (2019) argues that as logic models were developed to highlight a program's purpose, not to reflect the complex relationships between program and contextual elements, they are not structured to adequately represent complexity.

Recently, evaluators have begun to experiment with reflecting program and contextual complexities in evaluation frameworks (Botha et al., 2017; Brown et al., 2018; Renger et al.,

2019; Rüegg et al., 2018). Douthwaite and Hoffecker (2017) developed a complexity aware theory of change for participatory research programs within an agricultural context. A theory of change provides an explanation of the central processes that drive change within a program and can be used to inform the development of evaluation frameworks (Funnell & Rogers, 2011). Theories of change can be depicted using textual descriptions, in tables or using text boxes connected by arrows to illustrate connections (Funnell & Rogers, 2011). In the causal model developed by Douthwaite and Hoffecker (2017), presented in Figure 15, the change process is depicted in the non-linear way that it occurred. This differs from the conventional theory of change or logic model diagrams, which depict the change process as linear. However, as noted by Jones et al. (2016), presenting the change process as linear has value when needing to easily communicate the intent of a program to stakeholders.

Figure 15. Example of a non-linear theory of change for participatory research programs



Source: (Douthwaite & Hoffecker, 2017)

Other examples of how evaluation frameworks can address complexity include contextualising the program within the system it operates (Cunningham et al., 2019; Jones et al., 2016; Rüegg et al., 2018). Contextualising a program involves examining the variables that affect the functioning and impacts of programs and including them in the evaluation framework (Cunningham et al., 2019). Contextualising a program is supported through participatory evaluation, an approach that involves stakeholders with a vested interest in the evaluation (e.g., program managers, funders) participating in the evaluation planning

and design (Patton, 1997). Including stakeholders strengthens evaluation by supporting understanding of the relationships between a program and its context, fostering stakeholder commitment to the process and leads to evaluation that is more likely to be used (Bryson et al., 2011; Stack et al., 2018). For example, Stack et al. (2018) developed an evaluation framework for a complex government reform program. They took a participatory approach that involved an iterative consultation process with stakeholders. This approach enabled the evaluation to respond to the dynamics of the program and its context, resulting in evaluation findings that were more useful to stakeholders (Stack et al., 2018).

6.1.2. Frameworks developed to evaluate RECB programs

There is an expansive body of literature describing frameworks for ECB (Labin et al., 2012; Preskill & Boyle, 2008; Schwarzman et al., 2021; Taylor-Ritzler et al., 2013), RCB (Cooke, 2005, 2020; ESSENCE on Health Research, 2016; Matus et al., 2018), partnerships (Corbin et al., 2016; Currie et al., 2005; Israel et al., 2020) and knowledge translation (Esmail et al., 2020; Strifler et al., 2018). A few of these frameworks include measurable evaluation indicators (ESSENCE on Health Research, 2016; Labin, 2014; Pulford et al., 2020). Of these frameworks, the Planning, Monitoring and Evaluation Framework for Research Capacity Strengthening was developed to assess research capacity broadly (ESSENCE on Health Research, 2016). However, its indicators only address outputs, for example, number of research publications, and therefore do not reflect the processes, impacts and outcomes of RCB. Labin's (2014) framework provides indicators of ECB linked to measurement tools. However, this framework does not consider relational factors associated with capacity building or system level changes. The framework developed by Pulford et al. (2020) was developed based on a systematic review of RCB and has a large number of indicators relevant to research capacity. However, this framework was developed for RCB, not evaluation capacity, therefore limiting its use within this study. Furthermore, the reflection of complexity within these frameworks is limited to the influence of contextual factors (Israel et al., 2020; Schwarzman et al., 2021), change across multiple levels (Cooke 2005) and causal relationships (Currie et al. 2005). To the PhD Scholar's knowledge, there are no evaluation frameworks that could guide the evaluation and monitoring of a partnership that addresses both RECB, like SiREN.

6.1.3. Transforming systems diagrams into evaluation frameworks

As discussed in [Section 6.1.1.](#), evaluation frameworks that ignore complexity can misrepresent a program leading to flawed evaluation processes and findings. In response to this issue, evaluators have sought ways to incorporate aspects of complexity (e.g., causal relationships) into evaluation frameworks (Funnell & Rogers, 2011; Renger et al., 2019; Rogers, 2008). However, transforming the complexity of systems diagrams into a useable format for evaluation is challenging, and examples within the literature are sparse (Wilkinson et al., 2021). A recent review identified several studies that used CLDs to establish program theory (Kenzie, 2021) and one that used them to define the context of a program to inform an evaluation framework (Rüegg et al., 2018). A framework development study by Brown and colleagues (2018) took a participatory approach, engaging relevant organisations and community members in workshops to develop CLDs and an evaluation framework to evaluate peer-based services. Brown et al. (2018) concluded that this process facilitated the identification of crucial causal relationships and valuable indicators (Brown et al., 2018). Practical examples of how to represent complexity within evaluation frameworks are required to ensure they accurately depict programs.

6.2. Results

Consensus was reached on the importance of all indicators ($n = 151$) after two survey rounds and a meeting (Table 8). In the first survey round, consensus was established on 84% ($n = 127$) of indicators. In the second survey round consensus was established on a further 11% ($n = 16$) of indicators. The final 4% ($n = 6$) indicators reached consensus in the meeting.

Table 8. Results from the consensus-building rounds

Round	Indicators achieving consensus	Undecided indicators	Total indicators reviewed
Round one - survey	127	24	151
Round two - survey	16	6	22
Round three - meeting	6	0	6

Of the initial 151 indicators, 43 (28%) received suggested changes. Twenty-six of these were minor comments or changes to wording. Responses to these comments and resolution of changes were documented in a spreadsheet made available to the management team as a reference. The remaining 16 suggested changes were more complex and required discussion in the final meeting. The main types of changes included the following:

- 1) Deleting indicators that were not relevant to the domain, were addressed in another domain, or could be combined with another similar indicator.
- 2) Adding indicators to demonstrate progress towards a domain.
- 3) Improving the ability of the indicator to demonstrate achievement of the domain.

For example, for domain 2.2 *SiREN is perceived as credible* the original indicator was *Materials developed by SiREN (resources, publications etc.) are of high quality*.

Feedback was that this would be more accurately measured through stakeholder perspectives. It was changed to *Proportion of surveyed stakeholders who agree that materials developed by SiREN (resources, publications etc.) are of high quality*.

6.2.1. The framework

The final framework ([Appendix P](#)) comprises seven evaluation questions, 21 domains, 149 indicators (126 indicators are unique, seven indicators were used twice, and three are used three times across two or more domains) and 23 data sources. Figure 16 presents framework evaluation questions and domains. The framework was adapted from a traditional evaluation framework configuration; it includes processes, outputs, impacts and outcomes. Modifying a traditional framework enabled it to reflect the complexity of SiREN while maintaining a familiar structure. This familiarity will support new SiREN staff who may be inexperienced in systems thinking to implement the monitoring and evaluation framework, thus supporting the sustainability of the framework.

The framework provides the following:

- a structure to support the comprehensive evaluation of SiREN's context, processes, impacts, and outcomes,
- processes to identify and assess the influence of contextual factors on SiREN,

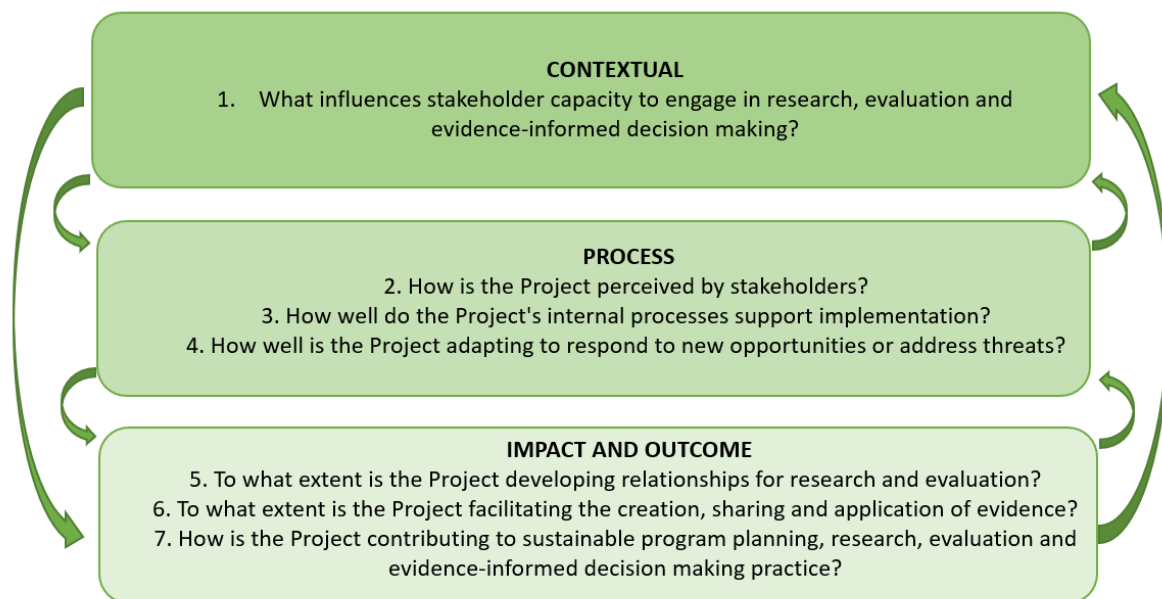
- a description of how causal relationships influence the functioning of the system and SiREN,
- indicators to demonstrate progress towards framework domains, and
- multiple quantitative and qualitative data sources to substantiate indicators.

Figure 16. Evaluation questions and corresponding domains

Questions	Domains
<p>1. What influences stakeholder capacity to engage in research, evaluation and evidence-informed decision-making?</p>	<ul style="list-style-type: none"> • Factors influencing stakeholder capacity to engage in research, evaluation and evidence-informed decision-making are identified
<p>2. How is the Project perceived by stakeholders?</p>	<ul style="list-style-type: none"> • There is awareness of the Project and the kinds of resources and services it offers • The Project is perceived as credible • The Project is perceived as trustworthy
<p>3. How well do the Project's internal processes support implementation?</p>	<ul style="list-style-type: none"> • The Project's activities are aligned to its aims and values • The Project engages with all key stakeholder groups • There is expertise within the Project team • The Project demonstrates it is capable
<p>4. How well is the Project adapting to respond to new opportunities or address threats?</p>	<ul style="list-style-type: none"> • Project activities are aligned with stakeholder needs • Emerging opportunities and threats are responded to • There are resources to sustain and grow project activities
<p>5. To what extent is the Project developing relationships for research and evaluation?</p>	<ul style="list-style-type: none"> • There are trusting relationships with partners and service users • Networks and partnerships are established and developed
<p>6. To what extent is the Project facilitating the creation, sharing and application of evidence?</p>	<ul style="list-style-type: none"> • The evidence agenda reflects local issues • Evidence is created that addresses local issues • Evidence is shared • There is evidence-informed policy and practice decision-making
<p>7. How is the Project contributing to sustainable program planning, research, evaluation and evidence-informed decision-making practice?</p>	<ul style="list-style-type: none"> • There are opportunities for continuous learning • There is increased program planning, research, evaluation and EIDM confidence, knowledge, and skills • There is a culture that values research and evaluation • Processes, policies, or practices that support program planning, research and evaluation practice are developed

The following section describes the framework under three categories of evaluation: contextual, process, and impact and outcome. Definitions of these categories are provided in the thesis [Definitions](#). Figure 17 illustrates how the seven evaluation questions align with the three categories. These categories are used to frame the analysis as they link the framework back to the [third objective](#) of this research.

Figure 17. Evaluation questions aligned to categories



Contextual evaluation

The inclusion of contextual factors within the framework acknowledges that change within the SHBBV system is shaped in response to a range of factors of which SiREN forms a part. However, given the vast and interconnected nature of systems, the scope of the context must be established before exploring it (Renger et al., 2019). The boundary of what was deemed contextually significant for SiREN was related to place (occurring within the SHBBV system) and the conditions that influence research, evaluation and evidence-informed practice.

SiREN actively seeks to understand how the system behaves by gathering feedback from its stakeholders on barriers and enablers to engaging in research, evaluation and EIDM (domain 1.1). SiREN then uses this information to adapt and align its activities and services

to stakeholder needs. In addition, routine monitoring of context using various methods at different time points enables SiREN to identify and respond to needs as they emerge. Data sources for monitoring context include periodic stakeholder surveys and informal feedback from stakeholders.

Process evaluation

Process evaluation assesses how a program is implemented to understand how it contributes to change (Rossi et al., 2004). Process focused framework domains encompass:

- monitoring how stakeholders perceive SiREN (e.g., credible, trustworthy),
- how SiREN's internal processes support implementation (e.g., engagement with all key stakeholder groups), and
- how well SiREN adapts to meet the changing needs of the system (e.g., emerging opportunities and threats are identified and responded to).

Processes for monitoring data sources include stakeholders support records (an Excel spreadsheet documenting stakeholder engagement that includes number and type of meetings), team observations and publication metrics.

The insight gained from developing the CLDs enabled conventional process indicators of reach and dose to be expanded upon to include causal mechanisms underpinning SiREN impacts and outcomes. These causal pathways are theories of change, providing a foundation for understanding SiREN's contribution to impacts and outcomes. Monitoring of causal mechanisms occurs throughout the framework, but it is particularly evident in process-focused domains. For example, under domain *4.1 SiREN activities are aligned with stakeholder needs* the indicator *Processes in place to understand how SiREN contributes to change* aims to ensure that SiREN comprehends how its activities interact with contextual factors. For example, if a service user reports that evaluation support provided by SiREN led to the creation of evidence that was subsequently used to inform program development, the service user will be asked what other factors contributed to this change outside of SiREN, for example, a manager who encourages EIDM.

SiREN's ability to achieve impacts and outcomes differs depending on the activity undertaken and the context in which the activity is implemented. On the other hand, causal mechanisms occur consistently. These are considered patterns or regularities in the systems literature and are valuable to monitor for evaluation (Dyehouse et al., 2009). In addition, causal mechanisms generally occur before impacts and outcomes (with some exceptions, see Box 2.) and can be used as initial indicators of success. For example, stakeholders perceive SiREN as credible before engaging with SiREN and the subsequent impact and outcomes that arise. Therefore, monitoring SiREN activities that build credibility (e.g., participation in events, publication metrics, knowledge dissemination through presentations or evidence summaries) or stakeholders' perceptions of the credibility of SiREN can address challenges with time delays between the interaction of SiREN with a service user/partner and impacts and outcomes occurring.

Box 2. A note on the blurred lines between process, impacts and outcomes.

There are differing views in evaluation on what constitutes processes, impacts and outcomes (Funnell & Rogers, 2011). Depending on the aims of an intervention some process indicators could be deemed impacts (McGill et al., 2021). In this framework, trust is considered both as a process and an outcome. The dual role of trust as both a process and outcome has been described in the literature before (Johns, 1996).

Examining trust as a process guides understanding of how it occurs. As a process, trust is developed through SiREN being perceived as credible, capable and trustworthy, demonstrating reliability and meeting stakeholder expectations. When examining trust as an outcome, it is viewed as the state of the process at a point in time. Indicators identify what SiREN would expect to see once trust is established, for example, stakeholder expectations being met and continued stakeholder engagement.

Impact and outcome evaluation

SiREN will use the evidence generated from impact and outcome evaluation to inform decisions about implementation (e.g., extend or cease an activity) and to demonstrate progress towards its aims to stakeholders (e.g., funders and steering group). The framework

identifies indicators to monitor to progress towards SiREN's impacts and outcomes including:

- formation and development of relationships for research and evaluation,
- creation, sharing and application of evidence, and
- contribution to sustainable program planning, research, evaluation and EIDM practice.

Examples of data sources that demonstrate impacts and outcomes include service user surveys and funding agreements.

Domain statements in the evaluation framework include a description of how impacts and outcomes are achieved and the consequent flow-on effects. Explaining how an impact or outcome leads to further change reflects systems' understanding that they are not endpoints. Instead, as described in the literature (Gates, 2016; Wilkinson et al., 2021), impacts and outcomes are inputs that feedback into the system creating more change. For instance, domain 7.2 *There is increased program planning, research, evaluation and evidence-informed decision-making confidence, knowledge, and skills* is supported by the description that when this is achieved, a service user's confidence in their program's strategies, evaluation methods and results also increase. They are then more likely to share program findings at conferences or forums. Hence, this change leads to greater evidence sharing. The domain descriptions are complexity sensitive narrative theories of change. The domains articulate what is likely to occur along the way to longer-term outcomes. Monitoring progress along this process can ensure the evaluation focuses on actual change rather than outputs (e.g., the number of training sessions held) (Funnell & Rogers, 2011). Monitoring the change process creates robust links between activities, impacts and outcomes.

The impacts and outcomes identified in the framework were based on what SiREN has achieved to date and its objectives; they did not include anticipated changes. However, the framework reflects the understanding that SiREN and the system will continue to change. What these changes will be and how they will affect SiREN is not yet known. The framework plans for unexpected impacts and outcomes through utilising a reflexive approach that

draws on several methods suggested by evaluators. These include capturing multiple stakeholder perceptions of change (e.g., service users, partners, staff) (Parrott et al., 2016), collecting data at various time points (Parrott et al., 2016), when evaluating activities asking open-ended questions about changes that occurred (Funnell & Rogers, 2011) and evaluating new activities (Parrott et al., 2016).

6.3. Summary

The presented evaluation framework was created and validated to operationalise the understanding acquired from the development of the CLDs. The framework provides a new way of depicting and accounting for complexity and insight into how systems approaches can strengthen evaluation. Within the framework, the complexity of SiREN is reflected through contextualising its activities, including descriptions that explain how SiREN contributes to change within a complex system, and plans for unexpected impacts and outcomes. Using participatory development processes, the in-depth understanding of SiREN held by the management team strengthened the framework and increased its usefulness as a tool to support the ongoing monitoring and evaluation of SiREN. A discussion of the framework within the context of the broader literature is provided in [Section 8.2.3](#), and strengths and limitations are described in [Section 8.3.3](#).

The following chapter ([Chapter 7](#)) presents two questionnaires developed to assess the processes, impacts and outcomes of the research and evaluation support provided by SiREN.

7. Questionnaires to assess SiREN research and evaluation support

This chapter presents and discusses the development of two questionnaires that are intended to assess the processes, impacts and outcomes of the research and evaluation support provided by SiREN. The first questionnaire, designed to assess synergistic (extended) engagement, is presented in the form of the following publication which is currently under review:

Tobin, R., Hallett, J., Crawford, G., Maycock, B., Lobo, R. (2022). *Development of a questionnaire to assess the processes, outcomes and impacts of a research and evaluation capacity building partnership for public health professionals*. Manuscript submitted for publication.

Following this, the chapter content describes the questionnaire developed to assess transactional (brief) engagement.

This chapter relates to the following objective:

4. Develop evaluation tools for use by SiREN to measure identified key indicators.

7.1. Background

To determine the most suitable tools to evaluate the RECB support provided by SiREN, a consultation processes with the management team and steering group was undertaken ([Publication 5](#), [Chapter 7](#)). From this process, an online questionnaire was identified as the most appropriate tool. Online questionnaires are a practical tool that can efficiently collect data that are easy to analyse when compared to other methods (e.g., qualitative interviews) (Van Selm & Jankowski, 2006). Online surveys can be brief, thus limiting respondent burden (Van Selm & Jankowski, 2006).

This study developed two questionnaires to reflect the different types of engagement between SiREN and its service users. The exploration of the impacts and outcomes of SiREN

([Publication 4](#), [Chapter 5](#)) identified two types of engagement, leading to different impacts and outcomes. Transactional (brief) engagement generally occurs over one interaction, and the flow of knowledge is one-directional (from SiREN to the service user). Examples of transactional engagement include SiREN reviewing an evaluation tool, providing access to evidence, or providing feedback on a funding application or conference presentation. In contrast, synergistic (extended) engagement involves two-way knowledge exchange (between SiREN and the service user) over multiple interactions across an extended period of time (weeks or months) to address a program planning, research or evaluation project. This process links back to [Section 2.1.1](#) and [2.1.2](#), which described capacity building as a continuous and experiential learning process (Preskill & Torres, 1999) that is influenced by relational factors such as the presence of trust and respect (Buckley et al., 2021; Cousins et al., 2020). Examples of synergistic engagement include partnering to write a manuscript for publication, providing tailored support to develop a program plan, providing support to collect or analyse data, or co-creating a funding or ethics application.

As described in [Publication 4](#), synergistic engagement between SiREN and its service users led to more impacts and outcomes than transactional engagement. In the partnership literature, synergy occurs when partners combine their knowledge, skills and resources to develop effective solutions (Lasker et al., 2001). In this study, the effects seen from synergistic engagement are attributed to the presence of trust, adapting support to the service user's needs, and/or providing them opportunities to learn by doing. Synergistic engagement had the potential to lead to all identified outcomes. Whereas outcomes attributed to transactional engagement were limited to the application of evidence to decision-making, improvements in program planning, research, evaluation confidence, knowledge and skills and confidence to share work at conferences and forums.

Despite their different outcomes, both synergistic and transactional engagement were an important part of SiREN's approach to building capacity and required evaluation tools. This chapter is described in two parts. The first part ([Publication 5](#)) is presented below and describes the development of a questionnaire to assess synergistic engagement. Following this, the questionnaire to assess transactional engagement is described.

7.2. Publication 5: Questionnaire to assess synergistic engagement

Publication 5: *Development of a questionnaire to assess the processes, outcomes and impacts of a research and evaluation capacity building partnership for public health professionals*. Manuscript submitted for publication.

7.2.1. Introduction

Public health professionals require research and evaluation capacity (Brownson 2018; Cooke et al., 2018) and access to relevant evidence for effective policy and practice decision-making (Edwards, Stickney, Milat, Campbell, & Thackway 2016; Pettman et al., 2013). Research and evaluation capacity is broadly defined as the motivation, knowledge, skills, and structures to engage in sustainable research and evaluation practice and apply research and evaluation evidence to decision-making (Cooke, 2005; Labin et al., 2012; Preskill & Boyle, 2008). This definition encompasses both the generation and application of research and evaluation evidence. In public health, many forms of evidence guide decision-making (Armstrong et al., 2014), including surveillance data, community perspectives, values and experiential knowledge. Recognition of the importance of research and evaluation capacity is growing (Pulford et al., 2020; Schwarzman et al., 2019b). There are several recent examples of public health research and capacity building programs in the literature (Bourgeois et al., 2018; Edwards et al., 2016; Hulcombe et al., 2014; Lindeman et al., 2018; Nichols et al., 2018). These programs have employed a range of strategies including: workshops and training (Bourgeois et al., 2018; Pettman et al., 2013); increasing access to funding opportunities (Bates et al., 2006; Hulcombe et al., 2014); access to tools and resources that support research and evaluation (e.g., evidence portals) (Edwards et al., 2016; LaRocca et al., 2012; Norton et al., 2016); and personalised support in the form of technical assistance, mentoring, or consultancy (Edwards et al., 2016; LaRocca et al., 2012; Lindeman et al., 2018; Norton et al., 2016). One promising strategy is formal partnerships between researchers, evaluators, and public health professionals (Lobo et al., 2016). These partnerships provide service providers, policymakers and public health professionals with ongoing tailored research and evaluation support and can lead to the generation and

application of evidence to decision-making (Akintobi et al., 2012; Gagliardi et al., 2015; Hulcombe et al., 2014).

Despite numerous examples of capacity building programs, it is not a well-evaluated field (Labin, 2014; Norton et al., 2016; Pulford et al., 2020). Researchers have expressed a need for appropriate and evidence-based measurement tools to examine the impact of these programs (Sauter et al., 2020; Schwarzman et al., 2019b; Stamatakis et al., 2017). This paper reports on the development of a questionnaire to assess the processes, outcomes and impacts of support provided by a capacity building partnership.

Using systems thinking to make sense of the complexity of capacity building programs

Evaluating capacity building programs is challenging due to their complexity (Cooke et al., 2018; Labin et al., 2012; Pulford et al., 2020). For example, the process of building capacity is dynamic, not occurring in a predictable linear way (Bourgeois & Cousins, 2013; Preskill & Boyle, 2008). In addition, capacity building programs may target multiple levels of change at the individual, organisational and system level (Cooke et al., 2018; Norton et al., 2016). Factors external to capacity building programs influence their ability to elicit change (e.g., staffing and funding changes) (Brownson et al., 2018; Labin, 2014; Tobin et al., 2022). There is often a long lag between implementing a capacity building program and evidence of intended outcomes (Bourgeois et al., 2018; Cooke et al., 2018; Tobin et al., 2022). The evaluation of such programs needs to account for these intricacies.

Applying systems approaches can address some of the challenges associated with evaluating capacity building interventions. Systems thinking is a way of viewing a system that seeks to explore it as a whole, its component parts and the interactions between them (Cabrera & Cabrera, 2019; Peters, 2014). Hawe (2009) has suggested that a systems perspective can improve understanding about how a program interacts with the system in which it is embedded and how the program contributes to change. Specifically, it can detect patterns and regularities within the system, understand the intervention, identify unanticipated effects, and assess change at multiple levels (individual, organisational and system) (Hummelbrunner, 2011; Prashanth et al., 2014; Rutter et al., 2017; Taghreed & De Savigny,

2012). A recent review by McGill (2021) highlighted the value of systems approaches to evaluation and concluded that there is a need for further studies exploring their application.

Existing tools for assessing research and evaluation capacity building

Several measurement tools have been developed that assess existing evaluation capacity (Bourgeois & Cousins, 2013; Cousins et al., 2008; Mackay, 1999; Nielsen et al., 2011; Schwarzman et al., 2019b; Taylor-Ritzler et al., 2013) and research capacity (Holden et al., 2012; Kothari et al., 2009; Smith et al., 2002; Van Mullem et al., 1999). Schwarzman et al. (2019b) and Taylor-Ritzler et al. (2013) developed surveys to assess evaluation practices in health promotion and not-for-profit organisations, respectively. These surveys are intended to assess the evaluation capacity of an organisation, and could be used pre and post implementation of a capacity building program to assess change. However, these surveys are not designed to evaluate the processes associated with delivering a capacity building program to service users. Evaluating these processes (e.g., communication and trust) can provide insight into how and why a capacity building program works or does not work. This knowledge could inform the development and implementation of more effective capacity building programs.

Existing tools for evaluating partnerships

In addition to assessing existing research and evaluation capacity, there are tools to evaluate a wide range of partnerships (Granner & Sharpe, 2004; Kegler et al., 2020). Relevant to this research are tools to assess partnerships between researchers, community organisations and community members. For example, the Community Impacts of Research Oriented Partnerships (CIROP) questionnaire (King et al., 2009) was developed to measure the impacts of research partnerships from the perspective of the community (individuals and organisations). While the CIROP provides a comprehensive assessment of the kinds of changes that research partnerships can achieve, it does not assess the interactions between partners or changes in evaluation capacity. Another tool that focuses on research partnerships is the Partnership Indicators Questionnaire, developed to assess the performance of knowledge creation and exchange partnerships between researchers and government that aim to generate policy-relevant research (Kothari et al., 2011). This tool includes process items such as clear leadership and respectful communication. Concepts or

outcomes relevant to non-government organisations or evaluation capacity building, such as increased evaluation skills, are not included. A need remains for measurement tools that are sensitive to the complexity of capacity building programs.

Purpose of this study

This paper describes the evidence-informed and consultative approach used to develop a questionnaire to evaluate the research and evaluation support delivered by a capacity building partnership. The development of the questionnaire contributes to addressing the limitations and considerations described earlier, particularly with regard to how evaluation tools can reflect the complexity of capacity building programs. This study was undertaken as part of a larger research project. It received ethical approval from the Curtin University Human Research Ethics Committee (approval number: HRE2017-0090).

7.2.2. Methods

The questionnaire assessed a capacity building partnership, the Western Australian Sexual Health and Blood-borne Virus Applied Research and Evaluation Network (SiREN). SiREN builds program planning, research and evaluation capacity within public health organisations working to prevent and manage sexually transmissible infections and blood-borne viruses and promote sexual health (the system). This system includes a range of research, clinical, government and non-government organisations staffed by researchers, educators, peer-based outreach staff, health promotion practitioners, clinicians, and policymakers. The beneficiaries of improvements within the system (community members) are not considered part of the system because SiREN's direct influence is on service providers and policymakers.

SiREN utilises strategies operating at the individual, organisational and system level. Examples include: providing personalised program planning, research and evaluation support; fostering partnerships between research, government and non-government organisations; seeking grant funding; developing and participating in collaborative research and evaluation projects; and creating and sharing a wide variety of resources and services to

build research, evaluation and evidence-informed decision-making capacity amongst public health professionals.

Management of SiREN is undertaken by a team of five university-based academics alongside a steering group comprising stakeholders from government, research and non-government organisations. Together they provide input into SiREN's strategic direction. Detailed descriptions of SiREN have been published previously (Lobo et al., 2016; Tobin et al., 2022; Tobin et al., 2019).

Questionnaire purpose

The purpose of the questionnaire was to evaluate the program planning, research and evaluation support provided by SiREN to service users (staff working within the system defined above). Specific examples of the kinds of support the questionnaire was required to assess include: writing a manuscript for publication; planning a public health program; creating an evaluation plan; developing a new evaluation method; writing a conference abstract; presenting at conferences; preparing an ethics application; or developing a grant proposal. The provision of this support forms a partnership between SiREN and the service user, as both parties combine their skills and knowledge to develop solutions to a shared concern (Schulz et al., 2003). SiREN staff who provide this support are university-based with expertise in service delivery, program planning, research and evaluation. The tool is not intended to assess other aspects of SiREN (e.g., partnerships with other researchers, online resources).

The questionnaire:

1. Assesses process factors that contribute to the achievement of outcomes and impacts;
2. Identifies changes that occurred to research and evaluation capacity, EIDM, and program planning; and
3. Determines the contribution of SiREN and external influences in achieving these changes.

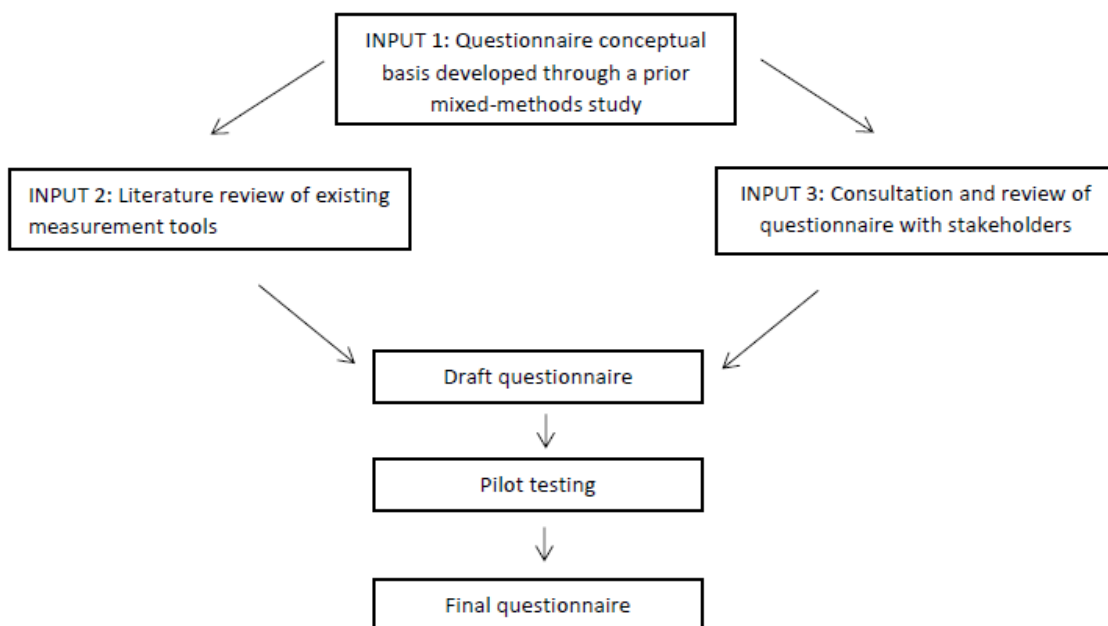
Questionnaire development

The Questionnaire Origin and Development Appraisal Tool (Hamzeh et al., 2019) guided questionnaire development and reporting. The questionnaire was constructed using

processes aligned with previous questionnaire development studies (Cousins et al., 2008; Holden et al., 2012; King et al., 2009; Kothari et al., 2009; Palinkas et al., 2016; Taylor-Ritzler et al., 2013) (outlined below) and had three key inputs (Figure 18):

1. Findings from a previous study conducted by the authors informed the conceptual basis of the questionnaire.
2. A literature review to identify existing tools and methods that could be used in the development of the questionnaire.
3. Consultation with the supervisory team; SiREN management team; and SiREN steering group to establish the purpose and general structure of the questionnaire, select questionnaire items, and assess face validity.

Figure 18. Questionnaire development



Input 1 – Conceptual Basis

A previous study conducted by the authors used systems concepts and methods to examine the influence of SiREN on research and evaluation practices (Tobin et al., 2022). A systems approach was selected to reflect the complexity of the system and SiREN. SiREN is considered as a series of activities occurring within the system that aims to influence its

behavior and structure (Foster-Fishman et al., 2007). The system can be considered as complex as it comprises interactions between individuals and organisations that are constantly changing and adapting, often in unforeseen ways (Eoyang & Berkas, 1998; Paina & Peters, 2011).

The previous study (Tobin et al., 2022) consolidated data collected from SiREN organisational documents ($n = 42$), responses to a survey ($n = 104$), in-depth interviews ($n = 17$), a workshop ($n = 9$) and three meetings with SiREN stakeholders ($n = 4$). Data were analysed using a grounded theory-informed approach and used to develop two CLDs (Tobin et al., 2022), a type of systems thinking approach (Sterman, 2006). The use of systems thinking provided insights into SiREN’s interactions with its service users and the subsequent outcomes and impacts achieved. The authors wanted to develop an evaluation tool that could reflect the understanding gained from the application of systems thinking. Table 8 describes these insights and how they were incorporated into the design of the questionnaire.

Table 8. Study findings that informed the design of the questionnaire

Study finding	Implications for the questionnaire
<p>The ability of SiREN to achieve its aims is inextricably linked to existing research and evaluation capacity. For example, if the service user works within an organisation where they are encouraged to undertake research and evaluation, they are more likely to engage with SiREN than if this culture was not present.</p>	<p>Have a way to capture the influence of contextual factors on outcomes.</p>
<p>SiREN and the system in which it is embedded are dynamic, existing in a constant state of change, and therefore there may be effects that have not yet been identified.</p>	<p>Be flexible enough to capture unintended or unexpected consequences.</p>

Study finding	Implications for the questionnaire
The relationship between SiREN and service users affects the kinds of outcomes that can be achieved. Long-term relationships that are built on trust and mutual understanding and combine the knowledge of both parties to address research and evaluation questions, have the potential to lead to greater outcomes when compared to brief interactions.	Have items that assess the interaction between SiREN and service users.
Linking outcomes back to SiREN can be difficult due to a long-time lag between engagement and effect or the non-linear nature of outcomes.	Have items that assess the interaction between SiREN and service users (e.g., expectations met), and earlier stage changes (e.g., knowledge and skills).
Change occurs across the individual, organisational and system level.	Be able to track changes across multiple levels.

In addition, the previous study identified process, impact and outcome domains to guide the generation of questionnaire items. Process domains focused on the interactions that occur between SiREN and the service user during implementation. Outcomes were classified as short-term changes to which SiREN has contributed, such as confidence, knowledge or skills (Funnell & Rogers, 2011). Impacts were defined as longer-term changes that occur after an outcome, such as the creation of evidence (Funnell & Rogers, 2011). These domains are presented in Table 9.

Table 9. Process, outcome and impact domains used to inform the development of the questionnaire items

Process domains	Outcome domains	Impact domains
<ul style="list-style-type: none"> • Expectations of support • Value of information provided by SiREN 	<ul style="list-style-type: none"> • Program planning, research, or evaluation confidence, knowledge or skills 	<ul style="list-style-type: none"> • Development of research or evaluation methods • Creation of evidence

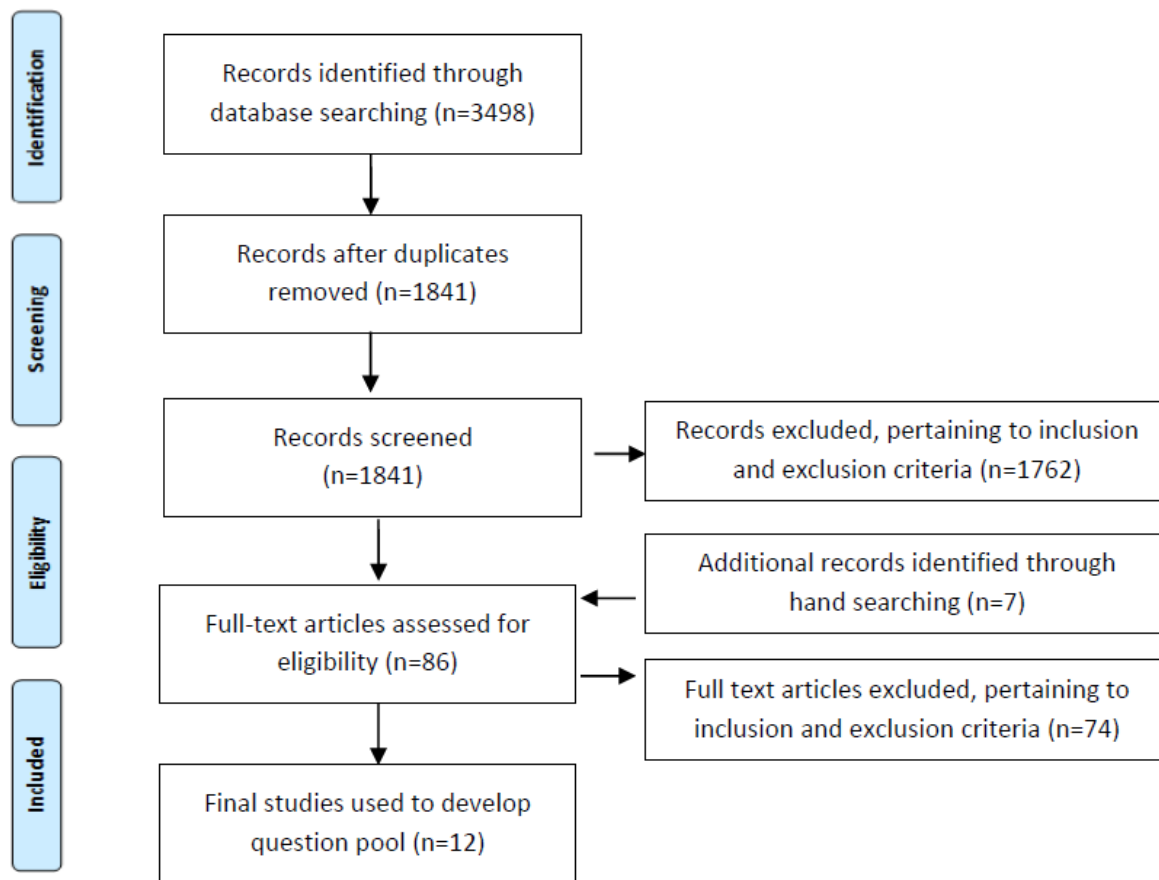
Process domains	Outcome domains	Impact domains
<ul style="list-style-type: none"> • Trusting relationship • Ability to work collaboratively 	<ul style="list-style-type: none"> • Attitudes towards research or evaluation • Evidence-informed decision-making abilities • Confidence to share research or evaluation findings • Understanding of program • Development of professional networks 	<ul style="list-style-type: none"> • Changes to activities, services, or programs

Input 2 - Literature review

A literature review located tools and methods to support development of questionnaire items. Specifically, the search identified tools that assessed: partnership functioning, or outcomes associated with evidence-informed practice, research capacity, or evaluation capacity building programs. Search terms were developed based on the domains in Table 10 and through consultation with the research team and librarian. Health-related databases searched were Proquest, PsycINFO, and CINAHL. An example search strategy is provided in Supplementary Table 1 ([Appendix X](#)). To increase the relevancy of results, search terms were limited to title or abstract. The review was conducted in June 2018, and peer-reviewed articles published in English any date prior to this were included. Reference lists of included articles were also reviewed to identify relevant studies. Articles were excluded if the study's questionnaire developed was not tested or could not be administered at an individual level.

Records identified through the database searches were exported into EndNote 8.0 for screening. Duplicates were removed and titles and abstracts were screened by the first author. Studies deemed to be potentially relevant underwent a full-text review to establish usefulness. Figure 19 presents the article selection process using the Preferred Reporting of Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram (Moher et al., 2009).

Figure 19. PRISMA flow diagram for article selection



As the database search mainly identified quantitative measures, the Better Evaluation website (Better Evaluation, 2020) was reviewed to locate relevant qualitative methods. The Better Evaluation website was chosen as it is a freely available knowledge platform that provides information on over 300 evaluation methods and processes (Better Evaluation, 2020). Through this process, additional approaches were identified that could capture data on unexpected changes, changes most valuable to the service user, and how SiREN contributed to the changes achieved.

The literature review identified twelve relevant questionnaires which were used to develop a pool of questions. These questions were reviewed to determine items that best captured the domains presented in Table 10. The final questionnaire used items from five questionnaires (Bronstein, 2002; Cousins et al., 2008; Jones & Barry, 2011a; King et al., 2009). In addition, two qualitative evaluation methods were identified from the Better

Evaluation website (Dart & Davies, 2003; Earl et al., 2001). These qualitative methods were used to address some of the implications described in Table 9 (e.g., capturing the influence of contextual factors). Where an appropriate item could not be located, a new question was developed through consultation with the research team. From this process, a draft questionnaire was developed.

Input 3 - Consultation

Group or individual consultation with members of the research team ($n = 4$), SiREN management team ($n = 5$), and SiREN steering group ($n = 7$) was used to refine the draft questionnaire and assess its face validity. These groups were selected for their expertise. At the time this study was undertaken, three members of the research team were members of the SiREN management team (RL, GC, JH), and two were paid SiREN employees (RL, RT). All research and management team members had experience in public health related evaluation, research, capacity building and questionnaire development. All groups had an in-depth understanding of SiREN's activities and evaluation needs. Assessing face validity with a small group of experts, numbering between nine and 24, has been used in similar studies (Holden et al., 2012; Sauter et al., 2020; Schwarzman et al., 2019b). Feedback from all groups was sought on the selection of measurement method and timing of administration. The SiREN steering group provided feedback on general evaluation considerations. Feedback from the research and SiREN management team included: inclusion and exclusion of questions; sequencing of questions; face validity of selected questions; clarity of the questionnaire instructions and questions and the response formats (e.g., Likert scale choices).

An online questionnaire was identified as the most practical measurement tool to enable the efficient collection and analysis of data and minimise respondent burden. Findings from the consultation suggested that the inclusion of process items was important in case outcomes were not achieved due to influences outside the control of SiREN (e.g., service user priorities changing or staff changes). Feedback on the timing of the questionnaire was that implementation should occur immediately after support had ceased. Support provided by SiREN can be provided from a few weeks to over a year, therefore it was thought that administering the evaluation questionnaire immediately after support has ceased would

enable enough time for most changes to occur and may reduce issues with recall (Kjellsson et al., 2014).

Pilot Testing

To assess content validity, individuals who had previously engaged with SiREN were purposefully selected to pilot test the questionnaire via an online survey. Assessing content validity with experts and refining the questionnaire based on feedback is recommended practice (Haynes et al., 1995). Criteria for inclusion were: a current SiREN steering group member, received research or evaluation support from SiREN, or partnered with SiREN to undertake research or evaluation. Pilot testing assessed the usability and acceptability of the questionnaire. Specifically, it asked respondents to provide feedback on the *clarity of the instructions and items and the accuracy of questionnaire completion timing*. If participants had received support from SiREN within the past 12 months, it asked if the questionnaire enabled them to provide an accurate description of changes that had occurred. Invitations to participate were delivered to participants by email which contained a link to review the questionnaire and a link to the pilot testing survey in Qualtrics Survey Software. Surveys were completed individually. Data collection was confidential but not anonymous, so researchers could contact participants to clarify responses.

Eighteen individuals were invited to participate, and 16 responses were received (89% response rate). Seven respondents had previously participated in interviews in the study described in input one. Respondents were from a non-government (69%), peak body (19%) and government (12%) organisations. Roles included management (50%), program delivery (31%), clinical (13%) and administration (6%). All participants indicated that survey instructions and questions were clear. More than half had requested research or evaluation support from SiREN in the last 12 months (56%). Of these participants, all agreed that survey questions enabled them to provide an accurate picture of support and any resultant changes. Of those who had requested support, one reported that some of the survey items were irrelevant to the support received. Respondents suggested minor amendments to question ordering and wording. Questionnaire completion was estimated at five minutes. The majority (81%) agreed that the time taken to complete the survey was acceptable.

Three participants reported that more time was required; as a result this estimation was amended to 10 minutes to capture respondent burden more accurately.

7.2.3. The final questionnaire

The final Research and Evaluation Capacity Building Questionnaire (RECB-Q) contains 17 quantitative and seven qualitative items that assess the processes, outcomes and impacts of the research and evaluation support provided by SiREN. Of the 24 items, 14 were based on pre-existing tools with the remaining items ($n = 10$) developed by the research team.

Questionnaire items and their sources are described below. The complete questionnaire is available in Supplementary Table 2 ([Appendix Y](#)).

Process items

The RECB-Q contains four process items that assess the interactions between SiREN and the service user: expectations being met, relevance of information provided by SiREN, establishment of trust, and working together to effectively problem solve. Response options are *always, often, sometimes, rarely* and *never*. Questions relating to process factors such as the development of trust and effectively working together to problem solve were adapted from Jones and Barry's trust and synergy scales (2011a; 2011). These items are shorter-term indicators that can determine if SiREN is on track to achieve change.

Quantitative items assessing outcomes and impacts

Eleven items assess the outcomes and impacts that occurred as a result of receiving support. Evidence-informed decision-making and research and evaluation capacity-related quantitative questions were modified from questionnaires developed by Cousins (2008) and King (2009) or were developed in consultation with the research team. While measured at the individual and organisational level, they can also indicate changes occurring at the system level, such as networks, funding, and culture.

Outcomes include changes to: program planning, evidence-informed decision-making, research and evaluation confidence, knowledge and skills; receptiveness to new research and evaluation opportunities; confidence in sharing work (e.g., at meetings or conferences);

the development of professional networks; and understanding of how their program fits or contributes to the broader response to sexual health and blood-borne virus issues. This last item reflected the increase in clarity around program purpose that is acquired from the provision of program planning and evaluation support.

Impacts include: the development of research or evaluation methods; improvements in the organisation's program planning, evaluation, or research-related processes, policies, or practices; and changes in the activities, services, or programs provided by the organisation. To capture the importance of SiREN in supporting change, service users are asked if the support led to outcomes that they, or their organisation, could not have achieved otherwise. This question was adapted from Bronstein (2002) and Jones and Barry (2011).

Quantitative question response options are *increased/decreased, no change, or agree/disagree*. These were chosen to allow service users to identify whether or not a change occurred, rather than assigning it a value (e.g., strongly agree, somewhat agree, agree). This acknowledges that the degree of change depends on a wide variety of factors, many of which are outside SiREN's control, including pre-existing skills and knowledge, organisational research and evaluation capacity and the type of support provided. The response option *not relevant to the support received* was also included as the support provided by SiREN is individualised, therefore, some of the changes included in the questionnaire items will not be relevant to all service users. For example, a service user who received assistance with developing an evaluation method is unlikely to see an increase in the development of their professional networks.

Qualitative methods regarding critical changes

Qualitative items aim to elicit story-based responses about important changes that occurred. The Most Significant Change (Dart & Davies, 2003) and Outcome Mapping (Earl et al., 2001) techniques informed development of qualitative questions about outcomes that were valued by service users and SiREN's contribution to those changes. To capture unintended or unexpected consequences, service users are asked to describe changes not listed in the previous quantitative section. They are then asked to describe the most valuable change that occurred, why the change was important to their work, how support

provided by SiREN contributed to this change, and what other factors contributed to the change. These items enable service users to describe what change they found most important and why, rather than selecting from a pre-determined list of changes. In addition, the response to these questions enables SiREN to differentiate between its influence and the effect of contextual factors on changes that occurred.

To strengthen the credibility of reported changes, supporting documentation of the changes that occurred (e.g., evaluation plan) is requested from respondents (Earl et al., 2001; Mayne, 2008). Final questions ask service users if they would have liked the support to have been different in any way, if they have any other feedback and would be happy to be contacted to discuss their feedback.

7.2.4. Discussion

The RECB-Q was designed to assess the processes, outcomes and impacts of research and evaluation support provided by a capacity building partnership (SiREN). To the authors' knowledge, the RECB-Q is the first research and evaluation capacity building questionnaire that includes process, impact and outcome items and explicitly links systems concepts to design. Questionnaire development was informed by the findings of a previous study (Tobin et al., 2022) that used a systems approach to explore SiREN, a literature review of existing measurement tools, and consultation and pilot testing with SiREN stakeholders. Pilot testing demonstrated that the questionnaire was easy to understand, acceptable and enabled service users to provide an accurate description of the support they received from SiREN and any changes that occurred as a result.

Sensitivity to complexity

To date, tools to assess capacity building and partnerships have focused on pre-determined quantitative indicators (Cousins et al., 2008; King et al., 2009; Kothari et al., 2009; Kothari et al., 2014). While the RECB-Q does include quantitative questions, its crucial point of difference compared with other tools is the inclusion of complexity-sensitive questions. These qualitative questions ask respondents about a change they found most important to their practice and why it was important. These questions were modified from the Most

Significant Change technique (Dart & Davies, 2003). The inclusion of these questions adds value to the RECB-Q in two key ways. Firstly, these questions concentrate on what SiREN service users find most important rather than what SiREN values. This understanding can inform continuous improvement as activities can be refocused on how to enhance value from a service user's perspective. Secondly, the types of support provided by SiREN are diverse and the sexual health and blood-borne virus system in which it operates is dynamic. Therefore, new impacts and outcomes may emerge that have not yet been identified. These qualitative questions can identify unanticipated changes which can be used to inform new directions, strengthening SiREN's responsiveness and effectiveness.

Evaluation often ignores complexity through de-contextualising outcomes, limiting understanding of how change is achieved (Zappala, 2020). The RECB-Q attempted to address this limitation, seeking to understand the role of context by including questions that ask how SiREN and external factors contributed to the attainment of outcomes, if at all. This can establish credible causal links between observed changes and SiREN's actions (Earl et al., 2001; Mayne, 2012). In addition, it builds an understanding of how contextual factors interact with SiREN to constrain or amplify outcomes (Hawe, Bond, et al., 2009). This is an important consideration when evaluating capacity building programs as external factors (e.g., organisational culture) influence their ability to elicit change (Brownson et al., 2018; Labin, 2014; Tobin et al., 2022). Findings from the RECB-Q can be supplemented with other sources of contextual information and used to inform SiREN's future implementation. These sources can include SiREN's stakeholder advisory groups, informal feedback, and regular needs assessment surveys with stakeholders. Understanding how capacity building programs and contextual factors interact to create change will strengthen understanding of which strategies work in different situations (DeCorby-Watson et al., 2018).

Another point of difference of the RECB-Q from other capacity building measurement tools is that it contains process items in addition to impact and outcome items. The inclusion of process items, such as the development of trust and ability to engage in collaborative problem solving, is important as they affect the ability of SiREN to achieve its intended aims. While outcomes may differ depending on the kind of support requested or contextual influences, the processes of establishing trust and meeting expectations occur consistently.

These are regularities or patterns in systems thinking and are beneficial points to monitor for evaluation (Dyehouse et al., 2009). Process items can act as initial indicators of success as they occur before the longer-term impacts, such as creating evidence. In this way, monitoring processes can assist with addressing challenges with the dynamic nature of capacity building and the lag time between implementation and changes becoming evident.

The evaluation field is rapidly embracing complexity sensitive approaches in various forms (Gates, 2016; McGill et al., 2021). At the same time, researchers increasingly acknowledge the complex nature of capacity building (Hanlon et al., 2018; Lawrenz et al., 2018; Pulford et al., 2020). There are synergies between complexity sensitive methods and the evaluation of capacity building programs (Lawrenz et al., 2018). For example, there is a need for greater understanding of the mechanisms of action of capacity building programs (Lamarre et al., 2020); complexity sensitive methods may be able to address this by exploring context and causal relationships (McGill et al., 2020). Evaluators and researchers wishing to build a stronger evidence base of how capacity building programs work could add systems concepts and methods to their toolkits, a call echoed in health promotion and public health practice more broadly (Gates, 2016; McGill et al., 2021).

Challenges with assessing change across multiple levels

Comprehensive evaluation of capacity building programs needs to capture longer-term and system level changes such as shifts in practice or policy (DeCorby-Watson et al., 2018). These changes provide the most compelling evidence of their worth, yet little is known about them (DeCorby-Watson et al., 2018; Labin, 2014; Norton et al., 2016; Pulford et al., 2020). While the RECB-Q focuses on individual and organisational level change, it does contain longer-term and system level changes, including the development of networks, and changes to how services and programs are delivered. However, trying to measure system-level changes at the individual level is limited as depending on an individual's role within the system they may not be aware of changes occurring at the system level (e.g., changes to policy). The authors acknowledge that other methods would provide a more rigorous approach, such as using social network analysis to examine the development of networks (Rosas & Knight, 2018). However, to assess change in a resource-limited context, the RECB-Q can provide an indication of intermediate system level change.

Further examination of process factors

Process items included in the RECB-Q focused only on factors identified as essential to achieving outcomes for SiREN. There are no established process indicators for capacity building programs that address both research and evaluation. Therefore, it is unclear if the RECB-Q process items are reflective of similar capacity building programs. The exploration of processes that support other research and evaluation capacity building programs is warranted and would provide deeper insight into how to design and implement such efforts to maximise effectiveness. The relationally focused process factors included in the RECB-Q correlate with previously identified research partnership literature, such as the development of trust and good communication processes (Luger et al., 2020). Several tools have been constructed to assess research partnership functioning that could be used as a starting point to expand on the measures included in the RECB-Q (Arora et al., 2015; Kothari et al., 2011; Marek et al., 2014).

Study strengths and limitations

A key strength of the RECB-Q development was the empirical and collaborative approach. Similar to other questionnaire development studies (King et al., 2009; Kothari et al., 2009; Taylor-Ritzler et al., 2013), the creation of the RECB-Q was based on multiple methods, which increased its conceptual and methodological quality (Hamzeh et al., 2019; Haynes et al., 1995). The collaborative expert-led approach used to develop the questionnaire has been used in similar studies (Arora et al., 2015; Palinkas et al., 2016; Taylor-Ritzler et al., 2013) and ensured that the RECB-Q is appropriate and relevant to the needs of SiREN and its service users. Its brief, online format makes it acceptable to service users and reduces the time taken for SiREN to collect and analyse data. Outcome items reflect what is known in the research and evaluation capacity building literature (Cooke et al., 2008; Labin, 2014; Preskill & Boyle, 2008), strengthening its content validity (Haynes et al., 1995). The search for existing qualitative evaluation methods was limited to one online knowledge platform. Therefore, methods not included on the identified website were excluded. Pilot testing was confidential but not anonymous, which may have led to social desirability bias (Nederhof, 1985). The majority of the research team were past or current SiREN staff or management

team members. This was a strength as they had an in-depth understanding of SiREN. However, it may have increased social desirability bias during pilot testing.

The RECB-Q may be adapted to evaluate other similar capacity building projects in health-related fields. While many of its items align with what is known in the literature, it was developed based on a single capacity building project and it should undergo testing and modification as required before evaluating other programs. The number of organisations that SiREN engages with is relatively small, consisting of approximately 15 research, government and non-government agencies. The size of SiREN and the organisations it supports limited the sample available for pilot testing and precluded the use of tests of statistical significance. The study findings that informed the generation of the questionnaire items were also derived from a limited sample. This may have reduced the number and type of questionnaire items generated. Further reliability and validity testing, including test-retest reliability, is recommended (Hinkin, 1995) with a larger sample size from other health-related fields.

RECB-Q strengths and limitations

The ordering of the questions in the RECB-Q may influence participant responses (Dillman et al. 2014). Quantitative questions about changes to knowledge and practices that occurred as a result of support (e.g., if support led to the development of evaluation methods) are asked at the beginning. Following this, qualitative questions ask respondents about a change they felt was most important to them. Asking respondents if they experienced a range of impacts, followed by asking them about the most important change, may affect what change they choose to describe. However, asking only open-ended questions may result in incomplete responses as respondents may skip them, provide a brief response or a response that does not answer the question (Dillman et al. 2014). Therefore, a pragmatic decision was made by the SiREN management and supervisory team to include both the quantitative and qualitative questions to ensure as many impacts and outcomes as possible were identified by respondents.

The RECB-Q does not collect data on service user demographics, organisation characteristics, and the type of support provided. SiREN has established an understanding of

these factors through the interactions during the period of support. The authors acknowledge the fundamental role that existing capacity, such as level of knowledge and resources, plays in the ability of a capacity building program to elicit change (Labin, 2014; Preskill & Boyle, 2008). However, the RECB-Q does not assess existing capacity. The literature highlights a range of tools that exist to assess existing research (Holden et al., 2012; King et al., 2003) and evaluation (Cousins et al., 2008; Schwarzman et al., 2019a; Taylor-Ritzler et al., 2013) capacity. Capacity building program managers, evaluators, or funders may wish to include contextual factors in program assessment tools. However, the information that is important for evaluation needs to be balanced with other factors such as budget constraints and optimising completion rates.

Conclusion

The advancement of research and evaluation capacity building in public health requires the development of evidence-informed evaluation tools. The RECB-Q is an evaluation tool that assesses processes, outcomes and impacts of research and evaluation support provided by a capacity building partnership. It was informed by systems concepts and reflects the dynamic and complex nature of capacity building. We suggest that the RECB-Q offers greater sensitivity to complexity than other available questionnaires developed for similar purposes. It addresses aspects of complexity through the inclusion of process indicators, consideration of contextual influences, and its ability to capture unanticipated outcomes. Applying systems concepts to the development of the RECB-Q provides insight for evaluators interested in incorporating systems approaches into the design of structured evaluation tools. The RECB-Q can be adapted to evaluate other research and evaluation capacity building programs and the evidence it generates will be used to strengthen capacity building efforts.

To view the supplementary material referred to in this paper, please refer to the corresponding appendices.

Supplementary file 1:

Example search strategies. Refer to [Appendix X](#).

Supplementary file 2:

Research and Evaluation Capacity Building Questionnaire (RECB-Q) and instructions. Refer to [Appendix Y](#).

7.3. Questionnaire to assess transactional engagement

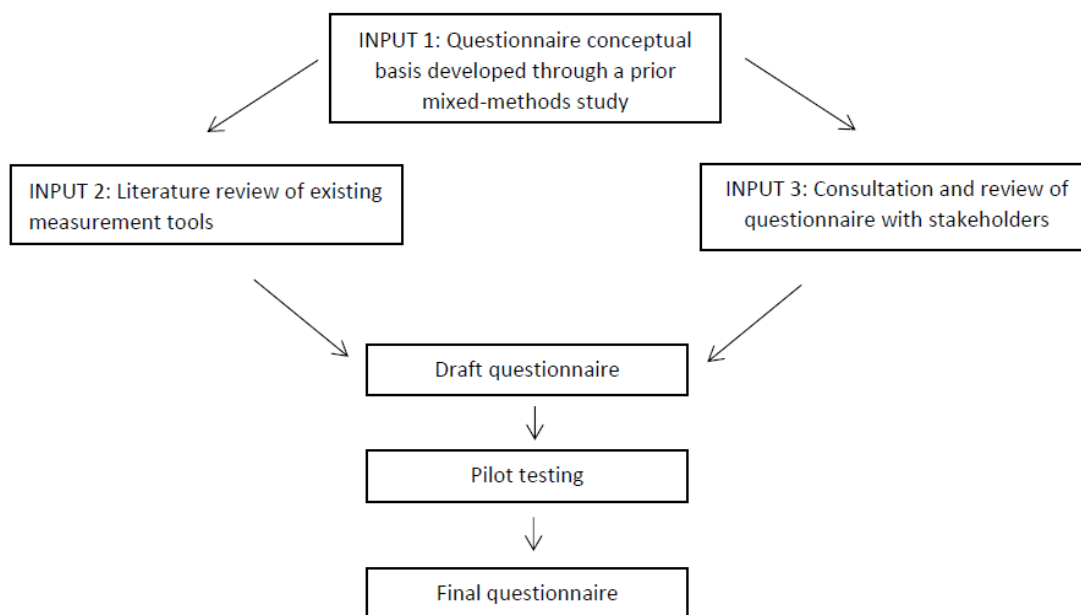
The following section describes the methods and results related to the questionnaire to assess transactional engagement.

7.3.1. Methods

The need to develop a questionnaire to assess transactional engagement was identified after the literature review for the RECB-Q had been completed. At this time, the management team expressed that developing a tool to assess the impacts of transactional engagement would be beneficial, as the RECB-Q only evaluates synergistic engagement. Developing another questionnaire would ensure that all types of SiREN's RECB support were evaluated.

The methods used to develop the transactional survey followed similar methods to what is described in [Publication 5](#). Figure 20 is a reproduction of a figure included in this publication that illustrates study methods used to develop the RECB-Q.

Figure 20. Questionnaire development processes



The methods used to develop the transactional engagement questionnaire included the following inputs:

1. Items were informed by the insights gained from the examination of SiREN described in [Publication 4](#).
2. The tools identified from the literature review undertaken to develop the RECB-Q were reviewed to identify items that could be used or modified for inclusion in the questionnaire.
3. Consultation to refine the survey was undertaken with members of the supervisory team ($n = 4$) and the SiREN management team ($n = 5$).

Following this, pilot testing for the questionnaire was combined with the RECB-Q.

When developing the transactional engagement questionnaire, there was no need to incorporate relational items (e.g., trust) or systems concepts. This was due to the uncomplicated nature of transactional engagement. It was not dependent on relational factors, as it often occurred over email (e.g., SiREN providing resources and tools to support decision-making) or one in-person meeting.

7.3.2. Results

The results of pilot testing the transactional engagement questionnaire are presented in [Publication 5](#). The final questionnaire contains six quantitative questions and is presented in Figure 21. All questions were developed by the PhD Scholar in consultation with members of the management team, except question 3, which was adapted from the study by King et al. (2009), which developed a questionnaire to assess the impacts and outcomes of research partnerships.

Figure 21. Transactional engagement questionnaire

Introduction at start of survey:

This survey aims to understand if you found the recent support provided by SiREN useful and if it led to any changes in your program planning, research or evaluation confidence, knowledge or skills. This information is confidential and will only be used by SiREN to improve the support it provides.

Thank you for taking the time to complete this survey.

From the SiREN team.

Questions:

- **Did you find the support provided by SiREN useful?** (Response options: To a great extent, somewhat, very little, not at all)
- **Did you (or do you intend to) apply the information provided by SiREN to your work?** (Response options: To a great extent, somewhat, very little, not at all)
- **Did the support provided change your overall confidence in undertaking program planning, research, or evaluation?** (Response options: increase, decrease, no change, not relevant to the support I received)
- **Did the support provided change your overall program planning, research, or evaluation knowledge or skills?** (Response options: increase, decrease, no change, not relevant to the support I received) (original)
- **Did the support provided change your confidence in sharing your work at conferences or forums?** (Response options: increase, decrease, no change, not relevant to the support I received)
- **Would you recommend SiREN support to a colleague?** (Response options: Yes, No, Unsure)

A document was developed by the PhD Scholar to support the use of both questionnaires by the SiREN team. This document provides guidance on stakeholder engagement record-keeping, determining which questionnaire to use (synergistic or transactional), disseminating the questionnaires and compiling results ([Appendix Z](#)).

7.3.3. Summary

Measurement tools are required to assess the effectiveness of capacity building programs. This chapter presented two questionnaires created and pilot tested to assess the research and evaluation support provided by SiREN. Findings from the study that developed CLDs to describe SiREN ([Publication 4](#), [Chapter 5](#)), a literature review, stakeholder consultation and pilot testing informed the development of the questionnaires. The first questionnaire (RECB-Q) was developed to assess synergistic engagement, and the second questionnaire assessed

transactional engagement. Systems concepts were used in the design of the RECB-Q to reflect the systems insights gained through the development of the CLDs ([Publication 4](#)). The development of the RECB-Q provides insight into how evaluation tools can reflect the complexity of the programs they evaluate. These considerations include determining the influence of contextual factors, assessing process factors and identifying unintended outcomes. Combined, these two tools were designed to assess the research and evaluation support provided by SiREN.

The following chapter ([Chapter 8](#)) concludes the thesis by providing a reflection on how this research addressed the study objectives, strengths and limitations of the research, implications and opportunities, recommendations and concluding remarks.

8. Discussion

This chapter will provide a brief overview of the study, discuss the study findings and strengths and limitations in relation to each of the study objectives. Following this, it will discuss implications and opportunities and recommendations. The chapter will close with concluding remarks.

8.1. Research summary

Public health issues are complex (Bagnall et al., 2019) and require a collaborative and evidence-informed response (Australian Government, 2021b). Despite growing interest in research and evaluation capacity building (RECB) to strengthen the public health response (Cooke et al., 2018; Punton, 2016), the process of how to build capacity within a public health system is not well understood and further exploration is required (Bowen et al., 2021; Cooke et al., 2018; Labin et al., 2012). Examination of capacity building in different contexts is required to inform action (Bowen et al., 2021). Reviews of the RECB literature indicate that approaches that are responsive to the unique context in which they operate and promote sustained engagement between researchers, service providers and policymakers (e.g., partnerships) are likely the most successful (Beckett et al., 2018; Cooke et al., 2018; Lamarre et al., 2020).

Evaluating RECB is challenging (Vang et al., 2021). RECB is a dynamic learning and knowledge creation process influenced by intersecting contextual factors (e.g., knowledge and culture) (Brownson et al., 2018; Gadsby, 2011; Labin et al., 2012). Systems approaches are sensitive to the complexities of capacity building and can offer new insights into how to build evaluation capacity (Grack Nelson et al., 2018). When applied to evaluation, systems approaches can explain how a program and contextual elements interact to bring about change (Cabrera et al., 2008; Hargreaves, 2010). There is a need for the application of systems approaches to evaluation to be examined within a public health context (McGill et al., 2021). Causal loop diagrams (CLDs) are a type of systems method that can be used to understand how a program contributes to change (Kenzie, 2021) and support the identification of meaningful indicators for program evaluation (Brown et al., 2018).

This study applied a systems approach to examine the Western Australian (WA) Sexual Health and Blood-borne Virus Applied Research and Evaluation Network (SiREN). SiREN is a ten-year partnership between sexual health and blood-borne virus (SHBBV) researchers, service providers and policymakers in WA. SiREN aims to strengthen evidence-informed policy and practice by developing research and evaluation capacity. Evaluations of SiREN undertaken two and three years after initial funding showed early indications of its contribution to research and evaluation capacity within the SHBBV sector (the SHBBV system). Yet, how these changes were achieved, and the long-term changes SiREN could attain were unknown. The SiREN management team expressed a need to contribute a broader understanding of how to undertake RECB within a public health system and develop practical tools to support ongoing monitoring and evaluation. This doctoral research was developed in response and aimed to further understand research and evaluation capacity building within a public health context.

To achieve the research aim, the objectives were:

1. Identify key constructs from frameworks used to explain or evaluate research partnerships between community-based organisations and universities ([Publication 1](#)).
2. Explore the application of systems approaches to examine the functioning, impacts and outcomes of SiREN ([Publication 2](#), [3](#), [4](#)).
3. Develop and validate a framework to inform the ongoing monitoring and evaluation of SiREN ([Chapter 6](#)).
4. Develop evaluation tools for use by SiREN to measure identified key indicators ([Publication 2](#), [5](#) and [Chapter 7](#)).

Using a systems approach, data were collected from multiple sources: online surveys, in-depth interviews, organisational documents, workshops and meetings, to examine how and in what ways SiREN supports RECB within the SHBBV system. Following this, an evaluation framework and questionnaires were developed. These tools reflect the understanding of SiREN and the SHBBV system gained from developing the CLDs. The insight into RECB processes, impacts and outcomes and the evaluation framework and questionnaires can be

used by public health service providers, researchers, or policymakers seeking to strengthen the development or evaluation of partnership-based approaches to RECB.

8.2. Findings related to study objectives

In this section, the findings of the study are discussed in relation to the four study objectives.

8.2.1. Objective 1

Identify key constructs from frameworks used to explain or evaluate research partnerships between community-based organisations and universities.

Summary of how this objective was met

A scoping review of frameworks used to describe or examine research partnerships between community-based organisations (CBOs) and universities was undertaken to achieve this objective ([Publication 1, Chapter 2](#)). For a detailed examination of the constructs identified from the frameworks included in this review, refer to the discussion section of [Publication 1](#). A summary of key findings presented in the publication is provided below.

Summary of key findings from Publication 1

Across the identified frameworks, there was little consistency between included constructs. This lack of consistency resulted from the variability across frameworks' purposes and the type of partnerships they were developed for. However, commonly identified process factors that supported the development of successful partnerships included a balance of power, respect and trust. These factors align with what is known to support partnerships unrelated to research (Corbin et al., 2016; Jones & Barry, 2011b; Lasker et al., 2001), indicating that the functioning of CBO-university partnerships could be strengthened by drawing on learnings from the broader partnership literature.

The frameworks did not adequately reflect the range of partnership impacts and outcomes. Outcome and impact constructs identified within the frameworks included enhanced research capacity (e.g., skills, attitudes), evidence-informed decision-making, changes to policy or practice, and improved capacity for partnering. However, a recent review exploring researcher-CBO engagement reported these partnerships have led to the generation of recommendations that informed subsequent research projects and improved the ability of CBOs to meet the needs of their communities (Adebayo et al., 2018). These changes were not included in the frameworks identified in this scoping review. This demonstrates that there may be unidentified impacts and outcomes of these types of partnerships and supports recent calls from researchers for a greater understanding of what changes research partnerships can achieve and how they can be achieved (Adebayo et al., 2018; Hoekstra et al., 2020; Oliver et al., 2019). As this knowledge evolves, existing frameworks will need to be adapted or new ones developed to reflect potential effects comprehensively.

Considering complexity may strengthen the ability of researchers to track the actions of CEnR to longer-term, emergent and unanticipated effects (Beckett et al., 2018). To determine effect attribution, stronger links must be made between processes and impacts to trace the change process (Beckett et al., 2018). Applying complexity and systems thinking concepts can strengthen partnership and capacity building understanding and evaluation (Beckett et al., 2018; Cooke et al., 2018; Rycroft-Malone et al., 2016). Therefore, future framework development studies related to partnerships or capacity building should consider their inclusion.

The identified frameworks provide a helpful starting point for developing, implementing or evaluating a partnership. Yet each was limited by a lack of specificity for CBOs, comprehensiveness or validation with CBO-university partnerships. These limitations reduce the generalisability and usefulness of the frameworks as comprehensive partnership development or evaluation tools.

8.2.2. Objective 2

Explore the application of systems approaches to examine the functioning, impacts and outcomes of SiREN.

Summary of how this objective was met

To achieve this objective, three CLDs were developed. An overview of CLDs and a rationale for use is provided in [Section 3.2.4](#) and within Publications [2](#), [3](#) and [4](#). The final CLDs are presented in Publications [3](#) and [4](#) within Chapters [4](#) and [5](#), respectively. For an in-depth discussion of the functioning, impacts and outcomes of SiREN, refer to these publications. This section provides an overview of the key findings from the published CLD papers related to the functioning, impacts and outcomes of SiREN. It then reflects on the application of a systems approach.

Summary of key findings from examining SiREN (Publications 3 and 4)

This study found that an ability to adapt helped SiREN achieve its aims. According to a quote attributed to Charles de Gaulle (date unknown), *“You have to be fast on your feet and adaptive or else a strategy is useless.”* Adaptation enabled SiREN to evolve with and meet the dynamic needs of the SHBBV system. Adaptation is a central concept in systems thinking (Wilkinson et al., 2018) and is identified as a factor supporting approaches to increase RECB and EIDM (Beckett et al., 2018; Fransman et al., 2021; Vang et al., 2021). However, consideration of the adaptability of programs within public health is limited. As complexity is increasingly applied to public health evaluation (McGill et al., 2021), focusing on how a program interacts within its system could enhance adaptability, leading to more responsive public health action. Furthermore, when designing partnership-based approaches to building research and evaluation capacity strategies to support adaptation should be included. For example, the establishment of stakeholder reference groups to ensure the partnership is informed of, and responsive to, emerging issues.

Prior to SiREN’s establishment, some management team members had strong relationships with stakeholders from working with and within the SHBBV system. Even though SiREN had this foundation, significant time was (and is) spent establishing, building and maintaining

relationships, particularly as stakeholders entered and exited the system. This finding is consistent with those from the broader partnership literature (Brush et al., 2020; Rycroft-Malone et al., 2016). However, time to develop relationships is rarely valued (or accounted for) in research funding (Nyström et al., 2018) and can conflict with university interests of achieving tangible research outputs (Douglas et al., 2020). Yet, this time is essential to support the development of a trusting relationship based on mutual understanding (Nyström et al., 2018). Once established, these relationships led to benefits such as faster responses to emerging issues and greater efficiencies in developing collaborative grant applications. Furthermore, these partnerships added credibility to funding applications. In these ways, these partnerships can smooth the path to more impactful research (Oliver et al., 2019). Therefore, approaches to building RECB require a commitment from stakeholders and funders to invest resources into building relationships before more tangible benefits such as research outcomes can occur. In addition, partnership-based approaches, like SiREN, are particularly suited to building RECB within complex systems requiring responsive action.

SiREN stakeholders include universities, non-government organisations and government. Each of these stakeholders has divergent interests, as highlighted in the introduction. For example, universities value quality research (Douglas et al., 2020), CBO's require evidence to improve service delivery (Adebayo et al., 2018) and governments need evidence to support policy decisions (Williamson et al., 2019). Diversity in stakeholder motivations and needs can threaten the sustainability of partnerships (Nyström et al., 2018; Oliver et al., 2019). SiREN's main government funder provided long-term investment in SiREN and supported it in establishing relationships that underpin its work. Being situated within Curtin University enhanced the credibility of SiREN and provided access to postgraduate students to support research activities. SiREN sought to balance its diverse stakeholder needs through the types of activities it pursued. For example, it met the evaluation and research capacity building needs of the main funder and non-government organisations through collaboratively producing research and evaluation evidence with service providers, which also led to research outputs, thus meeting the needs of the university. Partnership-based approaches to building capacity should consider the needs and motivations of different stakeholders to ensure their structure and activities support a sustainable partnership.

Examining the impacts and outcomes of SiREN found that synergistic (extended) engagement between SiREN, its service users and partners led to more impacts and outcomes that were sustained over time, when compared to transactional (brief) engagement. Synergistic engagement was defined as occurring over multiple exchanges across a long period of time (e.g., months, years) and was based on a trusting and reciprocal relationship. As described by Bowen et al. (2021), with RCB there is a need to move from away one-off interactions (e.g., workshops, single research project collaboration) to longer-term relationships. Furthermore, the capacity building literature consistently demonstrates that strategies that are needs-based and provide practical opportunities to apply learnings are an effective and meaningful way to build capacity (Cooke et al., 2018; Lamarre et al., 2020; Lawrenz et al., 2018; Norton et al., 2016). Yet, a recent review concluded that *“sustainable mechanisms for supporting ongoing ECB in public health have not been established.”* (Lamarre et al., 2020, p. 12). SiREN is an example of how a relational and needs-based approach can lead to sustained improvements in research and evaluation capacity within a public health context.

The development of trusting relationships between SiREN, its partners, and service users was identified as essential to SiREN’s success. The ECB literature is limited in its examination of relational factors that support the capacity building process (Buckley et al., 2021). This research suggests that the development of trust in ECB parallels the RCB and broader partnership literature (Jones & Barry, 2011a; Wye et al., 2020). The findings indicate trust was predicated on credibility, reliability, and power-sharing to define problems and shape solutions. Relational aspects are central to successful RECB. The findings of this study add to the limited evidence base of how relational factors support ECB. However, further examination of relational factors that support ECB within different contexts will strengthen understanding of how to effectively nurture the capacity building relationship.

SiREN’s continued investment in aligning its services and resources to the needs of stakeholders supports its ability to address emerging changes. SiREN built networks and partnerships which had a reinforcing relationship with the creation and sharing of evidence. Evaluation and research evidence created by SiREN was applied to decision-making. SiREN’s contribution to embedding research and evaluation as part of regular practice in the system

and the continuous learning opportunities it provided enhanced sustainability by ensuring the impacts of its capacity building strategies did not diminish over time (e.g., through staff turnover) (Preskill & Boyle, 2008). This finding aligns with the understanding that capacity is not an end point but a continual process embedded within an evolving system (Vang et al., 2021). Approaches to RECB should continue to move away from singular strategies such as workshops, to sustained partnership-based approaches.

There is a need for capacity building programs to address change at a system level (e.g., creating shared research priorities) (Bowen et al., 2021). The examination of the impacts of SiREN found examples of system level changes such as increased funding for research and evaluation, evidence sharing, the development of networks and partnerships that led to more efficient responses to SHBBV issues. While many system level changes begin at the individual level (e.g., support to undertake a research project), they can reverberate across the system over time when they occur through synergistic engagement. This ripple effect theory has been identified previously in the research partnership literature (Jagosh et al., 2015). While this examination of SiREN provided some examples of system level change, there is potential for greater impact at this level. Building capacity at the system level requires supportive policy and funding (Lamarre et al., 2020) and can include strategies such as protected research time and funding to build collaborative relationships (Cooke, 2020). There remains a need to invest in RECB at the system level to create sustained change (Cooke, 2020; Lamarre et al., 2020).

Reflections on a systems approach

An examination of the application of a systems approach was discussed in Publications [3](#) and [4](#) ([Chapters 4](#) and [5](#)) and is expanded on in the following section. Reflections are also considered in relation to the development of the framework ([Objective 3](#), [Chapter 6](#)) and questionnaires ([Objective 4](#), [Chapter 7](#)).

Using systems concepts to guide the design of this study ensured that context and contextual influences and multiple perspectives were considered. The literature suggests this is important because it strengthens understanding of how interventions lead to change (Datta & Petticrew, 2013; McGill et al., 2020). SiREN was contextualised by defining the

study boundaries to include the broader SHBBV system and factors that affect EIDM, research and evaluation capacity. This supported the identification of factors that affected the implementation and effectiveness of SiREN. For example, how organisational culture affected a service user's decision to engage with SiREN. However, understanding context also required collecting and analysing a large amount of data which were not always relevant to SiREN. For example, the online surveys ([Appendix E](#)) and in-depth interviews ([Appendix F](#)) asked questions about factors that influence EIDM and research and evaluation capacity broadly. When examining a program using systems concepts it may be more time and resource efficient to draw a closer boundary between the program and system by only collecting data about contextual factors that directly affect the program functioning. For example, instead of defining the system as the SHBBV system, the boundary could have been tightened to the system that delivers evidence-based SHBBV programs and services.

Considering the concept of perspectives during sampling and data collection required the inclusion of a wide range of participants. Participants included those who had not engaged with SiREN and those who had prolonged engagement. In addition, participants included people with a bird's-eye view of the system (e.g., senior health department staff) and those on the frontline of service delivery (e.g., clinical trainers). Including multiple perspectives has been highlighted in the literature as critical to assess different experiences or perspectives of a program and understanding different change trajectories (McGill et al., 2020). In this doctoral research, it was a useful approach as it enabled identification of reasons why stakeholders may choose to engage with SiREN or not. In addition, it provided insight to the value of SiREN for different roles within the system (e.g., senior manager, researcher). Future studies that use systems approaches, should consider expanding study participants to include those with different perspectives such as funders or program staff.

Many of the impacts and outcomes identified align with what is widely known in the capacity building literature, for example, changes to knowledge and skills, and the establishment of networks and partnerships (Lamarre et al., 2020; Preskill & Boyle, 2008; Pulford et al., 2020). However, unexpected processes and changes were identified. These included the process of adaptation that enabled SiREN to be responsive to the needs of the

SHBBV system, as well as impacts such as increased clarity amongst SiREN service users of their program's purpose and processes. Identifying unanticipated outcomes demonstrates the benefit that a systems approach contributed to understanding SiREN.

Reflections on the value of CLDs

CLDs were utilised to examine the relationships between and within SiREN and the system.

This method benefited the study in the following ways:

1. identified reasons for variability in engagement and impacts and outcomes,
2. enriched understanding of how SiREN functions and contributes to change, and
3. supported theory driven evaluation.

The following sections describes these strengths and their related challenges in more detail.

Identified reasons for variability in engagement and impacts and outcomes

The development of CLDs can identify reasons for variability in program implementation and outcomes through the examination of contextual influences (Fredericks et al., 2008; Kenzie, 2021). This is a strength when applied to examining capacity building programs, as there are contextual variabilities in capacity that need to be accounted for, for example, differences in abilities and attitudes. The examination of contextual influences also highlighted factors that influenced an individual's or organisation's decision to engage with SiREN. Many of these factors (e.g., boundary spanning, trust) have been explored in the literature on RCB (Cooke, 2020; Frerichs et al., 2016) and KT (Nguyen et al., 2020). However, these factors have not been well explored in the ECB literature (Buckley et al., 2021) and their identification within this study, highlights the valuable role CLD's can play in elucidating the relationship between a program and contextual influences.

Enrich understanding of how SiREN functions and contributes to change

CLDs provided a method to visually depict the complexity of SiREN. There is limited understanding of how RECB programs work (Bourgeois & Cousins, 2013; Cooke et al., 2018; King, 2017). Systems approaches can shift the focus from whether or not a program works toward what it is about the program that makes it work (Sridharan & Nakaima, 2017). As a systems tool, CLDs are well suited to illuminating the causal relationships between program

characteristics and effects (Owen et al., 2018). This was evident in the identification of relational factors e.g. trust the supported the attainment of impacts and outcomes. However, as CLDs do not quantify the effects of a program it is not possible to predict the degree of change over time (Barbrook-Johnson & Penn, 2022). If quantifiably predicting system behaviour over time is required, another type of systems diagram called stock and flow diagrams may be used (Sterman, 2000).

Presenting the program change process as non-linear (as CLDs do) makes it challenging to communicate program processes to stakeholders (Jones et al., 2016). This can be addressed by involving stakeholders in the CLD development process, as was done in this doctoral research. The management team reported that participating in the development of the CLDs crystallised what aspects of SiREN were most valued. These findings align with the CLD building literature (Brennan et al., 2015; Gerritsen et al., 2020; Hovmand, 2014) that state the participatory methods in diagram development increase understanding of the issue the diagram illustrates. When participatory CLD development processes are not used or do not include all stakeholders, more easily interpreted versions of the CLD (e.g. simplified or colour coded) should be developed for broader dissemination (Barbrook-Johnson & Penn, 2022).

The development of the CLDs led to the identification of feedback loops and leverage points. Loops and leverage points have considerable influence within the system because they are points where change is amplified or dampened and can be manipulated to affect change and enhance a program's effectiveness (Gates, 2016; Williams & Hummelbrunner, 2010). Key leverage points included SiREN's ability to adapt within a dynamic system, establish and maintain partnerships, demonstrate capability and credibility, boundary spanning skills of the team and the development of trusting relationships. A crucial feedback loop was the reinforcing relationship between trusting relationships and engagement. SiREN can use this understanding of the pivotal role of trust to actively strengthen relationships and therefore improve its ability to support research and evaluation capacity within the system. Being able to view all the factors that affect the functioning of a program in one diagram provides a different vantage point, which may support the identification of how a change in one part of the system could lead to change in another. For example,

understanding the central role of adaptability in supporting the functioning of SiREN emerged in the first CLD ([Publication 3](#)).

Support theory driven evaluation

As highlighted in [Section 3.2.4](#), CLDs are well suited to support the development of program theory (Renmans et al., 2017; Wilkinson et al., 2021). This is because program theory, like CLDs, can uncover the relationships between a program, its context, and outcomes (Funnell & Rogers, 2011; Kenzie, 2021). While CLDs can better reflect the complexity of programs when compared to traditional theories of change (Renmans et al., 2017), they are not as easy to interpret and use to inform program evaluation because the change process is presented in a non-linear way (Wilkinson et al., 2021). Renmans et al. (2017) converted CLDs to hypotheses feeding into a theory-driven evaluation of a performance-based financing intervention. However, the authors did not describe the decision-making processes behind converting the diagrams. In a study by Wilkinson et al. (2021), a methodology was developed for creating theories of change from a CLD. However, the study concluded that while the process produced useful insights, the methodology needs to be refined through further application and testing. This Doctoral research provided insight into how CLDs can be used to support the theory driven evaluation of SiREN. Yet, within the wider literature uncertainty remains regarding how to extract the insights on program theory from CLDs to inform program evaluation.

8.2.3. Objective 3

Develop and validate a framework to inform the ongoing monitoring and evaluation of SiREN.

Summary of how this objective was met

The evaluation framework was developed using three processes: systematically consolidating the data from the three CLDs, consulting with the management team to refine the framework structure and validate its content and, finally, undertaking a consensus-building process with the management team to determine the importance of the framework indicators. The final framework ([Appendix P](#)) comprises seven evaluation questions, 21

domains and 149 indicators. The framework was modified from a traditional framework to enable it to reflect the complexity of SiREN, while maintaining a familiar and practical structure. The framework methods and final framework are discussed in [Chapter 7](#).

The development of the framework contributed to a need for evaluators to explore ways for evaluation to reflect real-world complexity (Preskill et al., 2015; Stack et al., 2018). The framework embraces aspects of traditional evaluation in that it summarises processes, outputs, impacts and outcomes (Rogers, 2008). In addition, the framework incorporates more recent evaluation advances that reflect the complexity of programs, such as contextualising programs (Renger et al., 2019), accounting for causal relationships (Rosas & Knight, 2018) and promoting a reflexive approach (Rijswijk et al., 2015). The development of the framework describes a method to transform the systems-based insights gained from the CLDs into an evaluation framework with measurable indicators. Adopting an iterative stakeholder-informed response resulted in a comprehensive framework that the management team considered a practical and useful way to evaluate SiREN. The following sections will consider how systems concepts were included in the framework and the value they add, provide management team reflections on the framework and discuss how the evaluation of SiREN may be strengthened in future.

How systems concepts strengthened the framework

Contextualising a program supports understanding of how change occurs (Midgley, 2006; Renger et al., 2019). The framework contextualises SiREN in two main ways. Firstly, it identifies factors that influence the ability of stakeholders to undertake research, evaluation and evidence-informed decision-making. Equipped with this knowledge, SiREN can identify the contextual influences that affect its ability to achieve its aims as well as those to target to effect change (Renger et al., 2019). For example, when stakeholders have reported a lack of access to evidence, SiREN has addressed this by developing and sharing evidence summaries. Secondly, when evaluating its activities, SiREN seeks to understand how these activities interact with the context in which they were implemented. This information enables SiREN to confirm existing or establish new theories of '*what is happening and why*' (Parrott et al., 2016, p. 7). In this way, the context-sensitive evaluation provides insight into how a program can be adapted to increase effectiveness (Renger et al., 2019).

Multiple interdependent causal relationships exist both within and between SiREN and the broader system. These relationships affect the functioning a program and the system in which it operates (Gates, 2016; Wilkinson et al., 2021). Traditional evaluation frameworks often depict change as a linear process affected only by the program in question. This depiction obscures the complexity of the relationship between a program, the system and the changes that occur, resulting in a misrepresentation of reality (Astbury & Leeuw, 2010; Renger et al., 2019). In the framework, causal relationships are explained in the domain descriptions. In these descriptions, attention is paid to the mechanisms that affect the attainment of impacts and outcomes, and the flow on effects. This acknowledges the recursive nature of change in systems thinking whereby *'causes can also be effects and effects can also be causes'* (Gates, 2016, p. 70). For instance, domain 5.2 *Networks and partnerships are established and developed* is supported by the following domain description: *Once established, networks and partnerships enable a more efficient and effective response to emerging issues and the creation and sharing of evidence. In turn, the process of creating evidence can lead to the establishment of new networks and partnerships.* This example highlights the reinforcing relationship between the creation of evidence and the development of networks and partnerships. Elucidating causal relationships highlights crucial links that influence SiREN's ability to achieve its ascribed purpose (Rosas & Knight, 2018), which provides meaningful data for evaluation purposes (Dyehouse et al., 2009; Preskill et al., 2015).

The framework encourages a reflexive approach that extends the purpose of evaluation beyond learning (Rijswijk et al., 2015). A reflexive approach involves a continuous cycle of observing, analysing, reflecting and adjusting processes and activities (Preskill et al., 2015; Van Mierlo et al., 2010). This cycle is evident in framework domain 4.1 *SiREN activities are aligned with stakeholder needs* and 4.2 *Emerging opportunities and threats are responded to.* Bryson et al. (2011) explained this cyclical process supports program adaptation within a complex system as evaluation end-users are constantly required to reconcile the expected with the unexpected and adapt accordingly. Adaptations to SiREN may include governance adjustments, pursuing new research areas based on emerging issues or developing new research or evaluation support services to better meet stakeholder needs. Taking a reflexive approach is suited to programs that operate within a complex system as it enables program

managers or funders to “respond to emergent trends rather than focusing on expected results” (Rijswijk et al., 2015, p. 40).

Taking a retrospective approach

The framework was developed retrospectively, drawing on the rich data collected from the study. Regeer et al. (2016) explained that evaluation frameworks are often developed prospectively, which involves forecasting expected impacts and outcomes. Prospective approaches have been criticised for focusing an evaluation on expected results rather than emerging change (Botha et al., 2017; Rijswijk et al., 2015). A retrospective approach sets realistic expectations of what SiREN could achieve based on past data collected over nine years of operation. The framework content supports a reflexive approach to identify and explain emergent or unintended consequences. When developing a framework, a balance needs to be struck between knowing what is occurring and seeing what is possible (Regeer et al., 2016). Therefore, before developing a framework, evaluators need to consider the type of program (e.g., established, experimental) and the available evaluation data. A retrospective approach was a good fit for developing the SiREN evaluation framework as it was supported by reliable evaluation data.

Management team reflections

During the development and validation of the framework, the management team reflected on the development processes and usability of the framework. When considering the methods used to develop and validate the framework, they reported it enabling familiarity with what is required to evaluate SiREN. They described the consensus-building process as “systematic rather than random” and reported it was a time-efficient method of identifying priority indicators for evaluation. At times they thought it was difficult to interpret the meaning of indicators, highlighting that during the second round, it would have been preferable to be able to see the results from the first round. This would have given weighting to their choices as they could see how indicators that had reached consensus in the first round were classified.

When reflecting on the future usability of the framework, participants highlighted the possibility of further reducing the number of essential indicators as they felt regularly

measuring 149 indicators is not pragmatic and asked, “*If we do nothing else, what do we need to do?*” They felt reducing the number of essential indicators could support them to prioritise areas for evaluation when restricted by resourcing. Furthermore, the indicators could be pooled around specific activities, such as research partnerships or evaluation capacity building. This comprehensiveness is a challenge of using CLDs to develop evaluation frameworks. CLDs can have large numbers of variables and relationships and condensing them down into a practical evaluation framework is challenging. Participants also expressed interest in reviewing the framework to see which indicators were classified as essential and desirable. This would enable them to reclassify indicators if required. The framework was made available to SiREN for this to occur later.

8.2.4. Objective 4

Develop evaluation tools for use by SiREN to measure identified key indicators.

Summary of how this objective was met

To achieve this objective, two questionnaires were developed to assess the processes, outcomes and impacts of research and evaluation support provided by SiREN. A discussion of how this objective was met and the development of the questionnaires were presented in [Publication 5](#) and [Chapter 7](#). A summary is provided here.

The first questionnaire presented, the RECB-Q, was developed to assess synergistic (extended) support, and the second questionnaire was developed to assess transactional (brief) support. The development of the questionnaires was informed by insights gained from the development of the CLDs, a literature review of existing measurement tools, and consultation and pilot testing with SiREN stakeholders. Pilot testing results found the questionnaires were easy to understand, acceptable and enabled service users to provide an accurate description of the support they received from SiREN and any changes that occurred as a result. The following discussion focuses on the RECB-Q because this tool reflects the complexity of synergistic support.

The RECB-Q differs from other RECB related questionnaires because it is sensitive to complexity. Complexity is reflected in three key ways:

1. Considers how system variables are interrelated through asking respondents how SiREN and external contextual factors contributed to the attainment of outcomes. This can establish credible causal links between SiREN's actions and observed changes (Earl et al., 2001; Mayne, 2012).
2. Includes process related questions (e.g., ability of SiREN and service user(s) to engage in collaborative problem solving). Processes occur before longer-term impacts (e.g., EIDM). Long-term impacts take time to occur and may not always occur due to factors outside of the control of SiREN (e.g., staff changes). Therefore, monitoring processes can show that SiREN is 'on the right track' and address difficulties evaluating RECB within a complex system.
3. Asks respondents about a change they found most important to their practice and why it was important. This strengthens SiREN's ability to determine changes most valued by service users and identification of emerging impacts and outcomes. Findings from these questions can inform new directions, strengthening SiREN's ability to adapt within a complex system.

There are synergies between complexity sensitive methods and the evaluation of capacity building programs (Lawrenz et al., 2018). There is a need for greater understanding of the mechanisms of action of capacity building programs (Lamarre et al., 2020); complexity sensitive methods are a suitable approach to addressing this gap through exploring contextual influences and causal relationships (McGill et al., 2020).

8.3. Strengths and limitations

This section considers the overall strengths and limitations of the study as well as those related to the scoping review and the development of the CLDs, evaluation framework and questionnaires.

8.3.1. Overall strengths and limitations

The research examined how to strengthen EIDM, a pressing global public health issue (World Health Organization, 2021). SiREN was used to illustrate and understand how a

partnership-based approach can support RECB across a public health system. Evaluations of SiREN at two and three years demonstrated promising early signs of capacity (e.g., increased knowledge and skills). However, longer-term outcomes and the processes supporting capacity building were unknown. Using a systems approach provided novel insights into how SiREN contributed to building research and evaluation capacity across the SHBBV system. This study developed practical tools to demonstrate the impact of SiREN and other RECB programs.

Strategies used to enhance the rigour of the study were discussed in [Section 3.2.9](#). The Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist developed by Tong et al. (2007) Using this checklist supported the reporting of important aspects of the qualitative research (e.g., research team, analysis methods) (Tong et al., 2007). A comprehensive understanding of the issue was achieved through the PhD Scholar spending prolonged time engaging with the literature, having continuous experience with SiREN and the SHBBV system and collecting data from multiple sources.

When a researcher is positioned within the system they are examining, the research may be considered insider research. In this research, the PhD Scholar and three members of the supervisory team were insiders (RL, GC, JH). Insider research can be a strength when strategies to reduce bias are implemented (Asselin, 2003). The implications of insider research and the strategies implemented to mitigate them were discussed in detail in [Section 3.2.9](#) and some are highlighted, alongside other strengths and limitations in the following paragraph.

As the PhD Scholar was involved with SiREN, social desirability bias may have occurred during data collection (Bergen & Labonté, 2020). This was reduced by utilising a variety of data collection methods, providing participants with assurances of confidentiality, probing to clarify in-depth interview responses and discussing data collection processes with the supervisory team (Bergen & Labonté, 2020). Several strategies were used to address the limitations of insider research (e.g., not assuming a shared understanding with interview participants, see [Section 3.2.9](#)) and a single researcher collecting data and conducting primary analysis. Trustworthiness was improved by taking a reflexive approach that involved

triangulating data from different sources and methods, reflective journaling and frequent meetings with the supervisory team during data collection and analysis to discuss and refine emerging findings (Krefting, 1991). When developing the CLDs presented in [Publication 4](#), a team member who was not involved in SiREN was present to enhance objectivity (Krefting, 1991).

8.3.2. Strengths and limitations related to the scoping review

This review is the first to report on CBO-university partnership frameworks. It provides a broad scope capturing 15 years of the available peer-reviewed literature. Publication bias may have occurred by only searching academic databases. Included studies were undertaken in a high-income country (USA), which may limit applicability of findings. Two reviewers screened abstracts and full texts and checked data extraction to reduce error. Studies that tested or refined the included frameworks were not purposefully searched for. Most studies that tested these frameworks would have been identified in the search. However, as targeted searching was not undertaken, some may have been missed. Some frameworks have been widely cited (Donabedian, 1982; Wallerstein et al., 2008) and searching this expansive body of literature which largely lies outside of CBO-university partnerships was outside the scope of this study. There are no widely accepted terms to describe CBO-university partnerships (Haapanen & Christens, 2021; Hoekstra et al., 2020). Studies using terminology inconsistent with our search terms may have been overlooked.

8.3.3. Strengths and limitations related to the CLDs

This section discusses the strengths and limitations related to the CLDs developed to examine SiREN ([Objective 2](#)). Strengths and limitations of the CLDs were also addressed when reflecting on the value of CLDs ([8.2.2](#)) and in Publications [3](#) and [4](#).

The impact of differences in participatory diagram building on diagram quality

There were variations in the processes used to develop the CLDs in this study. For the diagram examining the functioning of SiREN ([Publication 3, Chapter 4](#)), the management

team and staff were involved in an iterative process that included five meetings and a workshop to refine and validate the diagram. Whereas, for the diagrams illustrating engagement, impacts and outcomes, service users and partners were involved in a single workshop. This process also involved meetings ($n = 3$) with the management team. However, their role was to interrogate the diagram (e.g., question accuracy and completeness) rather than explain how SiREN had contributed to impacts and outcomes, as this was the role of SiREN partners and service users.

The reason for involving these participant groups differently in the diagram development processes was primarily based on maintaining confidentiality and anonymity, and efficiently using participants' time. Interviews were selected as a first step in developing the CLDs to enable participants to anonymously share their perspectives and experiences (Dicicco-Bloom & Crabtree, 2006, p. 319). Using interviews may be preferable to group methods in contexts where confidentiality and anonymity are important (Sim & Waterfield, 2019). Furthermore, collaborative model-building workshops require a significant investment of time (Hovmand, 2014). Asking SiREN service users and partners to attend multiple meetings to develop and refine a CLD would have required a significant commitment of their time and was not practical or acceptable. However, for the management team and staff, these meetings were incorporated as part of their work and had the added value of leading to the development of evaluation tools, thereby reducing respondent burden.

These variations in diagram development processes may have led to the different levels of detail in the final diagrams. When developing the first diagram ([Publication 3, Chapter 4](#)), each meeting with management team and staff led to the identification of new variables and relationships. This led to a rich diagram with more relationships and feedback loops than the other diagrams combined. However, as the management team and staff had a deeper level of understanding of SiREN when compared to SiREN service users and partners, the level of expertise is also likely to have contributed to the richer diagram ([Publication 4, Chapter 5](#)). The contrast between the diagrams brings into question what level of stakeholder participation is required and at what timepoint stakeholders should be involved and for how long. This is discussed further in [Section 8.4.1](#).

Data analysis processes were informed by Kim and Andersen (2012) and included the development of a table that created an audit trail of transparent and traceable links between data and the diagrams, thus building confidence in the reliability of the diagrams. The diagrams were verified with stakeholders using similar processes articulated in comparable studies (Brennan et al., 2015; Fredericks et al., 2008; Rwashana et al., 2014). Validating the diagrams acted as a form of member checking (Breen, 2007; Kornbluh, 2015).

A recent doctoral thesis by Kenzie (2021) developed structured guidelines for undertaking interviews to construct CLDs. The interview schedules developed in this study ([Appendix F](#) and [Appendix H](#)) were designed with systems concepts in mind and the qualitative research knowledge of the supervisory team and PhD Scholar. The questions and techniques inadvertently used some of Kenzie's (2021) recommendations (e.g., constructivist approach, looking for cause and effect relationships). However, Kenzie (2021) provided probing techniques specific to the development of CLDs that were not used by the PhD scholar such as *"So it sounds like X and Y reinforce each other."* Using these techniques may have improved the richness of the data collected. Furthermore, Kenzie (2021) recommended the use of a follow-up interview to focus on parts of the CLD that are incomplete or need to be clarified. A second interview could have been offered for participants who could not attend the CLD workshop ([Publication 4](#)). Kenzie's (2021) interview guidelines have not been tested for effectiveness. However, their application may have enhanced the rigor of the CLD development process.

The perspectives of SiREN's main funder were not included as they declined to participate, citing a conflict of interest. The main funder has been involved with SiREN since its inception in 2009, therefore by not interviewing the main funder, some insight into its history and value to the SHBBV system was not included in the development of the CLDs. However, the main funder did provide input into the development of [Section 1.3](#). In addition, the main funder has a representative on the SiREN steering group and their staff (e.g., program or policy officers) have received research and evaluation support. As their perspectives were not included, this may mean that some impacts and outcomes were not identified.

8.3.4. Strengths and limitations related to the evaluation framework

This section discusses the strengths and limitations related to the evaluation framework ([Objective 3](#)). Framework development methods and the final framework are discussed in [Chapter 6](#).

Transforming the complexity captured in the CLDs into a modified traditional evaluation framework required several iterations until members of the management team agreed it adequately reflected SiREN. The relationships depicted in the diagrams were reduced to those considered most relevant to the functioning of SiREN to avoid overcomplicating the framework. Condensing the diagram was systematic, but some causal relationships are not explained in the framework as they were too numerous, as noted as a limitation of CLDs previously. Involving the SiREN team in developing the diagrams and framework ingrained an understanding of causal relationships as part of their tacit knowledge. In addition, the original diagrams and their textual description provide a reference point for further insight when required.

Actively involving intended users in evaluation design draws on their collective expertise and understanding, enhances relevance and meaningfulness of the evaluation to end-users, and lays the foundation for ongoing evaluation (MacLellan-Wright et al., 2007). The management team were involved in all stages of framework development. However, the diversity of stakeholders could have been increased by including steering group members, partners or service users. Steering group members were informed of the development of the framework at a steering group meeting. They were not invited to directly provide input as they were not the target users of the evaluation framework and would not be using the evaluation findings to make decisions. However, many of them participated in the development of the CLDs. Therefore, their understanding of how SiREN works and what it can achieve informed the framework. In addition, the evaluation expectations of the main funder were established in the funding agreement. These indirect approaches supported the inclusion of other stakeholder perspectives within the framework.

Using online questionnaires in the consensus-building process maintained anonymity, reduced dominant individuals' influence on others' opinions and provided participants adequate time to consider their responses (Ali, 2005; Hsu & Sandford, 2007). In addition, the final face-to-face meeting clarified reasons for disagreements and enabled consensus (Eubank et al., 2016). The use of experts (management team) increased the framework's validity (Hasson et al., 2000). The small number of experts was not ideal because one opinion could markedly affect the results of the consensus-building process (Mitchell et al., 2009). However, the whole sample of the management team was used so this could not be avoided.

Evaluation frameworks need to be tailored to meet the needs of program stakeholders, context and purpose (Moreau, 2017). The generalisability of the framework is limited because it was explicitly developed for SiREN, a unique partnership designed to support the WA SHBBV system. There are overlaps between the framework domains and other frameworks focusing on the related areas of evaluation capacity (Labin et al., 2012; Preskill & Boyle, 2008; Taylor-Ritzler et al., 2013), research capacity (Cooke, 2005; Edwards et al., 2016), partnerships (Corbin et al., 2016; Currie et al., 2005; Lasker et al., 2001) and knowledge translation (Gagliardi et al., 2015; Greenhalgh et al., 2016). These consistencies indicate that aspects of the framework will be relevant to similar programs but must be adapted and validated before use.

8.3.5. Strengths and limitations related to the RECB-Q

A key strength of the RECB-Q development was the empirical and collaborative approach. Similar to other questionnaire development studies (King et al., 2009; Kothari et al., 2009; Taylor-Ritzler et al., 2013), the creation of the RECB-Q was based on multiple methods, which increased its conceptual and methodological quality (Hamzeh et al., 2019; Haynes et al., 1995). The collaborative expert-led approach used to develop the questionnaire has been used in similar studies (Arora et al., 2015; Palinkas et al., 2016; Taylor-Ritzler et al., 2013) and ensured that the RECB-Q is appropriate and relevant to the needs of SiREN and its service users. Its brief, online format makes it acceptable to service users and reduces the time taken for SiREN to collect and analyse data. Outcome items reflect what is known in

the research and evaluation capacity building literature (Cooke et al., 2008; Labin, 2014; Preskill & Boyle, 2008), strengthening its content validity (Haynes et al., 1995). The search for existing qualitative evaluation methods was limited to one online knowledge platform. Therefore, methods not included on the identified website were excluded. Pilot testing was confidential but not anonymous, which may have led to social desirability bias (Nederhof, 1985). The majority of the research team were past or current SiREN staff or management team members. This was a strength as they had an in-depth understanding of SiREN. However, it may have increased social desirability bias during pilot testing.

The RECB-Q may be adapted to evaluate other similar capacity building projects in health-related fields. While many of its items align with what is known in the literature, it was developed based on a single capacity building project and it should undergo testing and modification as required before evaluating other programs. The number of organisations that SiREN engages with is relatively small, consisting of approximately 15 research, government and non-government agencies. The size of SiREN and the organisations it supports limited the sample available for pilot testing and precluded the use of tests of statistical significance. The study findings that informed the generation of the questionnaire items were also derived from a limited sample. This may have reduced the number and type of questionnaire items generated. Further reliability and validity testing, including test-retest reliability, is recommended (Hinkin, 1995) with a larger sample size from other health-related fields.

8.4. Implications and Opportunities

The following summarises the implications and opportunities for research, SiREN and the WA SHBBV system, and policy and practice. Some of these have been highlighted throughout the thesis, including relevant publications ([1](#), [3](#), [4](#), [5](#)) and in [Section 8.2](#) are expanded on here.

8.4.1. Implications and opportunities for research

This section considers the implications and opportunities for research identified arising from this study.

Examine process factors that support ECB

Within the ECB literature, there is little examination of the relational factors between a capacity building program and the individual or organisation whose capacity is being built (Buckley et al., 2021). However, this is widely explored within the RCB literature, particularly when considering research partnerships and knowledge translation (Bowen et al., 2016; Jagosh et al., 2015; Luger et al., 2020; Wye et al., 2020). This research identified several critical processes that are not well examined in the ECB literature, for example, trusting relationships and boundary-spanning skills. Further research could examine ECB processes, with attention paid to relational factors. These theoretical insights could strengthen ECB practice and inform the development of shared process indicators to strengthen existing capacity building frameworks and measurement tools.

Apply and test the framework and questionnaires with other RECB programs

Researchers have called for the development and validation of capacity building measurement tools (Norton et al., 2016; Schwarzman et al., 2019b). The evaluation framework and questionnaires could be adapted and tested with other capacity building programs, for example, those within non-communicable diseases or injury or with complex systems exploring social determinants of health. While many of the identified indicators align with what is known in the capacity building and partnerships literature, the framework and questionnaires were developed based on a single project. Therefore, these should undergo testing and modification before being applied to other programs.

Utilise complexity sensitive approaches when examining RECB

Researchers increasingly acknowledge the complex nature of capacity building (Cooke et al., 2018; Lawrenz et al., 2018; Pulford et al., 2020). This complexity makes tracking the impact of capacity building programs challenging (Beckett et al., 2018; Cooke et al., 2018). Stronger links must be made between processes and impacts to trace the change process (Beckett et al., 2018; Cooke et al., 2018). As evidenced in this PhD study and research by others (Beckett et al., 2018; Cooke et al., 2018; Lawrenz et al., 2018; Rycroft-Malone et al., 2016), applying complexity sensitive methods can contextualise capacity building programs and generate new insights into their mechanisms of action and the changes they can achieve. Therefore,

future studies of capacity building programs should incorporate complexity sensitive methods to advance understanding.

Experiment with using systems concepts in evaluation design

This study identified limited examples of studies that incorporated systems concepts into the design of evaluation tools, an area for further exploration research. Specifically, future research could:

- develop protocols to extract systems insights from CLDs to develop program theory and evaluation frameworks,
- continue to experiment with different ways of depicting complexity within frameworks, and
- experiment with incorporating systems concepts into the design of standardised evaluation tools. Studies could consider capturing contextual influences, mechanisms of action and unintended consequences.

Examine the strengths and limitations of different CLD validation processes

The value of group model building has rich traditions in the system dynamics literature (Hovmand et al., 2011; Richardson & Andersen, 1995; Vennix, 1999). As described in Box 1 in [Section 3.2.6](#), group model building is a process where a researcher/facilitator guides stakeholders through creating and refining a diagram that represents the shared understanding of the group (Siokou et al., 2014). In public health, a continuum of stakeholder involvement in CLD building exists. For example, researchers may develop the diagram based on data collected directly from stakeholders (e.g., interviews), introduce a preliminary model developed using their expertise for stakeholders to refine, or utilise group model building (Baugh Littlejohns et al., 2021). Participatory processes enhance stakeholder understanding of the issue being modelled and motivation to implement the results (Baugh Littlejohns et al., 2021; Gerritsen et al., 2020).

A recent study by Valcourt et al. (2020) examined the difference between diagrams developed through group model building and those developed by researchers from semi-structured interview data. The authors concluded that group model building produces richer insights into the dynamic behaviour of the system and greater alignment between system

variables and relationships compared to diagrams developed from semi-structured interview data (Valcourt et al., 2020). This finding is not surprising as the group model building participants were encouraged to identify cause and effect relationships, but the interview participants were not (Kenzie, 2021). Furthermore, unlike this doctoral research, the study by Valcourt et al. (2020) did not refine and validate the CLD developed from interview data through participatory workshops. The literature provides limited guidance on appropriate methods of diagram validation when applied at the later stages of diagram development. As noted previously, it is more challenging to maintain participant anonymity and confidentiality in a group context than in one-to-one interviews (Sim & Waterfield, 2019). Therefore, interviews may be preferable to group model building in program evaluation. As described in [Section 8.3.3](#), Kenzie (2021) developed structured interview guidelines to develop and refine CLDs. To the PhD Scholar's knowledge, later-stage group workshop-based methods, such as those used in this study, have not been explored in the literature. Examining the strengths of interview-based diagram validation methods, such as those developed by Kenzie (2021), compared to group workshop-based methods at later stages of model development would strengthen understanding of the CLD validation processes.

8.4.2. Implications and opportunities for SiREN and the WA SHBBV system

During the development and validation of the framework, the management team met and reflected on the framework's usability and opportunities to strengthen the overall evaluation of SiREN. The following points combine the PhD Scholar's perspectives with those highlighted by the management team.

Develop a condensed framework containing priority indicators

The framework is comprehensive and has succeeded in expanding the scope of the evaluative enquiry. However, SiREN has not utilised the framework since its development, primarily due to a lack of staff resources for evaluation. The management team suggested that reducing the number of indicators could support them to prioritise areas for evaluation when restricted by resourcing. SiREN has committed to reducing the framework indicators

to increase its practical, day-to-day value. Once the condensed framework is created, its use should be monitored to determine its utility and sustainability.

Continue to develop and refine evaluation tools

The WA Department of Health awarded a further five-year funding agreement to SiREN in December 2020. Under the new funding terms, the provision of one-to-one research and evaluation support has ceased. Instead, SiREN delivers face-to-face and online training to meet capacity building needs of its stakeholders and undertakes knowledge translation activities. In addition, once a year, SiREN will evaluate a program or undertake an evidence review selected through an expression of interest process from organisations within the SHBBV system. The change in funding is an example of the impact the dynamic nature of SiREN has on its evaluation needs. The PhD Scholar has since adapted the questionnaires developed in this study to evaluate the online training and the annual program evaluation/evidence review.

The change in funded activities occurred around the same time SiREN's evidence-building activities (e.g., research grant applications, funded research and evaluation projects) were increasing. These are not part of the core funding provided by the WA Department of Health. SiREN staff now spends the majority of its time on research-focused activities. There is an opportunity to develop evaluation tools to assess the functioning of SiREN's research partnerships and the impact of the research and evaluation evidence it generates. There are existing partnership (Kothari et al., 2011; Salignac et al., 2019) and research impact (Milat et al., 2015) tools that staff working in SiREN could modify for this purpose.

Determine appropriate time points for evaluation

Ideal time points to evaluate SiREN's planning, evaluation and research support have not yet been established. Some activities occur over long periods, for example, collaborating on research grant proposals or co-authoring publications. Consequently, waiting for activities to cease before evaluation can mean years before evaluation occurs. There is an opportunity to experiment with evaluating at different time points to see what works best. For example, SiREN may trial evaluating capacity building while it is occurring, immediately after it ceases or several months after completion.

Increase understanding of the WA SHBBV workforce

Consistent with findings about the broader public health workforce (Herriot et al., 2022; Jancey et al., 2020), there is a lack of knowledge about the breadth and composition of the WA SHBBV workforce (e.g., the number of staff, types of roles, size). This can present challenges to understanding workforce needs and developing target capacity building programs (Jancey et al., 2020). For SiREN this presents challenges in assessing its reach and determining if it is meeting the needs of its stakeholders. Understanding the characteristics and needs of the SHBBV workforce can help SiREN support capacity building efforts and inform the development of appropriate and effective activities. In response to this need identified in the PhD research, SiREN intends to undertake a study to examine the characteristics of the WA SHBBV workforce.

8.4.3. Implications and opportunities for policy and practice

This section considers what this study means for broader public health and RECB policy and practice.

Scale up SiREN

The First National BBV and STI Research Strategy 2021-2025 (the Strategy) (Australian Government, 2021b) states that to progress action on STIs and BBVs in Australia, partnership approaches are required to generate and apply evidence. Capacity building programs, like SiREN, can support efforts to meet the Strategy's aims through connecting stakeholders and building capacity to generate and apply evidence. There is the potential to increase the scale of impact by expanding SiREN, such as increasing the resourcing of SiREN or expanding its activities to focus more on system level change. In addition, the SiREN partnership could be replicated in other jurisdictions and contexts, such as areas that overlap the SHBBV system, for example, mental health or alcohol and other drugs. Scaling up SiREN within other public health sectors could improve the quality of the evidence produced and increase EIDM. This may have value for:

- universities, as it could support them in generating quality research and demonstrating community engagement

- government, as it may provide timely evidence to support policy decision making, and
- CBOs, as it could enhance accountability and support programs and services that better meet the needs of the community.

Strengthen RECB at the system level

There is a need for RECB efforts to address system level barriers (Bowen et al., 2021; DeCorby-Watson et al., 2018; Lamarre et al., 2020; Schwarzman et al., 2021). System barriers include the ability of individuals and organisations to collaborate, resourcing for research and evaluation, political environment and funding body requirements (Bowen et al., 2021; Schwarzman et al., 2019b; Schwarzman et al., 2021). There is an opportunity for capacity building programs to strengthen capacity at the system level. System level strategies could focus on the following:

- investing in the creation of shared measurement systems. For example, the creation of online platforms that include shared indicators to provide organisations with the ability to assess, track and compare their performance (Kramer et al., 2009),
- creating and strengthening sustained connections between researchers, service providers and policymakers to create, share and apply evidence to decision-making (Bowen et al., 2021) and
- encouraging funders to reassess how they require organisations to do and use evaluation. For example, moving from requiring outputs to outcomes and using evaluation evidence for program improvement (Lobo et al., 2014; Schwarzman et al., 2021).

8.5. Concluding remarks

The World Health Organization (2021, v) stated that though increasing the application of quality evidence to decision making *“we can improve the effectiveness, efficiency and equity of health policies and interventions, enhance the effective use of scarce public resources, and increase the transparency and accountability of policies and interventions.”* Yet, supporting EIDM within complex systems is challenging (Bowen et al., 2021; Lamarre et al., 2020). The WA SHBBV system is an example of a complex system; it is in a continuous state of change

and adaptation in response to emerging issues (e.g., changes in HIV epidemiology). The importance of EIDM has been recognised by the Australian Government (2021b), which acknowledged that effectively responding to SHBBV issues within this dynamic context requires the SHBBV system to have the capacity to engage in research and evaluation. Yet, understanding how to operationalise programs that support this capacity and the type of impacts and outcomes they can achieve requires examination (Bowen et al., 2021; Cooke et al., 2018; Labin et al., 2012).

This study utilised a systems approach to explore SiREN, a partnership-based capacity building program that links researchers, service providers and policymakers to support RECB and EIDM within the WA SHBBV system. Taking a systems approach illustrated how SiREN strengthened research and evaluation capacity by providing traceable links between context, process, impacts and outcomes. Factors that facilitated progress toward SiREN's aims included its capacity to adapt within a dynamic system and establish trusting relationships with stakeholders. SiREN demonstrated credibility and capability, which supported the development of partnerships, which in turn increased its sustainability and growth. The sustained investment in SiREN gave it time to build stakeholder relationships, which have enabled a more responsive approach to generating evidence to address SHBBV issues.

The insights gained from applying systems concepts and methods to examining SiREN were used to develop complexity-sensitive evaluation tools. These tools included an evaluation framework and two questionnaires. The framework and questionnaires reflect the complexity of SiREN through contextualising its activities, capturing causal relationships that influence its ability to achieve its aims and encouraging a reflexive approach to evaluation. Application of the tools to other capacity building partnerships is possible. However, they will need to be adapted to meet their unique requirements. Further testing of the tools will improve inter-contextual reliability.

This thesis expands understanding of how a partnership-based approach improved research and evaluation capacity within a complex system. A partnership-based approach fosters the development of trusting and responsive relationships which enhance research and

evaluation capacity building efforts, leading to EIDM. Developing relationships between public health researchers, service providers and policymakers can support a more efficient response to emerging public health evidence needs. The PhD Scholar hopes these insights go some way to enhance relationships between research and practice to support effective action to address SHBBV issues in WA and beyond.

Appendices

Appendix A: Copyright permissions

1. Tobin, R., Hallett, J., Maycock, B., Lobo, R. (2019). Taking a systems approach to explore the impacts and outcomes of a research and evaluation capacity building partnership: A protocol. *BMJ Open*, 9, Article e026706. <https://doi:10.1136/bmjopen-2018026706>

This article is published under license to BMJ Publishing Group Limited. This is an Open Access article distributed in accordance with the Creative Commons Attribution Non-Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>

2. Tobin, R., Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2022). Critical factors that affect the functioning of a research and evaluation capacity building partnership: A causal loop diagram. *PLoS ONE*, 17(1), Article e0262125.

<https://doi:10.1371/journal.pone.0262125>

This article is published under license to PLOS. PLOS applies the Creative Commons Attribution (CC BY 4.0) license to published articles. Under this Open Access license, the author agrees that anyone can reuse their article in whole or part for any purpose, for free, even for commercial purposes. These permitted uses include but are not limited to self-archiving by authors of submitted, accepted and published versions of their papers in institutional repositories. Anyone may copy, distribute, or reuse the content as long as the author and original source are properly cited. See: <https://journals.plos.org/plosone/s/licenses-and-copyright>.

3. Tobin, R., Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2022). Utilizing causal loop diagramming to understand a research and evaluation capacity building partnership. *Frontiers in Public Health*, 10, 857918. <https://doi:10.3389/fpubh.2022.857918>

This article was published under license to Frontiers. Under the Frontiers Conditions for Website Use and the Frontiers General Conditions for Authors, authors of articles published in Frontiers journals retain copyright on their articles, except for any third-party images and other materials added by Frontiers, which are subject to copyright of their respective owners. Authors are therefore free to disseminate and re-publish their articles, subject to any requirements of third-party copyright owners and subject to the original publication being fully cited. Visitors may also download and forward articles subject to the citation requirements and subject to any fees Frontiers may charge for downloading licenses. The ability to copy, download, forward or otherwise distribute any materials is always subject to any copyright notices displayed. Copyright notices must be displayed prominently and may not be obliterated, deleted or hidden, totally or partially. See:

<https://www.frontiersin.org/journals/public-health - about>

Appendix B: Signed statements of contribution



CONTRIBUTION STATEMENT

I, Dr Gemma Crawford contributed as a co-supervisor. I had ongoing close involvement with the research from 2020, however, I was involved in conceptualising the project. As a supervisor I was involved in developing data collection methods, providing feedback on research findings, providing input on the structure of publications, the reading of drafts and making suggestions for improvements to the following publications:

1. **Tobin, R.**, Hallett, J., Crawford, G., Maycock, B., Lobo, R. Frameworks to guide partnerships between community-based organisations and universities: A scoping review. (Currently under review.)
2. **Tobin, R.**, Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2021). Critical factors that affect the functioning of a research and evaluation capacity building partnership: A causal loop diagram. *PLoS ONE* 17(1): e0262125. [doi:10.1371/journal.pone.0262125](https://doi.org/10.1371/journal.pone.0262125) (Impact factor: 3.04)
3. **Tobin, R.**, Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2022). Utilising causal loop diagramming to understand a research and evaluation capacity building partnership. *Frontiers in Public Health*. 10: 857918. [doi:10.3389/fpubh.2022.857918](https://doi.org/10.3389/fpubh.2022.857918) (Impact factor: 3.709)
4. **Tobin, R.**, Hallett, J., Crawford, G., Maycock, B., Lobo, R. Development of a questionnaire to assess the processes, outcomes and impacts of a research and evaluation capacity building partnership for public health professionals. (Currently under review.)



CONTRIBUTION STATEMENT

I, Dr Jonathan Hallett, contributed as a co-supervisor throughout the entire duration of this study. I had ongoing close involvement with the research, including conceptualising study design and data collection methods, supporting analysis of scoping review findings, providing feedback on research findings, providing input on the structure of publications, the reading of drafts and making suggestions for improvements to all publications.

1. **Tobin, R.**, Hallett, J., Maycock, B., Lobo, R. Taking a systems approach to explore the impacts and outcomes of a research and evaluation capacity building partnership: A protocol. *BMJ Open*. 9: e026706. doi: [10.1136/bmjopen-2018026706](https://doi.org/10.1136/bmjopen-2018026706) (Impact factor: 2.692)
2. **Tobin, R.**, Hallett, J., Crawford, G., Maycock, B., Lobo, R. Frameworks to guide partnerships between community-based organisations and universities: A scoping review. (Currently under review.)
3. **Tobin, R.**, Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2021). Critical factors that affect the functioning of a research and evaluation capacity building partnership: A causal loop diagram. *PLoS ONE* 17(1): e0262125. doi:[10.1371/journal.pone.0262125](https://doi.org/10.1371/journal.pone.0262125) (Impact factor: 3.04)
4. **Tobin, R.**, Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2022). Utilising causal loop diagramming to understand a research and evaluation capacity building partnership. *Frontiers in Public Health*. 10: 857918. doi:[10.3389/fpubh.2022.857918](https://doi.org/10.3389/fpubh.2022.857918) (Impact factor: 3.709)
5. **Tobin, R.**, Hallett, J., Crawford, G., Maycock, B., Lobo, R. Development of a questionnaire to assess the processes, outcomes and impacts of a research and evaluation capacity building partnership for public health professionals. (Currently under review.)



CONTRIBUTION STATEMENT

I, Dr Roanna Lobo, contributed as co-supervisor from 2016 to early 2020 and as primary supervisor from early 2020 to 2022. I had ongoing close involvement with the research, including conceptualising study design and data collection methods, providing feedback on research findings, providing input on the structure of publications, the reading of drafts and making suggestions for improvements to all publications.

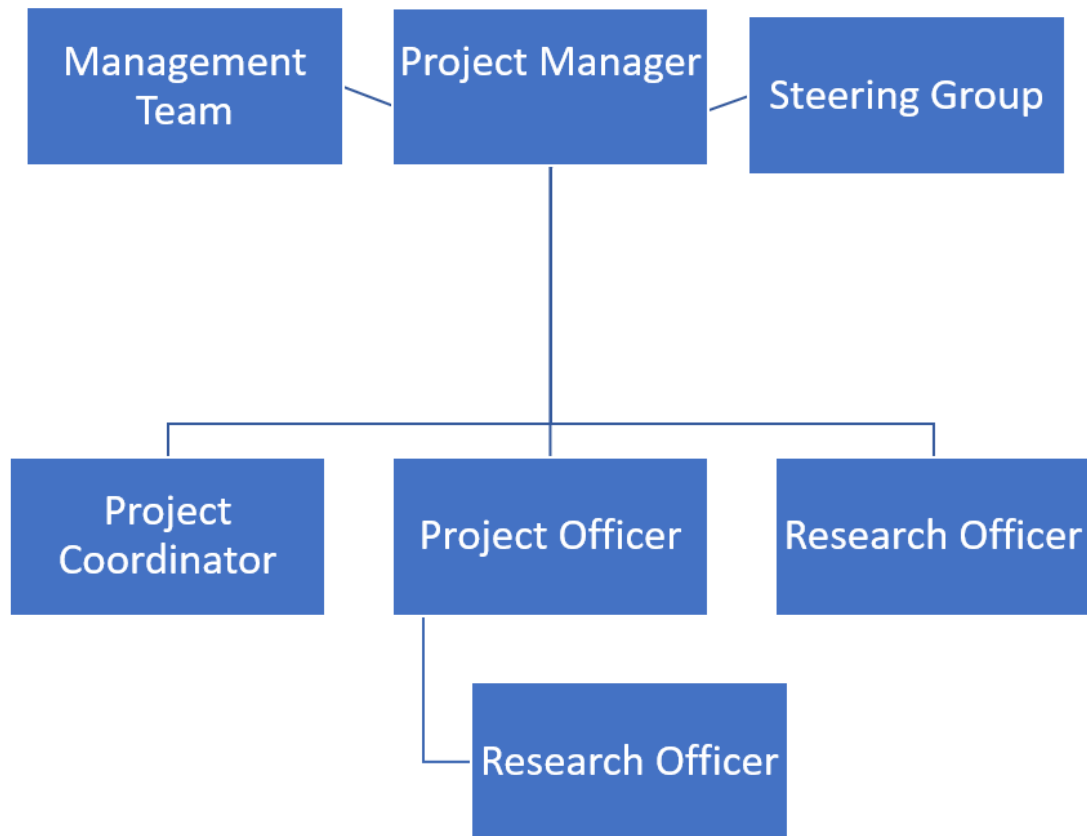
1. **Tobin, R.**, Hallett, J., Maycock, B., Lobo, R. Taking a systems approach to explore the impacts and outcomes of a research and evaluation capacity building partnership: A protocol. *BMJ Open*. 9: e026706. [doi:10.1136/bmjopen-2018026706](https://doi.org/10.1136/bmjopen-2018026706) (Impact factor: 2.692)
2. **Tobin, R.**, Hallett, J., Crawford, G., Maycock, B., Lobo, R. Frameworks to guide partnerships between community-based organisations and universities: A scoping review. (Currently under review.)
3. **Tobin, R.**, Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2022). Critical factors that affect the functioning of a research and evaluation capacity building partnership: A causal loop diagram. *PLoS ONE* 17(1): e0262125. [doi:10.1371/journal.pone.0262125](https://doi.org/10.1371/journal.pone.0262125) (Impact factor: 3.04)
4. **Tobin, R.**, Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2022). Utilising causal loop diagramming to understand a research and evaluation capacity building partnership. *Frontiers in Public Health*. 10: 857918. [doi:10.3389/fpubh.2022.857918](https://doi.org/10.3389/fpubh.2022.857918) (Impact factor: 3.709)
5. **Tobin, R.**, Hallett, J., Crawford, G., Maycock, B., Lobo, R. Development of a questionnaire to assess the processes, outcomes and impacts of a research and evaluation capacity building partnership for public health professionals. (Currently under review.)

CONTRIBUTION STATEMENT

I, Dr Bruce Maycock, contributed as primary supervisor from 2016 to early 2020. I had ongoing close involvement with the research, including conceptualising study design and data collection methods, providing feedback on research findings, providing input on the structure of publications, the reading of drafts and making suggestions for improvements to all publications.

1. **Tobin, R.**, Hallett, J., Maycock, B., Lobo, R. Taking a systems approach to explore the impacts and outcomes of a research and evaluation capacity building partnership: A protocol. *BMJ Open*. 9: e026706. [doi: 10. 1136/ bmjopen- 2018026706](https://doi.org/10.1136/bmjopen-2018026706) (Impact factor: 2.692)
2. **Tobin, R.**, Hallett, J., Crawford, G., Maycock, B., Lobo, R. Frameworks to guide partnerships between community-based organisations and universities: A scoping review. (Currently under review.)
3. **Tobin, R.**, Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2021). Critical factors that affect the functioning of a research and evaluation capacity building partnership: A causal loop diagram. *PLoS ONE* 17(1): e0262125. [doi:10.1371/journal.pone.0262125](https://doi.org/10.1371/journal.pone.0262125) (Impact factor: 3.04)
4. **Tobin, R.**, Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2022). Utilising causal loop diagramming to understand a research and evaluation capacity building partnership. *Frontiers in Public Health*. 10: 857918. [doi:10.3389/fpubh.2022.857918](https://doi.org/10.3389/fpubh.2022.857918) (Impact factor: 3.709)
5. **Tobin, R.**, Hallett, J., Crawford, G., Maycock, B., Lobo, R. Development of a questionnaire to assess the processes, outcomes and impacts of a research and evaluation capacity building partnership for public health professionals. (Currently under review.)

Appendix C: SiREN organisational chart



Appendix D: Example search strategy Proquest

("community*based organi*ation" AND "research partnership") OR ("community*based organi*ation" AND "research collaboration") OR ("CBO" AND "research partnership") OR ("CBO" AND "research collaboration") OR "research community partnership*" OR "research community collaborat*" OR "research practice partnership*" OR "research practice collaborat*" OR "community university partnership*" OR "community institutional partnership*" OR "community academic partnership*" OR "community university research partnership*" OR "community university collaborat*" OR "academic community partnership*" OR "academic community collaborat*" OR "academic practice partnership*" OR "academic practice collaborat*" OR "university community partnership*" OR "university community collaborat*" OR "university practice collaborat*" OR "university practice partnership*" OR "public academic partnership*" OR "researcher decision maker partnership*" OR "integrated knowledge trans*")

AND (model OR framework OR evaluat*)

AND la.exact("English")

AND all(peer(yes))

Appendix E: Online survey with SHBBV sector

Are you currently a SiREN member?

- Yes
- No

How long have you been a SiREN member?

- Less than two years
- Two to three years
- More than three years
- Unsure

Please select the job title that best represents you. This is just to ensure the needs assessment includes feedback from a variety of different people.

- Senior Manager / Executive
- Researcher / Academic
- Nurse / Physician
- Health Worker
- Educator
- Project Officer / Coordinator
- Policy / Planning Officer
- Engagement / Development Officer
- Administration
- Student
- Other (please specify)

Which area of Western Australia do you work? You can select more than one option if you work across multiple areas.

- Metropolitan
- Regional
- Remote

Which of the following best describes the organisation you work for?

- Non-government organisation
- State government organisation
- Local government organisation
- University or research based organisation
- Private organisation
- Indigenous health organisation
- Other (please specify)

How long have you worked in the SHBBV sector?

- Less than one year
- One to two years
- More than two years

My organisation values research. Please rate how much you agree with this statement.

- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree

My organisation values evaluation. Please rate how much you agree with this statement.

- Disagree
- Somewhat disagree
- Neither agree nor disagree
- Somewhat agree
- Agree

Do you undertake research as part of your current role?

- Yes
- No

Skip next two questions if no.

What proportion of your week at work do you usually spend on research activities?

- Less than one day

- Two to three days
- Four to five days

In the last 12 months, what barriers to undertaking research have you experienced? (Response options: often, sometimes, seldom, never, not applicable to my role)

- Lack of time as other responsibilities take priority
- Difficulties in engaging target population (community of interest) in research
- Lack of funding to undertake research
- Lack of knowledge and skills
- Lack of confidence in undertaking research
- Low internal support from management/colleagues
- Limited or no training opportunities to improve research knowledge and skills
- Limited or no external resources e.g., online tools, software, access to research publications
- Lack of access to external expertise (universities, research institutions, other agencies)

If you have experienced other barriers to undertaking research not listed above please list them here.

Do you undertake evaluation as part of your current role?

- Yes
- No

Skip next two questions if no.

What proportion of your week at work do you usually spend on evaluation?

- Less than one day
- Two to three days
- Four to five day

In the last 12 months, what barriers to undertaking evaluation have you experienced? (Response options: often, sometimes, seldom, never, not applicable to my role)

- Lack of time as other responsibilities take priority
- Difficulties in engaging target population (community of interest) in evaluation
- Lack of funding allocated in budgets to evaluate programs
- Lack of evaluation knowledge and skills

- Lack of confidence in undertaking evaluation
- Feel it is not important
- Low internal support from management/colleagues
- Limited or no training opportunities to improve evaluation knowledge and skills
- Limited or no external resources e.g., online tools, software, access to research publications
- Lack of access to external expertise (universities, research institutions, other agencies)

If you have experienced other barriers to undertaking evaluation not listed above please list them here.

Are you involved in making decisions in relation to programs or policies?

- Yes, policies
- Yes, programs
- Yes, both policies and programs
- No, neither policies or programs (Skip next two questions if no.)

Thinking about your work in the last 12 months, what barriers have you experienced when accessing research evidence? (Response options: often, sometimes, seldom, never, not applicable to my role)

- Lack of time to identify relevant research
- Lack of current and/or relevant research
- Lack of knowledge and skills on how to locate and interpret research
- Low internal support from management/colleagues
- Limited or no training opportunities to improve research skills
- Limited or no access to research publication databases
- Lack of access to external expertise (universities, research institutions, other agencies)

If you have experienced other barriers to accessing research evidence please list them here.

Please review the SiREN resources, groups and services in the table. For each one, select the answer that is most relevant to you or leave blank if not applicable.

(Response options: aware of, Used or participated in at least once in the last 12 months Likely to use or participate in at least once in the next 12 months)

- SHBBV Partnership Guide

- SHBBV Program Planning Toolkit
- SHBBV Ethics Approval Guide
- HIV and Mobility in Australia: A Road Map for Action
- Survey design
- Research project collaboration
- Student placements
- Project planning support
- Research and evaluation support
- Assistance with grant proposals
- Assistance with conference posters, abstracts or manuscripts
- Training workshops
- SiREN Symposium

To what extent have the SiREN services or resources you used (in the previous question) influenced your work?

- A great deal
- Somewhat
- Very little
- Not at all

Could you please explain why the SiREN services or resources you used did or did not influence your work?

What factors have influenced your decision not to access SiREN services? You can choose more than one answer.

- I'm not really sure what I can ask SiREN for help with
- My question is not really research or evaluation related
- We have research and evaluation expertise in-house
- I feel SiREN has limited capacity to assist me
- Depends on the time I have available
- I'm not sure if there would be a cost
- I have already accessed SiREN's services and I don't know if I could do so again
- Other (please specify) _____
- None, I contact SiREN when I need to

Appendix F: Interview schedule for SiREN partners and service users

1. Could you tell me about what your role involves?
2. When making decisions about new services or changes to existing ones, what kinds of sources of information do you use to inform your decisions? Do you have any difficulties accessing any of these sources of information?
3. When undertaking evaluation of a service, what factors support or hinder you to do this?
4. When undertaking research, what factors support or hinder you to do this?
5. How long have you been involved with SiREN?
6. What do you hope to achieve through working with SiREN? Have these expectations changed over time?
7. Could you tell me about the times you have accessed SiREN's services?
8. How did these interactions influence your personal thinking or practice? Did this change over time? What other factors may have influenced this?
9. Thinking about your organisation, do you think SiREN has had an influence? If so, how and in what ways? Why/how do you think this has happened? What other factors may have influenced this?
10. Thinking broadly about the sector, do you think SiREN has had an influence? If so, how and in what ways? Why do you think this has happened?
11. In your time with SiREN, what do you feel you have brought and contributed to the partnership? What did this contribution mean to you?
12. Do you think anything has been achieved by yourself, your team or the sector working collaboratively with SiREN that would not have been achieved otherwise? Why do you think this has happened?
13. Out of all your interactions with SiREN what has been the most useful to your practice and why?
14. Do you see how you engage with SiREN changing in the future? If so, how?

Appendix G: Recruitment email staff

Hello (insert staff name),

I am emailing to ask if you would be willing to participate in an interview for my PhD research. This interview will focus on your experiences as a member of the SiREN team and your understanding of how SiREN contributes to building research and evaluation capacity.

It will be an online interview that should take no more than one hour of your time.

Attached to this email is an information sheet that describes the research project in more detail.

Please take the time to read this and let me know if you are happy to participate.

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number HRE2017-0090).

Kind regards,

Rochelle Tobin

PhD Candidate

Appendix H: Interview schedule for SiREN staff

1. Could you describe your history of working with SiREN? (Role, time in role, type of work undertaken)
2. How well do you think SiREN achieves its aims? Do you think it does what it intends? (*Just to refresh your memory SiREN aims to build research and evaluation capacity, promote collaboration, foster links with national research centres and contribute to national research agendas.*)
3. What factors affect how well SiREN achieves its aims?
Internal prompts: Role of management team (skills, knowledge, and connections), governance structure, being located within a university, staffing and resources.
External prompts: Economic/policy environment, funding, sector skill levels.
In what ways do these factors have an effect?
4. Is there anything unique to the sector that has influenced SiREN's ability to achieve its aims?
5. Reflecting on the factors we have just discussed; how do these affect how well you can/could meet the requirements of your role with SiREN? Barriers, enablers?
6. What factors influence SiREN's ability to create and respond to new opportunities?
7. Has SiREN's structure or function changed between its commencement and now, if so, how and why?
8. How do you think SiREN is perceived by the sector?
9. What do you think are the things of value that SiREN provides?
10. Does SiREN need to change to meet the future research and evaluation needs of the sector? If so, in what ways?

Appendix I: Recruitment email SiREN staff and management team workshop

Hello (insert name),

I would like to invite you to attend a workshop to refine a visual diagram describing the internal functioning of SiREN.

This workshop forms part of my PhD which aims to: understand the processes, impacts, and outcomes of SiREN; and to develop an evaluation framework and tools to be used for the ongoing monitoring and evaluation of SiREN.

You have been invited to take part in this workshop as you are a past or current SiREN staff or management team member.

I have created a Doodle Poll to identify times that suit as many people as possible. Please complete it by Wednesday the 18th of November via the following link

https://doodle.com/poll/6qihni7wsgduqhnbn?utm_source=poll&utm_medium=link

In this workshop, I will present a draft diagram that illustrates the internal functioning of SiREN and seek input into the accuracy of the different elements and the relationships between them. It is anticipated that the workshop will take approximately 1.5 hours. The workshop will be held at Curtin's Bentley campus. Refreshments will be provided.

I will send a copy of the diagram through one week prior for those of you who would like to spend time reviewing it beforehand.

If you can't make any of the times suggested and would like to have input into the diagram, please let me know and I will be happy to make a time to meet with you on a one-to-one basis.

Kind regards,
Rochelle Tobin
PhD Candidate

Appendix J: An overview of SiREN activities and outputs from 2012 to 2020

SIREN OUTPUTS	YEAR									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total at 31/12/20
EVIDENCE BUILDING & TRANSLATIONAL RESEARCH OUTPUTS										
Published peer reviewed journal articles	0	2	2	1	6	3	13	12	9	48
Reports / other publications	0	1	2	5	1	2	2	3	1	17
Conference abstracts, presentations, workshops, posters	-	2	6	7	10	9	7	11	5	57
LINKAGES & RESEARCH PARTNERSHIPS										
SiREN WA network membership	61	184	207	198	206	245	300	375	339	339
Twitter Followers	0	38	96	152	225	319	416	431	531	559
WORKFORCE DEVELOPMENT & CAPACITY BUILDING										

SIREN OUTPUTS	YEAR									
	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total at 31/12/20
Hours of research and evaluation support provided	20	138	83	141	194	307	49	81	124	1137
Events delivered or co-facilitated by SiREN	1	5	7	4	4	4	2	2	3	32
Masters Student Projects ⁵	0	0	0	2	4	5	9	4	6	30
Honours Student Projects	0	0	0	0	1	0	0	0	0	1
PhD Student Projects ⁶	0	0	0	0	3	3	4	5	3	5

Note: The majority of the information presented here was undertaken by a SiREN project officer as part of a report provided to the main funder in 2020. I collected some of this data separately. However, the version developed by the project officer was more comprehensive. With permission, I have used their version and added in hours spent providing research and evaluation support.

⁵ Year of completion

⁶ Total per year, inclusive of new and ongoing PhD projects

Appendix K: List of organisational documents reviewed

For the development of the CLD described in [Chapter 5](#), documents were reviewed up to and including 2017. For the evaluation framework described in [Chapter 6](#) documents were reviewed up to and including 2020.

Evaluation Reports of SiREN Activities

Reports reviewed included:

1. Gray, C. 2017. Health Promotion Scholarships Final Report 2017. Curtin University. Perth, Western Australia.
2. John Scougall Consulting Services. 2015. SiREN Evaluation Final Report.
<https://siren.org.au/about-us/independent-evaluation/>
3. SiREN. Planning and Evaluation Skills Building Project. Final Report to Hepatitis WA. Curtin University. Perth, Western Australia.
4. SiREN Symposium Evaluation Reports. Dates of reports reviewed include: 2014, 2016 and 2018.

SiREN Sector Needs Assessment Survey Reports

Dates of reports reviewed included: 2012, 2014, 2016 and 2018.

SiREN Activity Reports to the Department of Health

Dates of reports reviewed included: May to June 2012, July to December 2012, January to June 2013, July to December 2013, January to June 2014, July to December 2014, January to June 2015, July to December 2015, January to June 2016, July to December 2016, January to June 2017, July to December 2017, January to June 2018, July to December 2018, January to June 2019, July to December 2019, January to June 2020 and July to December 2020.

SiREN Steering Group Meeting Minutes

Meeting dates minutes were reviewed included: August 2012, November 2012, March 2013, September 2013, December 2013, June 2014, October 2014, March 2015, July 2015, March 2016, November 2016, May 2017, October 2017, March 2018, August 2018, February 2019, August 2019, February 2020 and August 2020.

Emails from SiREN Stakeholders

Email dates and topics included:

1. 18 May 2017: Feedback from stakeholder on SiREN communications
2. 22 August 2017: SiREN involvement in the Perth Gay Periodic Survey
3. 17 August 2018: SiREN providing evidence to the BBV and STI Standing Committee

SiREN Evaluation Tools

1. Brief SiREN Research and Evaluation Support Questionnaire
2. Extended SiREN Research and Evaluation Support Questionnaire
3. SiREN Needs Assessment Survey 2018

Appendix L: Recruitment email SiREN needs assessment

Dear SiREN WA Network,

SiREN is conducting its biennial survey on research and evaluation in the Sexual Health and Blood borne Virus (SHBBV) sector and would like know what you have to say. The survey results will help SiREN understand how to better support you. Some of the results from this survey will also be used to inform a study investigating how networks, like SiREN, influence public health policy and practice.

The survey should take approximately 15 minutes to complete.

Your feedback will also ensure that the Department of Health's investment in SiREN is directed to activities of most importance and value. Results from the 2014 needs assessment survey have contributed to SiREN offering more 1:1 support for research and evaluation and undertaking action to redesign the website.

Responses to the survey remain **completely confidential** and will not be identifiable to you or your organisation. SiREN has approval to conduct the survey from the Curtin University Human Research Ethics Committee (Approval Number SPH-50-2012). If you have any questions about the survey please contact Rochelle Tobin rochelle.tobin@curtin.edu.au.

You can complete the survey by clicking on the following link:

https://curtin.au1.qualtrics.com/SE/?SID=SV_beAXjwpORfIousB

We want to ensure we include the views of those who aren't already SiREN Network members too. Therefore, we ask you to consider distributing the survey to other individuals within your organisation and your networks who may be involved in preventing and managing sexually transmitted infections and blood-borne viruses.

If you are not a member of the SiREN Network and would like to be, please email siren@curtin.edu.au with "join SiREN network" in the subject field. The Network is free and by joining you will receive email communication every 4-6 weeks on upcoming SHBBV related events, training, research, funding opportunities and more.

Your contribution is important to assist SiREN better meet the needs of stakeholders like you. A summary of the results will be posted on www.siren.org.au after the New Year.

Reminder email

Dear SiREN WA Network,

Recently you were sent an invitation to complete a survey to assist SiREN to better understand how to support people like you who are involved in preventing and managing sexually transmitted infections and blood-borne viruses.

We will be closing the survey very soon. If you have not completed it yet we kindly ask that you do so as we would like to include your feedback. The survey should take approximately 15 minutes to complete.

To start the survey please click on the following link:

https://curtin.au1.qualtrics.com/SE/?SID=SV_beAXjwpORfIOusB

If you have already completed the survey we thank you for your contribution. Your feedback will help ensure that the Department of Health's investment in SiREN is directed to activities of most importance and value to SHBBV stakeholders in WA.

Responses to the survey remain **completely confidential** and will not be identifiable to you or your organisation. A summary of the survey results will be posted on www.siren.org.au after the New Year.

Appendix M: Recruitment email interview with SiREN partners and service users

Hello (insert name),

This study aims to understand the ways in which SiREN influences research and evaluation practices within its member network and to develop an evaluation framework and evaluation tools that can be used to assess the impacts of SiREN. This research is important as it will contribute to understanding how models like SiREN can support effective public health practice. You have been asked to take part in this study because you have used SiREN's services. We hope the results of this research will enable SiREN to better meet the needs of organisations like (insert invited participants organisation name).

To take part in this study, we ask that you

- Participate in an interview that should take no more than one hour of your time. In this interview we will discuss your use of research and evaluation and your involvement with SiREN.
- Participate in a three hour workshop to build a map of the influences of SiREN on research and evaluation practices within the sexual health and blood-borne virus sector.

To thank you for your contribution to this study we can offer to work with (insert invited participants organisation name) where appropriate to determine its research and evaluation capacity and create an action plan to enhance research and evaluation practices.

Attached to this email is an information sheet that describes the research project in more detail. Please take the time to read this and contact me with any questions you may have.

Kind regards,
Rochelle Tobin
PhD Candidate

Appendix N: Invitation to attend a workshop for SiREN partners, service users and management team members

Hi All,

I would like to invite you to attend a workshop to refine a visual model that illustrates the influence of SiREN on research and evaluation practices within the WA sexual health and blood-borne virus sector. This workshop forms part of my PhD which aims to: understand the influence SiREN has had on research and evaluation practices; and develop evaluation tools to assess this.

You have been invited to take part in this workshop as you:

- have been interviewed as a participant for this study;
- are on the SiREN Steering group; or
- are part of the SiREN Management Team.

Please note **the workshop will be audio recorded**. This recording will only be used by me to ensure that all points raised during the workshop are addressed. Please let me know in advance if you have any concerns with this.

Refreshments will be provided.

If you can't make the proposed date and would like to discuss the model, please let me know and I will be happy to make a suitable time to meet with you on a one-to-one basis.

Looking forward to getting your input!

Kind regards,

Rochelle Tobin

PhD Candidate

Appendix O: Workshop slides

6/18/2022

Aim of today

Support the development of a systems map to understand the influence of SiREN on research and evaluation practices.

1

Why is this needed

- Unique partnership-based model that builds R & E capacity across organisations working in SHBBV's.
- Outcomes of SiREN and the 'how and why' are unclear.
- Effective evaluation and relevant research can lead to:
 - more successful programs and policies;
 - efficient use of resources; and
 - improved health outcomes.


2

What is a systems approach?

A system is a set of interconnected factors that work together to achieve a goal.

It is a way of thinking that brings together components of a bounded system, illuminates the relationships between them and how they interact as part of a whole.

A systems approach can be applied to understand an issue (low uptake of vaccines) or a program (SiREN).



3

Systems thinking – pros and cons

The good

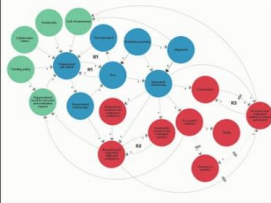
- Broader perspective
- Collaborative process
- No program or issue occurs in isolation
- Explores the how and the why

The not so good

- Time consuming
- If not careful, models can confuse rather than engage

4

How the map was developed



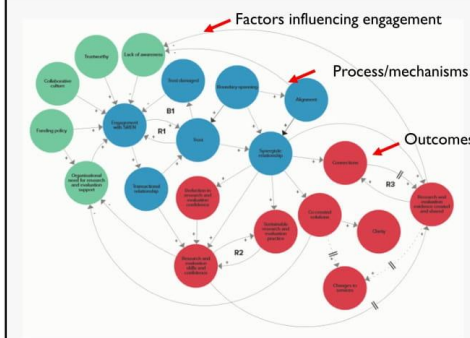
Map development

- 16 in-depth interviews
- 2016 Needs Assessment
- SiREN reports & evaluations.

Note:

- Multiple elements in each.
- Many factors influence R & E.

5



6

Factors influencing engagement

Lack of awareness: Not knowing what SiREN is, the kinds of support it offers, or its capacity to provide support have a negative influence on engagement.

Trustworthy: SiREN is considered trustworthy (university, past working relationships, 'storehouse' of knowledge).

"I think it was the backing of a research like with (a university) I think as well, that I think makes SiREN a really credible source for that type of advice." P4

Collaborative culture: Strong history of partnership working and SiREN team members past working relationships with organisations.

7

Factors influencing engagement

Funding policy: Strong support for organisations to engage in research and evaluation, and to actively work with research institutions, like SiREN, from the main government funding body. This influences organisational need for R & E support.

Organisational need for R & E support: Influenced by organisational capacity to engage in R & E (skills, knowledge, resources, access to other support). Main driver to engage with SiREN is to enhance a programs impact and demonstrate impact to funders and stakeholders.

8

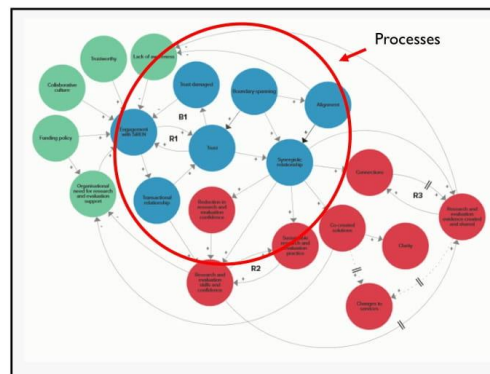
Engagement summary and discussion

Summary statement
An organisations decision to engage with SiREN is influenced by: awareness of SiREN; the perception that SiREN is trustworthy; a culture of collaboration; funding policy; and organisational need for R & E support.

Discussion (15 minutes)

- To what extent does this reflect your experience of engaging with SiREN?
- Based on your experience, are there any aspects that aren't represented here?
- Any comments on the terms used?

9



10

Trust

SiREN has built trust with organisations though demonstrating credibility, capability, responsiveness and understanding. Trust was described as the key mechanism that has enabled SiREN to support R & E.

"I think it's about showing credibility, following through with promises. So saying they'll do something and actually doing it. I think recognising ... I think that stuff around not coming in and being, "We know everything," and listening to what the sector has to say, and trying to work with the sector..." P9

"(SiREN is) ...capable and so willing to help, you know, and will answer emails within minutes, you know, can make themselves available for meetings and add so much value to the work we do here." P6

11

Trust – reinforcing effect

Trust and engagement have a reinforcing relationship.

Once trust is built it can lead to increased engagement which in turn leads to increased trust.

12

Trust damaged

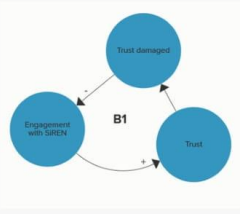
Trust is dynamic and can be damaged when expectations aren't met.

"I asked SiREN to help me create (evaluation) tools, but that hasn't happened yet... so we've actually just decided to create our own." P1

Engagement declined as a result, but did not disappear altogether indicating that trust was damaged but not lost.

13

Trust damaged – balancing effect



Declines in level of trust has a balancing effect on engagement (B1).

14

Process – Boundary-spanning

The ability to work across different groups (boundaries) to facilitate new learning. Boundary spanning skills include being able to understand different perspectives, build relationships, and connect people.

"Just so forth coming and it was so quickly for (SiREN Team member) to identify where I was it was easy for me to understand where (SiREN Team member) is at, so the compatibility of how we could share knowledge." P12

"I'm not an academic, and so for someone that's coming from a non-academic into an academic world, of which research and evaluation is, it can be daunting. But I don't feel that with SiREN." P9

Boundary-spanning builds trust, alignment and synergy.

15

Process – Alignment

SiREN's services are aligned (compatible) with the R & E needs of organisations. Alignment is achieved through flexible support.

"I suppose just being there in whatever shape or form they were needed. So that whenever there was a point of uncertainty we could access that support and guidance to keep things moving forward." P6

"... whenever I have something I am not sure about, I can call (SiREN team member). You know here, there isn't anyone who has that knowledge. A workshop or training can't give me that level of support, it is really useful. (SiREN team member) knows the work we do and we just get on with it." P12

16

Process – Alignment

Sharing decision-making around how SiREN's services are delivered between SiREN and those working in the SHBBV space supports alignment. E.g. Steering Group and needs assessment

"It (the Steering Group) brings together a common voice and an opportunity for SiREN to understand what the current emerging challenges are or issues are... to have that common focus I think is important, and that shared knowledge." P10

Alignment increases synergy. Alignment can increase awareness of SiREN and its services.

17

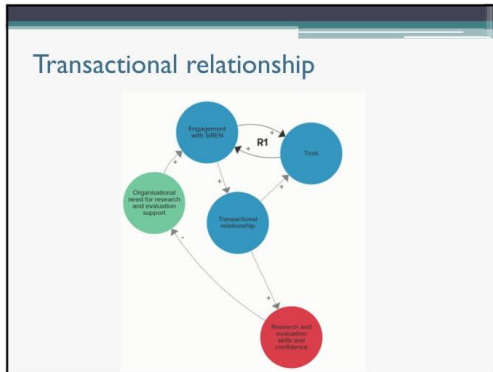
Transactional & synergistic relationships

Transactional relationships: Uses SiREN's resources or services to address specific R & E question, then ceases until there is a change in need. E.g. Toolkit, developing a survey, sounding board.

Short duration but can build trust for future engagement if need arises.

Influence on practice is minimal. Leads to an increase in research and evaluation skills and confidence.

18



19

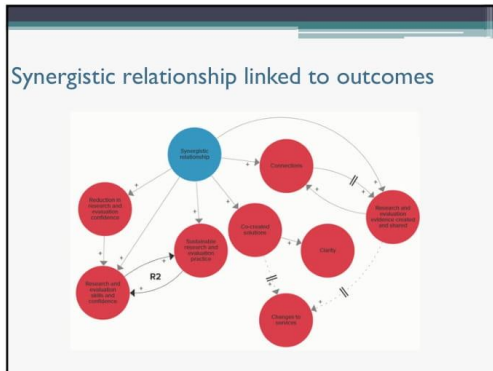
Transactional & synergistic relationships

Synergistic relationship: SiREN and organisations work in partnership. Achieve more by working together than they would if working in isolation.

Involves combining viewpoints, resources and abilities to create something new. E.g. working to develop an evaluation plan.

Dynamic, they ebb and flow reflecting changes in R & E needs.

20



21

Processes summary and discussion

Summary statement
Once engagement occurs trust, boundary spanning and alignment support the development of a synergistic relationship. A transactional relationship can also be established which builds trust for future engagement. Trust can be damaged leading to a reduction in engagement.

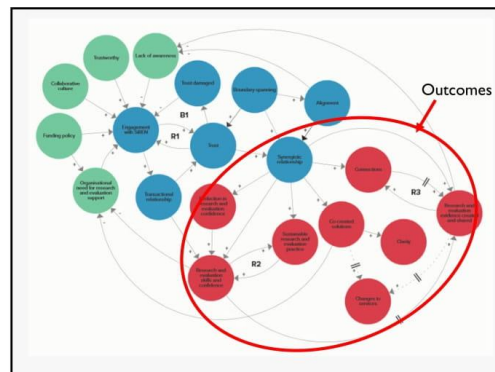
Discussion (20 minutes)

- To what extent do these processes reflect your organisations engagement with SiREN?
- Are there any aspects of your relationship with SiREN that aren't represented here?
- Any comments on the terms used?

22

Break

23



24

R & E skills and confidence

Both a transactional and synergistic relationship can lead to increased R & E skills and confidence.

"(Working with SiREN)... gives me more confidence in that what I'm doing is evidence-based, well-researched, and so it's about more confidence in what I'm doing." P8

25

R & E skills and confidence

Some participants described a loss of confidence in their evaluation skills early on in their engagement with SiREN.

"I had thought that I had a handle on exactly what I was trying to achieve in my project at that particular time. It wasn't until I went through this formal process of having to strip it back, that I realised that maybe I didn't quite have the handle that I thought I had." P5

The participant quoted previously reflected on how they now have the skills to confidently engage in evaluation.

"... from there I've been able to just keep the ball rolling and go through, rather confidently, go through my project. Knowing that I'm doing the right thing that I'm supposed to be doing in exactly the right way with the knowledge I'm supposed to have that's up to date... and that does a lot when you're a Project Officer to help you feel like you're doing the job that you're supposed to be doing." P5

26

R & E skills and confidence

Increased confidence can lead to the perception that projects and evaluations have more credibility. This has a flow on effect to sharing work at conferences and other fora.

"When you get something out of evaluation that you're like, "Oh, that's really interesting. That's really good." ...having that evaluation process and information to feedback at the forum is just like gold." P11

27

Sustainable R & E practices

Sustainability: embedding evaluation and research into everyday practice.

Three ways SiREN has supported sustainable R & E practice

- 1- Developing a culture that values R & E;
- 2- Creating project plans contributes to mainstreaming evaluation within organisations; and
- 3- Provide continuous opportunities for learning.

28

Sustainable R & E

1 - Supporting the development of a culture that values R & E.

"It's (evaluation) not something you just tag on the end of something. It actually drives the whole training and the future training, and to me I've learned a lot about the importance of evaluation as before I didn't really know how it important it was to be honest." P11

29

Sustainable R & E

2- Development of project plans contributes to mainstreaming evaluation within organisations.

"We stripped our programme down and looked at exactly what the goals and objectives were, to try and give a really clear picture of exactly what we were trying to achieve and how we were going to go about it... (the project plan) gave me a really clear scope of what we were trying to do." P5

This plan was still in use two years after it was developed.

30

Sustainable R & E

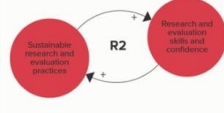
3 - Provide continuous opportunities for learning

SiREN provides a variety of ways organisations can engage in R & E learning

- supervising post-graduate research students;
- providing online resources that guide research evaluation practice; and
- the provision of research and evaluation support and training.

31

Reinforcing loop 2



Sustainable R & E practices leads to greater opportunities to increase R & E skills and confidence which in turn increases sustainability.

32

Co-created solutions

SiREN works in partnership with organisations to address R & E questions. As part of this process, they combine their knowledge of contextual factors, and R & E methods to co-create solutions (e.g. new evaluation strategies).

"I knew I kind of wanted the quality interaction data but I wasn't quite sure how to capture that and so (SiREN Team Member) worked with us to kind of think our way through that." P6

33

Co-created solutions

Co-creating program evaluation strategies with SiREN increases the rigor and scope of evaluation.

"(working with SiREN has led to a) "more detailed, deeper process, evaluation, and ways you can actually get that information, which I would never have really thought about that much, as, oh, look. We can really use that information... how do I put that now into an evaluation? And I realised that there's a way that you can do it." P11

34

Clarity

The process of co-creating a project plan can lead to clarity. Clarity is increased understanding of what a project is aiming to achieve, how it will achieve it, and how it fits within the broader SHBBV prevention system.

"really getting that sense of clarity of understanding of where all the work we do marries up to health promotion and the wider policies and guiding documents" P10

"It makes it clearer about what the project is and is not and where it sits among everything else." P12

"...that was the biggest thing that I got out of it (working with SiREN), was having that really clear understanding of this is exactly what I'm trying to do and this is how I need to do it." P5.

35

Connections

SiREN acts as a relationship facilitator and supports researchers, service providers and policy makers across Australia to undertake collaborative research and evaluation projects. E.g. ARC

SiREN connects researchers with organisations to support research projects. It is considered to be one of the 'go to' organisations for SHBBV research in WA.

"I suppose building its reputation as the go-to spot for any kind of research or partnerships or things like that, if it's going to include WA." P15

"Being able to tap into the relationship that SiREN has with individuals and with organisations, has helped facilitate the (research) work that I've been doing." P16

36

R & E evidence created and shared

SiREN works collaboratively with organisations and national research centres to create and share evidence from research and evaluation that has relevance to VWA issues.

E.g. Supporting a student to work with an organisations to publish an article from program evaluation findings.

"SiREN found a student who evaluated and were writing it up (program evaluation for a journal article) and, well that's actually is really good because I can't of imagined that would have happened three years before (SiREN)" P2

37

R & E evidence created and shared

A researcher explained that without SiREN, WA wouldn't be included in many national research projects due to the geographical divide between the east coast and WA.

"The thing that's probably allowed us to consider WA more often, has been that not only having SiREN, but people at SiREN who get that approach (applied research) and can kind of be the people that work directly with some of the agencies... the national projects I'm involved in, wouldn't be able to include a WA component if there wasn't SiREN" P15

SiREN shares evidence through a biennial symposium and regular email communications (E-News, Evidence Updates).

Creating and sharing evidence can lead to increased awareness amongst organisations of SiREN and the services it offers.

38

Reinforcing loop 3

Building connections leads to more evidence being created and shared (time-lag).

The process of creating and sharing evidence can lead to new connections.

E.g. Research collaborations

39

Changes to services

Changes to how services are delivered have occurred as an indirect result of SiREN supporting organisations to increase the scope of evaluations and to engage in evidence-based decision making.

"...we've broadened our scope (referring to new services) ... And part of that has been because we've increased the evaluation methods that we use and the way that we evaluate." P9

SiREN, in collaboration with other organisations, developed a resource outlining key action areas for HIV and mobility issues in Australia. This has been used to guide practice in an organisation and was described as *"absolutely crucial for our work"* P10

40

Outcomes summary and discussion

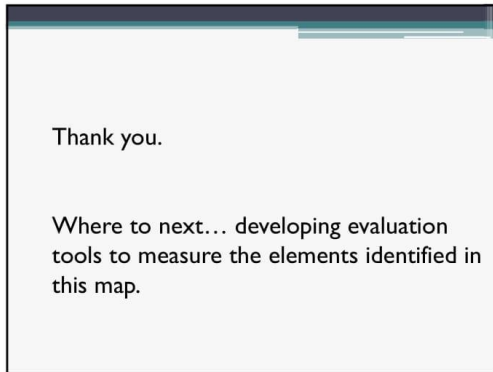
Summary statement
The relationships formed between SiREN and the organisations can lead to: R & E skills and confidence, sustainable R & E practices; co-created solutions; clarity; R & E evidence being created and shared; connections; and changes to how services are delivered. Many outcomes interact and influence each other.

Discussion (20 minutes)

- To what extent do these outcomes reflect those experienced by your organisation?
- Are there any outcomes that are missing?
- Any comments on the terms used?

41

42



43

Appendix P: Evaluation framework

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
<p>1. What influences stakeholder capacity to engage in research, evaluation and EIDM?</p>	<p>1.1 Factors influencing stakeholder capacity to engage in research, evaluation and EIDM are identified.</p> <p>Capacity to engage in research, evaluation and EIDM is dynamic and levels vary across the system⁷. Capacity determines whether or not an individual or organisation engages with SiREN. Factors influencing capacity have been identified in previous surveys and interviews with stakeholders and service users. They can include time available, ability to engage target group, funding available, level of confidence, knowledge and skills, and availability of external and internal support.</p>	<p>Essential</p> <ul style="list-style-type: none"> • Processes in place to identify stakeholder barriers and enablers to engaging in research, evaluation and EIDM • Description of barriers and enablers experienced by stakeholders to undertaking evaluation and research and accessing and applying evidence • Modifiable barriers and enablers are identified to inform the development of SiREN activities <p>Desirable</p> <ul style="list-style-type: none"> • Frequency of occurrence of barriers and enablers to undertaking evaluation and research and accessing and applying evidence • Low levels of engagement by individual stakeholders are monitored and investigated* 	<ul style="list-style-type: none"> • Informal feedback from stakeholders • Periodic stakeholder surveys • Informal SiREN team observations • Stakeholder support record

⁷ The system refers to individuals and organisations working to address sexual health or blood-borne virus issues in Western Australia.

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
<p>2. How is SiREN perceived by stakeholders?</p>	<p>2.1 There is awareness of SiREN and the kinds of resources and services it offers.</p> <p>Stakeholder awareness of SiREN is increased by promoting SiREN, having a presence at events, and developing relationships. The more stakeholders are aware of how SiREN can support them, the more likely they are to engage when the need arises.</p> <p>SiREN needs to constantly promote its resources and services to maintain awareness due to the dynamic nature of the system.</p>	<p>Essential</p> <ul style="list-style-type: none"> • Proportion of surveyed stakeholders who are aware of SiREN’s resources and services • Stakeholder reasons for not accessing SiREN’s resources and services* • Ways in which new service users heard about SiREN (e.g., word of mouth) • Ways in which new network members heard about SiREN (e.g., internet search) • New and existing network members (e.g., job title, organisation type, region)* <p>Desirable</p> <ul style="list-style-type: none"> • SiREN team participation in stakeholder activities and events (e.g., event name, date, role, time spent)* • Strategies used to promote SiREN (e.g., medium, purpose) • Number of new and existing Twitter followers • Number of new and returning website visitors 	<ul style="list-style-type: none"> • Activity report • Network member data • Periodic stakeholder surveys • Social media analytics • Stakeholder support record • Website analytics

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
		<ul style="list-style-type: none"> • Comparison of channels used to access website (e.g., direct search) 	
	<p>2.2 SiREN is perceived as credible</p> <p>The perception of SiREN as a believable source of knowledge comes from its association with the University and credible others, past working relationships between stakeholders and the SiREN team, the longevity of SiREN, and the visibility and quality of SiREN’s activities, and quality communications and publications.</p> <p>The perception of SiREN as credible increases the likelihood that stakeholders will request support from, or partner with, SiREN.</p>	<p>Essential</p> <ul style="list-style-type: none"> • Proportion of surveyed stakeholders who agree that materials developed by SiREN (resources, publications etc.) are of high quality (e.g., useful, evidence-informed and error free) • Proportion of surveyed stakeholders who report they perceive SiREN as credible • Publication metrics (e.g., h-index, citations, journal impact factor, media coverage)* • Awards and nominations received by the SiREN team (e.g., name of award, reason nominated/awarded, team member) • SiREN is located within a reputable University and managed by University staff <p>Desirable</p> <ul style="list-style-type: none"> • Invitations for the SiREN team to present at events (e.g., event name, date, presentation type) 	<ul style="list-style-type: none"> • Activity report • Periodic stakeholder surveys • Research metrics • Stakeholder support record

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
		<ul style="list-style-type: none"> • Invitations for the SiREN team to participate in committees, groups, and events (e.g., event name, date, role) • New and existing linkages and partnerships (e.g., organisation, purpose)* • Length of time SiREN has been operating 	
	<p>2.3 SiREN is perceived as trustworthy</p> <p>SiREN is perceived as reliable and deserving of trust. This comes from its reputation and association with trustworthy others such as University staff or its partners.</p> <p>The trustworthiness of SiREN can be questioned by stakeholders seeking support for the competitive tendering process due to potential conflicts of interest.</p>	<p>Essential</p> <ul style="list-style-type: none"> • Proportion of surveyed stakeholders who report they perceive SiREN as trustworthy • Stakeholder expectations are managed and met or exceeded* • Number of requests for support during the competitive tendering process • SiREN monitors and addresses conflicts of interest <p>Desirable</p> <ul style="list-style-type: none"> • SiREN is managed by University staff 	<ul style="list-style-type: none"> • Activity report • Periodic stakeholder surveys
3. How well do SiREN's internal	3.1 SiREN's activities are aligned to its aims and values	Essential	<ul style="list-style-type: none"> • Management team feedback

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
<p>processes support implementation?</p>	<p>Alignment improves SiREN functioning as it ensures all activities contribute to SiREN achieving its aims.</p> <p>Having a shared vision and shared values promotes cooperation of the team. Cooperation increases willingness of management team to contribute time in-kind. This willingness is also affected by other factors e.g., workload, aligning with career goals etc.</p> <p>Clear induction processes enable staff to gain an understanding of SiREN and how their role contributes to achieving its aims.</p>	<ul style="list-style-type: none"> • SiREN has a plan that outlines aims, values, governance roles, activities and milestones <p>Desirable</p> <ul style="list-style-type: none"> • Induction processes are in place to familiarise new staff with SiREN • Policies and procedures are in place to inform the development and implementation of Project activities (e.g., social media, standardised templates) • The team report they work cooperatively to achieve SiREN’s aims • The management team are willing to contribute their time in-kind 	<ul style="list-style-type: none"> • Organisational documents
	<p>3.2 SiREN engages with all key stakeholder groups</p>	<p>Essential</p> <ul style="list-style-type: none"> • A planned approach is taken to establish and maintain engagement with key stakeholder groups 	<ul style="list-style-type: none"> • Activity report • Network member data

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
	<p>Engagement increases when stakeholders perceive SiREN to be trustworthy and credible.</p> <p>Engagement is supported by funding policy that requires engagement in research and evaluation.</p> <p>Stakeholders work in a diverse range of organisations across a large geographical area. In addition to this diversity, stakeholders are constantly changing as they move in and out of the system. Therefore, a planned approach is required to maintain and grow engagement across all stakeholder groups.</p>	<ul style="list-style-type: none"> • Low levels of engagement by individual stakeholders are monitored and investigated* • New and existing linkages and partnerships (e.g., organisation, purpose)* <p>Desirable</p> <ul style="list-style-type: none"> • Proportion and type of surveyed stakeholders who report they have used website resources (e.g., job title, organisation type, region) • Number of new, repeat, and total requests for support (e.g., job title, organisation type, region) • New and existing network members (e.g., job title, organisation type, region)* • Stakeholder participation in advisory groups led by SiREN (e.g., job title, organisation type, region, role in advisory group) 	<ul style="list-style-type: none"> • Organisational documents • Periodic stakeholder surveys • Stakeholder support record
	<p>3.3 There is expertise within SiREN team</p>	<p>Essential</p> <ul style="list-style-type: none"> • Recruitment processes result in staff with the knowledge and skills to meet SiREN’s aims 	<ul style="list-style-type: none"> • Activity report

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
	<p>Expertise levels within the team are dynamic. Expertise is increased by the mentorship and sponsorship provided by the management team, access to other University staff engaged in related SiREN, and team members undertaking postgraduate degrees and engaging in professional development. The ability to provide attractive remuneration to recruit experienced staff is required or expertise levels can be compromised.</p> <p>Expertise supports adaptation and sustainability as there are the skills and knowledge within the team to pursue new opportunities.</p>	<ul style="list-style-type: none"> • Proportion of SiREN team who have the confidence, knowledge, and skills to meet the requirements of their role • There are processes in place to share knowledge between team members (e.g., team meetings) <p>Desirable</p> <ul style="list-style-type: none"> • Professional development needs of staff are identified and supported • Resources allocated for staff professional development and/or free of charge professional development activities are identified • Number and type of professional development activities undertaken by SiREN staff • Sponsorship and mentoring opportunities are provided to SiREN staff (e.g., staff member, area of mentoring, outcomes) • Proportion of SiREN staff who are undertaking or have attained a postgraduate degree 	<ul style="list-style-type: none"> • Annual Performance review • Informal feedback from stakeholders • Organisational documents

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
	<p>3.4 SiREN demonstrates it is capable</p> <p>Capability is the extent to which SiREN can undertake its activities and achieve its aims. Capability is demonstrated through meeting stakeholder expectations, producing high impact and quality research, and the expertise of the team.</p> <p>Demonstrating capability increases University recognition, the willingness of stakeholders to engage, the ability of SiREN to access additional funding sources and establish partnerships.</p>	<p>Essential</p> <ul style="list-style-type: none"> • Funding conditions have been met or exceeded* • Stakeholder expectations are managed and met or exceeded* • Evidence of SiREN demonstrating its capabilities to stakeholders (e.g., presentations, discussions at meetings) • Relevant expertise amongst SiREN team to meet SiREN's aims* • Research is of a high quality (e.g., addresses an important question, delivers value for research investment, is respectful) • Monitoring and evaluation systems are in place including data collection and reporting <p>Desirable</p> <ul style="list-style-type: none"> • Publication metrics (e.g., h-index, citations, journal impact factor, media coverage)* 	<ul style="list-style-type: none"> • Activity report • Funding agreements • Organisational documents • Research metrics
4. How well is SiREN adapting to	4.1 SiREN activities are aligned with stakeholder needs	Essential	<ul style="list-style-type: none"> • Meeting minutes

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
<p>respond to emerging opportunities or address threats?</p>	<p>Engaging stakeholders in the development of SiREN’s activities ensures they are acceptable and useful.</p> <p>The process of working with stakeholders to align activities to their needs increases the perception that SiREN is credible, supports the development of trusting relationships, and promotes awareness of SiREN. To effectively align activities to stakeholder needs SiREN must understand how its strategies contribute to change and how contextual influences affect this process.</p> <p>Boundary-spanning skills facilitate the alignment building process through facilitating the exchange of knowledge.</p>	<ul style="list-style-type: none"> • Proportion of surveyed stakeholders that report SiREN’s activities align with their needs (e.g., flexible, timely, acceptable) • Number and type of requests for support • Proportion of service users who report the support provided by SiREN was useful • Proportion of service users who report they would recommend SiREN to a colleague requiring research or evaluation support • Proportion of service users who report they would use the service in future • Proportion of service users who report the information provided by SiREN was relevant • Processes in place to understand how SiREN contributes to change • Processes in place to understand how contextual factors influence SiREN’s ability to meet its aims 	<ul style="list-style-type: none"> • Network member data • Periodic stakeholder surveys • Service user surveys • Stakeholder support record

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
		<ul style="list-style-type: none"> • Processes in place to identify unintended effects of SiREN activities <p>Desirable</p> <ul style="list-style-type: none"> • Representation from appropriate stakeholders on SiREN advisory groups (e.g., group purpose, stakeholders' roles) • Stakeholder input into the development of SiREN's activities (e.g., input type, activity, outcome) • Research priority setting process with key stakeholders (e.g., topics identified, stakeholder input, justification of action taken) • Number of network members who unsubscribe in a six month period 	
	<p>4.2 Emerging opportunities and threats are responded to</p> <p>Adaptation involves SiREN learning from the system and adjusting SiREN processes and activities to respond to emerging opportunities</p>	<p>Essential</p> <ul style="list-style-type: none"> • Strategies in place to identify emerging opportunities and threats (e.g., established relationships with diverse stakeholder groups, monitoring funding opportunities) • Resources are allocated to generate and develop ideas (e.g., new grant proposals) 	<ul style="list-style-type: none"> • Activity report • Funding applications • Grants register • Organisational documents

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
	<p>and threats. Adaptation requires the presence of trusting relationships between SiREN and stakeholders to enable the free flow of knowledge. Adaptation is supported by the knowledge exchanged between SiREN and stakeholders, the presence of a learning culture within SiREN team, a flexible approach to achieving SiREN's aims, support from the main funder, access to human and financial resources, and time to generate and develop ideas.</p> <p>A timely response to opportunities and threats (e.g., grant applications) is supported by the presence of existing relationships.</p> <p>The like-mindedness of the SiREN team can threaten adaptation through reducing innovation.</p>	<ul style="list-style-type: none"> • Demonstrated outputs of response to opportunities or threats (e.g., funding applications, informing policy) • Timely response to emerging opportunities • Risks are identified and risk management strategies are implemented <p>Desirable</p> <ul style="list-style-type: none"> • Presence of a learning culture amongst team members • Commitment to taking a flexible approach to achieve SiREN's aims • Access to additional human resources (e.g., research students, contract staff) 	<ul style="list-style-type: none"> • Informal SiREN team observations • Strategic plan

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
	<p>4.3 There are resources to sustain and grow SiREN activities</p> <p>Financial, human, and partnership resources are required to sustain SiREN. Aligning SiREN to stakeholder needs (including financial stakeholders such as the University), meeting or exceeding funding conditions, and building expertise within the team supports sustainability and growth.</p> <p>In-kind time provided by the management team and key person reliance threaten sustainability.</p>	<p>Essential</p> <ul style="list-style-type: none"> • Funding conditions have been met or exceeded* • New or continuing funding awarded (e.g., source, subject, partners, amount) • Access to University resources (e.g., staff training, PhD students) • A budget is developed and adhered to • Sufficient human resources to meet SiREN’s aims • Strategies in place to mitigate the risk of key-person reliance • New and existing linkages and partnerships (e.g., organisation, purpose)* <p>Desirable</p> <ul style="list-style-type: none"> • Relevant expertise amongst SiREN team to meet SiREN aims* • There is access to support from a management team 	<ul style="list-style-type: none"> • Activity report • Funding agreements • Organisational documents • SiREN team observations
5. To what extent is SiREN developing	<p>5.1 There are trusting relationships with partners and service users</p>	<p>Essential</p> <ul style="list-style-type: none"> • Proportion of service users reporting the support provided by SiREN met their expectations 	<ul style="list-style-type: none"> • Organisational documents

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
relationships for research and evaluation?	<p>Alignment processes (e.g., engaging with stakeholders to determine SiREN activities), meeting stakeholder and service user expectations, and boundary-spanning skills build trusting relationships.</p> <p>Once trust is established engagement increases and there is increased potential for impacts and outcomes to occur. When expectations of engagement are not met trust can be damaged.</p> <p>Due to staff changes, both within SiREN and the system, new trusting relationships need to be developed which takes time.</p>	<ul style="list-style-type: none"> • Proportion of service users reporting SiREN can be relied on to do what they say they will do • Proportion of service users reporting they worked with SiREN to effectively problem solve and overcome difficulties • Processes to establish clear expectations of engagement with partners and service users (e.g., memorandum of understanding) <p>Desirable</p> <ul style="list-style-type: none"> • Proportion of service users who have engaged with SiREN previously • Proportion of partners who have engaged with SiREN previously • Stakeholder reported reasons for not accessing SiREN services or resources* 	<ul style="list-style-type: none"> • Periodic stakeholder surveys • Service user surveys • Stakeholder support record
	<p>5.2 Networks and partnerships are established and developed</p>	<p>Essential</p> <ul style="list-style-type: none"> • Proportion of time spent working collaboratively with stakeholders 	<ul style="list-style-type: none"> • Activity report • Funding applications

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
	<p>The development of networks and partnerships is supported by the presence of a culture of collaboration within the system and the history of SiREN team members working with and within the system.</p> <p>Establishing networks and partnerships takes time. Once established, networks and partnerships enable a more efficient and effective response to emerging issues and the creation and sharing of evidence. In turn, the process of creating of evidence can lead to the establishment of new networks and partnerships.</p> <p>Partnerships build the credibility of SiREN through association with credible others, which in turn supports funding applications and generates new opportunities to partner.</p>	<ul style="list-style-type: none"> • SiREN team participation in stakeholder activities and events (e.g., event name, date, role, time spent)* • Number of requests for SiREN to link organisations and researchers together for research and evaluation activities (e.g., organisation, time spent) • Engagement with stakeholders for knowledge translation activities hosted by SiREN (e.g., symposium) • New and existing linkages and partnerships (e.g., organisation, purpose)* • Maturity of partnerships (e.g., length of time working together, number and size of projects worked on) • Number funding applications undertaken in partnership • Proportion of stakeholders reporting there is the presence of a collaborative culture within the system <p>Desirable</p> <ul style="list-style-type: none"> • Proportion of service users reporting support provided by SiREN led to the development of professional networks or partnerships 	<ul style="list-style-type: none"> • Service user surveys • Stakeholder support record

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
		<ul style="list-style-type: none"> • Number of publications undertaken in partnership 	
6. To what extent is SiREN facilitating the creation, sharing and application of evidence?	<p>6.1 The evidence agenda reflects local issues</p> <p>When the evidence agenda reflects local issues, it supports the generation of relevant and useful evidence that is more likely to be used to inform policy and practice decision-making.</p>	<p>Essential</p> <ul style="list-style-type: none"> • Opportunities provided by SiREN for stakeholders to identify gaps in the evidence base and develop research or evaluation projects to address them (e.g., linkages with researchers, research priority setting) • SiREN highlights local issues at events (e.g., conference presentations or discussions at meetings) 	<ul style="list-style-type: none"> • Activity report • Meeting minutes
	<p>6.2 Evidence is created that addresses local issues</p> <p>When service users engage with SiREN to co-create solutions to research or evaluation challenges (e.g., develop an ethics application or an evaluation method) they combine their knowledge of contextual factors and research an evaluation methods. This process can lead to the creation of relevant and useful evidence.</p>	<p>Essential</p> <ul style="list-style-type: none"> • Proportion of service users reporting support led to the development of new, or the improvement of existing, research or evaluation methods • New research and evaluation funding awarded (e.g., subject, partners, amount, how it addresses a local issue) • Details of research and evaluation project data collection and analysis (e.g., project, team members, status: commenced, in progress, completed) 	<ul style="list-style-type: none"> • Activity report • Funding agreements • Ethics applications • Service user surveys • Stakeholder support record

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
	<p>The process of co-creating evidence that is relevant to local issues is an opportunity to develop networks and partnerships.</p> <p>Evidence that addresses local issues is more likely to be used to inform EIDM amongst stakeholders.</p> <p>The publication of evidence can take years.</p>	<p>Desirable</p> <ul style="list-style-type: none"> • Number of requests for support to develop research and evaluation solutions (such as an evaluation method or ethics application) (e.g., organisation, time spent) • Number of requests for support to collect or analyse data (e.g., organisation, time spent) • Number of requests for support to co-author publications (e.g., organisation, time spent) • Number of students placed with stakeholder organisations to support evidence generation (e.g., student type, organisation, purpose, outcome) • Number of ethics applications submitted and proportion approved • Publication details (e.g., title, authors, status: in development, submitted, accepted, published) 	
	<p>6.3 Evidence is shared</p>	<p>Essential</p> <ul style="list-style-type: none"> • Procedures are in place for disseminating evidence generated by SiREN 	<ul style="list-style-type: none"> • Activity report • Communication analytics

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
	<p>Evidence sharing increases stakeholder EIDM and research and evaluation capacity.</p> <p>When SiREN shares evidence it has created this enhances awareness and the perceived credibility of SiREN and enables SiREN to demonstrate its capabilities.</p>	<ul style="list-style-type: none"> • Number of network communications (e.g., type, number of recipients, proportion of opens and clicks) • Details of knowledge translation events hosted by SiREN (e.g., event name, purpose, attendance, outcomes) • Proportion of service users reporting support led to an increase in their confidence in sharing their work at conferences or forums. <p>Desirable</p> <ul style="list-style-type: none"> • Number of requests for support to prepare conference abstracts or presentations (e.g., organisation, time spent) • Publication dissemination details (e.g., format, channel) • SiREN team presentations at events (e.g., event name, date, presentation type) • Number of requests for copies of journal articles or reports 	<ul style="list-style-type: none"> • Emails • Organisation documents • Service user surveys • Stakeholder support record • Website analytics • Social media analytics
	<p>6.4 There is evidence-informed policy and practice decision-making</p>	<p>Essential</p> <ul style="list-style-type: none"> • Proportion of service users reporting they did (or intend to) apply the information provided by SiREN to their work 	<ul style="list-style-type: none"> • Activity report • Informal stakeholder feedback

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
	<p>EIDM is supported by the availability of relevant evidence and the user’s ability to apply evidence to decision-making. Evidence is combined from multiple sources (e.g., research, evaluation and experiential knowledge) to inform decision-making.</p> <p>Evidence can take years to publish, therefore there can be delays with evidence generated being used to inform decision-making.</p>	<ul style="list-style-type: none"> • Proportion of service users agreeing that support led to changes in their organisation’s activities, services, or programs • Proportion of service users reporting support increased their ability to apply research or evaluation evidence to their work • Description of evidence provided by SiREN to inform policy setting process (e.g., format of evidence provided, policy) • Feedback from stakeholders that evidence created by SiREN was applied to decision-making 	<ul style="list-style-type: none"> • Service user surveys
<p>7. How is SiREN contributing to sustainable program planning, research, evaluation and evidence-informed</p>	<p>7.1 There are opportunities for continuous learning</p> <p>Providing diverse and flexible opportunities for continuous learning increases engagement with stakeholders and contributes to the development of sustainable program planning, research,</p>	<p>Essential</p> <ul style="list-style-type: none"> • Description of new training, services, resources, or events developed • Attendance at knowledge and skill building events hosted by SiREN <p>Desirable</p> <ul style="list-style-type: none"> • Summary of all support provided (e.g., type of support, time spent) 	<ul style="list-style-type: none"> • Activity report • Informal SiREN team observations • Stakeholder support record • Video analytics

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
decision-making practice?	evaluation, and evidence-informed decision-making practice.	<ul style="list-style-type: none"> • Description of mentorship provided to students and partners • Number of postgraduate students supervised by SiREN team (e.g., project, student name, degree type, activities, supervisors) • Number and duration of page views of website resources • Number of views of training videos 	<ul style="list-style-type: none"> • Website analytics
	<p>7.2 There is increased program planning, research, evaluation and evidence-informed decision-making confidence, knowledge, and skills</p> <p>An increase in stakeholder confidence, knowledge, and skills can lead to repeat engagement with SiREN as the service user’s awareness of, and ability to engage in, research and evaluation opportunities increases. However, it can also reduce engagement as the service user may feel</p>	<p>Essential</p> <ul style="list-style-type: none"> • Proportion of service users reporting support increased their confidence in undertaking program planning, research, and/or evaluation • Proportion of service users reporting support increased their program planning, research, and/or evaluation knowledge and/or skills • Proportion of service users reporting support increased their ability to apply research or evaluation evidence to their work • Proportion of service users reporting support increased their understanding of how their program fits or contributes to 	<ul style="list-style-type: none"> • Informal SiREN team observations • Service user surveys

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
	<p>they have the confidence, knowledge, or skills to meet the requirements of their role.</p> <p>The provision of program planning and evaluation support can lead to a service user having a greater understanding of their programs role within the wider system.</p> <p>When stakeholders have confidence in their program’s strategies, evaluation methods and results, they are more likely to share it at conferences or forums.</p> <p>There can be a time lag between receiving support and confidence increasing as service user confidence reduces as they realise what they do not know. It then takes time to build confidence levels back up through applying learnings.</p>	<p>the broader response to sexual health and blood-borne virus issues</p> <ul style="list-style-type: none"> • Service user feedback on changes to thinking or practice that occurred because of support provided by SiREN* <p>Desirable</p> <ul style="list-style-type: none"> • Description of outcomes of mentorship and supervision provided to students and partners 	

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
	Therefore, the timing of evaluation needs to be carefully considered.		
	<p>7.3 There is a culture that values research and evaluation</p> <p>The presence of a culture that values research and evaluation amongst stakeholders has a positive effect on research and evaluation capacity and engagement with SiREN. Valuing research and evaluation increases stakeholder willingness to participate in research and evaluation activities and actively seeking out new opportunities to engage in research and evaluation.</p>	<p>Essential</p> <ul style="list-style-type: none"> • Proportion of service users reporting support increased their receptiveness to new research or evaluation opportunities • Proportion of service users reporting support increased their appreciation of the value of research or evaluation • Service user feedback on changes to thinking or practice that occurred because of support provided by SiREN* • Proportion of stakeholders reporting their organisation values research and evaluation <p>Desirable</p> <ul style="list-style-type: none"> • There is a shared language for research and evaluation • Stakeholders request research and evaluation support at the start of a project rather than towards the end 	<ul style="list-style-type: none"> • Informal SiREN team observations • Periodic stakeholder surveys • Service user surveys
	<p>7.4 Processes, policies, or practices that support program planning, research, and evaluation practice are developed</p>	<p>Essential</p>	<ul style="list-style-type: none"> • Service user surveys

Evaluation questions	Domain and description	Indicators *Used for more than one domain	Data sources
	<p>Supporting the development of research and evaluation processes, policies or practices (e.g., developing evaluation frameworks) increases sustainability through establishing it as part of routine practice.</p>	<ul style="list-style-type: none"> • Proportion of service users reporting support led to improved program planning, research and evaluation processes, policies, or practices • Service user feedback on changes to thinking or practice that occurred because of support provided by SiREN* <p>Desirable</p> <ul style="list-style-type: none"> • Number of requests for support to develop program planning, research and evaluation processes, policies, or practices (e.g., organisation, time spent) 	<ul style="list-style-type: none"> • Stakeholder support record

Appendix Q: Framework consultation recruitment and reminder emails

Email 1: Recruitment for initial survey

Dear (insert name),

I would like your feedback on an evaluation framework that has been developed to support the monitoring and evaluation of the SiREN project. You have been asked to participate as you are a member of the SiREN management team and will be involved in the implementation of the framework. Your feedback will ensure the framework is practical and relevant to SiREN's needs.

This framework forms part of my PhD which aims to: understand the processes, impacts, and outcomes of SiREN; and to develop an evaluation framework and tools to be used for the ongoing monitoring and evaluation of SiREN.

To participate, I ask that you review the attached framework and complete an online survey. The survey questions focus on the importance of individual framework indicators in demonstrating that project aims have been met. Reviewing the framework and completing the survey should take about one hour of your time.

Part of the purpose of the survey is to develop consensus amongst members of the management team on which evaluation indicators are most important. To do this, a modified-Delphi method is being used. This method uses survey rounds to build agreement with a group of people. Therefore, there may be brief follow up surveys to establish agreement on framework indicators that do not achieve consensus in this survey round. It is important that you complete the survey individually as each of your responses will be compared to determine if consensus has been achieved.

Once you have reviewed the framework, please complete the survey using the link below

https://curtin.au1.qualtrics.com/jfe/form/SV_3wb9HiEGAli2Q2p

[Please complete the survey by the 29th of January.](#)

Curtin University Human Research Ethics Committee has approved this study (HRE2017-0090).

Kind regards, Rochelle Tobin

Email 2: First survey reminder email

Hello All,

Just a gentle nudge to remind you all that I'd appreciate your feedback on this before the end of the week.

Let me know if you will need additional time.

From Rochelle

Email 3: Recruitment for second survey

Dear (insert name),

Thank you for giving your feedback on the SiREN evaluation framework.

As you may recall, the purpose of the survey was to develop consensus amongst management team members on the importance of framework indicators. The good news is that 85% of indicators reached consensus in the first round. Therefore, the time required to undertake this round will be less than ten minutes.

While undertaking the survey, I suggest that you have the evaluation framework (attached) nearby so that you can refer to it as needed. It is important that you complete the survey individually as each of your responses will be compared to determine if consensus has been achieved.

You can complete the survey using this link

https://curtin.au1.qualtrics.com/jfe/form/SV_0oBZ9BnSpBzk9fg

[Please complete it by the 19th of March.](#)

Curtin University Human Research Ethics Committee has approved this study (HRE2017-0090).

Kind regards, Rochelle Tobin

Email 4: Second survey reminder email

Hello,

A friendly reminder to please complete the SiREN evaluation framework survey if you have not already. As the responses are anonymous I can't tell who has and who hasn't, so I apologise if you have completed it.

The survey is available via this link https://curtin.au1.qualtrics.com/jfe/form/SV_0oBZ9BnSpBzk9fg

Kind regards,

Rochelle Tobin

Email #5: Request to attend a meeting

Hello All,

Thank you for completing the second survey round for the SiREN evaluation framework. There are now only a handful of indicators that have not reached consensus. I would like to schedule this meeting so we can discuss these indicators as a group.

In addition to this, I received feedback on some indicators that I would like to discuss with you prior finalising the framework.

From Rochelle

Appendix R: Framework consensus-building surveys

First round survey

Hello,

This survey asks you questions about an evaluation framework that has been developed to support the ongoing monitoring and evaluation of SiREN. The questions focus on the importance of individual framework indicators in demonstrating that project aims have been met. The data collected from this survey will ensure the framework is practical and relevant to SiREN's needs.

Before you begin this survey please ensure you have read the framework in its entirety.

This survey will take approximately 30 minutes to complete. If needed you can come back and complete the survey once you have started, just click on the link again and your saved survey will reappear.

This study has approval from the Curtin University Human Research Ethics Committee (Approval Number HRE2017-0090). Your survey responses are confidential and individual responses will not be identified in any materials. The data will only be accessible by myself.

If you have any questions about the survey please contact me at rochelle.tobin@curtin.edu.au.

Thank you for taking the time to provide your input.

Kind regards,
Rochelle Tobin

Do you agree to participate in this study?

By selecting yes you agree that you:

- Have read the information statement that was emailed to you and you understand its contents;
- Voluntarily consent to take part in this research project;
- Believe you understand the purpose, extent and possible risks of your involvement; and
- Have had an opportunity to ask questions and are satisfied with the answers you have received.

- Yes
 No

As you have not provided consent you cannot complete this survey. If this selection was made in error please click back to adjust your response. If you do not wish to provide consent, I thank you for your time.

The following questions ask you to determine if the framework indicators are 'essential' or 'desirable' in demonstrating that its corresponding domain has been met. 'Essential' means they are very important in demonstrating the domain has been met, Essential indicators should be a part of a minimum set of indicators that can form the basis of the monitoring and evaluation of SiREN. 'Desirable' is somewhat important but not essential to the monitoring and evaluation of SiREN.

If an indicator require modification, please note your suggested changes in the corresponding column.

When determining your responses, it may be useful to reference the domain description included in the complete framework.

The following section relates to evaluation question one 'What influences stakeholder capacity to engage in research, evaluation and evidence-informed decision making?'

For the domain '1.1 Factors influencing stakeholder capacity to engage in research, evaluation and evidence-informed decision making are identified' please select if the below indicators are essential or desirable in demonstrating it has been met.

Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
Desirable	Essential	

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Processes in place to identify stakeholder barriers and enablers to engaging in research, evaluation and evidence-informed decision making	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Description of barriers and enablers experienced by stakeholders to undertaking evaluation and research and accessing and applying evidence	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Frequency of occurrence of barriers and enablers to undertaking evaluation and research and accessing and applying evidence	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Modifiable barriers and enablers are identified to inform the development of project activities	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Low levels of engagement by individual stakeholders are monitored and investigated	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

The following sections relate to evaluation question two 'How is the project perceived by stakeholders?'

For the domain '2.1 There is awareness of the project and the kinds of resources and services it offers' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Proportion of surveyed stakeholders who are aware of the project's resources and services	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Engagement of stakeholders with the project's services	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Stakeholder reasons for not accessing the project's resources and services	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Project team participation in committees, groups, and events (e.g. event name, date, role)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Strategies used to promote the project (e.g. medium, purpose)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Ways in which new service users heard about the project (e.g. word of mouth)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Ways in which new network members heard about the project (e.g. internet search)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of new and existing network members	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of new and existing Twitter followers	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of new and returning website visitors	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Comparison of channels used to access website (e.g. direct search)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

For the domain '2.2 The project is perceived as credible' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Proportion of surveyed stakeholders who report they perceive the project as credible	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Materials developed by the project (resources, publications etc) are of high quality (e.g. evidence-based and error free)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Project team presentations at events (e.g. event name, date, presentation type)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Project team participation in committees, groups, and events (e.g. event name, date, role)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Publication metrics (e.g. h-index, citations, journal impact factor, media coverage)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Awards and nominations received by project team (e.g. name of award, reason nominated/awarded, team member)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
The project is located within a university and managed by university staff	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
New and existing linkages and partnerships (e.g. organisation, purpose)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

For the domain '2.3 The project is perceived as trustworthy' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Proportion of surveyed stakeholders who report they perceive the project as trustworthy	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
The project is managed by university staff	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
The project meets stakeholder expectations	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
The project does not disclose confidential information to stakeholders	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of requests for support with the competitive tendering process	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

The following sections relate to evaluation question three 'How well do the project's internal processes support implementation?'

For the domain '3.1 The project's activities are aligned to its aims and values' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
The project has a plan that aligns activities with aims and values	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
The project has a governance plan	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Induction processes are in place to familiarise new staff with the project	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Policies and procedures are in place to inform the development and implementation of project activities (e.g. social media, standardised templates)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
The team report they work cooperatively to achieve project aims	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
The management team are willing to contribute their time	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

For the domain '3.2 All key stakeholder groups are reached' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
A planned approach is taken to establish and maintain engagement with key stakeholder groups	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proactive engagement with stakeholders who are not accessing the project's services	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Methods used to reach stakeholders (e.g. email(s))	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion and type of surveyed stakeholders who report they have accessed the project's services or resources (e.g. job title, organisation type, region)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of new, repeat, and total requests for support (e.g. job title, organisation type, region)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
New and existing network members (e.g. job title, organisation type, region)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Stakeholder participation in advisory groups led by the project (e.g. job title, organisation type, region, role in advisory group)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
New and existing linkages and partnerships (e.g. organisation, purpose)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

For the domain '3.3 There is expertise within the project team' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Professional development needs of staff are identified and supported	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Resources allocated for staff professional development and/or free of charge professional development activities are identified	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number and type of professional development activities undertaken by project staff	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Sponsorship and mentoring provided by team to project staff (e.g. staff member, area of mentoring, outcomes)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Recruitment processes result in staff with the knowledge and skills to meet project aims	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of project staff who are undertaking or have attained a postgraduate degree	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of project team who have the confidence, knowledge, and skills to meet the requirements of their role	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
There are processes in place to share knowledge between team members (e.g. team meetings)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

For the domain '3.4 The project demonstrates it is capable' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Funding conditions have been met or exceeded	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Stakeholder expectations are managed and met	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Evidence of the project demonstrating its capabilities to stakeholders (e.g. presentations, discussions at meetings)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
The project team have the knowledge and skills required to meet project aims	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Publication metrics (e.g. h-index, citations, journal impact factor, media coverage)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Research is of a high quality (e.g. addresses an important question, delivers value for research investment, is respectful)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Monitoring and evaluation systems are in place including data collection and reporting	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

The following sections relate to evaluation question four 'How well is the project adapting to respond to new opportunities or address threats?'

For the domain '4.1 Project activities are aligned with stakeholder needs' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Proportion of surveyed stakeholders that report the project's activities align with their needs (e.g. flexible, timely, acceptable)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number and type of requests for support	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of service users who report the support provided by the project was useful	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of service users who report they would recommend the project to a colleague or use the service in future	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of service users who report the information provided by the project was relevant	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Representation from appropriate stakeholders on project advisory groups (e.g. group purpose, stakeholders' roles)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Stakeholder input into the development of the project's activities (e.g. input type, activity, outcome)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Research priority setting process with key stakeholders (e.g. topics identified, stakeholder input, justification of action taken)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Length of time network members have been subscribed	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

For the domain '4.2 New opportunities are responded to and threats are addressed' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Strategies in place to identify new opportunities and threats (e.g. stakeholder consultation, monitoring funding opportunities)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Established relationships with stakeholders enable efficient partnership-based responses to emerging opportunities	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Presence of a learning culture amongst team members	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Commitment to taking a flexible approach to achieve project aims	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Time is allocated to generate and develop ideas (e.g. new grant proposals)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Access to additional human resources (e.g. research students, contract staff)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Details of funding applications (e.g. subject, partners, amount)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Risks are identified and risk management strategies are implemented	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

For the domain '4.3 There are resources to sustain and grow project activities' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Funding conditions have been met or exceeded	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
New or continuing funding awarded (e.g. subject, partners, amount)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Access to university resources (e.g. staff training, PhD students)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
A budget is developed and adhered to	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Sufficient human resources to meet project aims	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Relevant expertise to meet project aims	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of hours of in-kind time provided by management team	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Strategies in place to mitigate the risk of key-person reliance	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
New and existing linkages and partnerships (e.g. organisation, purpose)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

The following sections relate to evaluation question five 'To what extent is the project developing relationships for research and evaluation?'

For the domain '5.1 There are trusting relationships with partners and service users' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Proportion of service users reporting the support provided by the project met their expectations	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of service users reporting the project can be relied on to do what they say they will do	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of service users reporting they worked with the project to effectively problem solve and overcome difficulties	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Stakeholder reported reasons for not accessing or not intending to access the project services or resources	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Process to establish clear expectations for the provision of support	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Process to establish clear expectations with partners	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of service users who have engaged with the project previously	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of partners who have engaged with the project previously	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

For the domain '5.2 Networks and partnerships are established and developed' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Time spent working collaboratively with stakeholders	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Project team participation in stakeholder activities and events (e.g. event name, date, role, time spent)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of requests for the project to link organisations and researchers together for research and evaluation activities (e.g. organisation, time spent)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number and type of stakeholder networking opportunities provided by the project	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of service users reporting support provided by the project led to the development of professional networks or partnerships	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
New and existing linkages and partnerships (e.g. organisation, purpose)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Maturity of partnerships (e.g. length of time working together, number and size of projects worked on)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number funding applications undertaken in partnership	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of publications undertaken in partnership	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Relationships with stakeholders enable efficient partnership-based responses to emerging opportunities	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

The following sections relate to evaluation question six 'To what extent is the project facilitating the creation, sharing and application of evidence?'

For the domain '6.1 The evidence agenda reflects local issues' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Opportunities provided by the project for stakeholders to identify gaps in the evidence base and develop research or evaluation projects to address them (e.g. linkages with researchers, research priority setting)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
The project highlights local issues at events (e.g. conference presentations or discussions at meetings)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

For the domain '6.2 Evidence is created that addresses local issues' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Evidence is created by the project that addresses a local issue	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of requests for support to develop research and evaluation solutions (such as an evaluation method or ethics application) (e.g. organisation, time spent)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of requests for support to collect or analyse data (e.g. organisation, time spent)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of requests for support to co-author publications (e.g. organisation, time spent)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of service users reporting support led to the development of new, or the improvement of existing, research or evaluation methods	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of students placed with stakeholder organisations to support evidence generation (e.g. student type, organisation, purpose, outcome)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
New research and evaluation funding awarded (e.g. subject, partners, amount, how it addresses a local issue)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of ethics applications submitted and proportion approved	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Details of research and evaluation project data collection and analysis (e.g. project, team members, status: commenced, in progress, completed)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Publication details (e.g. title, authors, status: in development, submitted, accepted, published)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

For the domain '6.3 Evidence is shared' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Number of requests for support to prepare conference abstracts or presentations (e.g. organisation, time spent)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of service users reporting support led to an increase in their confidence in sharing their work at conferences or forums	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Website activity (e.g. visitors, page views, session duration)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Twitter activity (e.g. followers, tweets)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of network communications (e.g. type, number of recipients, proportion of opens and clicks)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Project team presentations at events (e.g. event name, date, presentation type)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Details of evidence sharing events hosted by the project (e.g. event name, purpose, attendance, outcomes)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of requests for copies of journal articles or reports	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Procedures are in place for disseminating evidence generated by the project	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Project publication dissemination details (e.g. format, channel)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

For the domain '6.4 There is evidence-informed policy and practice decision making' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Proportion of service users reporting they did (or intend to) apply the information provided by the project to their work	<input type="radio"/>	<input type="radio"/>	
Proportion of service users agreeing that support led to changes in their organisation's activities, services, or programs	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of service users reporting support increased their ability to apply research or evaluation evidence to their work	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Description of evidence provided by the project to inform policy setting process (e.g. format of evidence provided, policy)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Feedback from stakeholders that evidence created by the project was applied to decision making	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

The following sections relate to evaluation question seven 'In what ways is the project contributing to the development of sustainable program planning, research, evaluation and evidence-informed decision-making practice?'

For the domain '7.1 There are opportunities for continuous learning' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Summary of all support provided (e.g. type of support, time spent)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of postgraduate students supervised by project team (e.g. project, student name, degree type, activities, supervisors)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Description of new training, services, resources, or events developed	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number and duration of page views of website resources	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Number of views of training videos	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Attendance at knowledge and skill building events hosted by the project	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Description of mentorship provided to students and partners	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

For the domain '7.2 There is increased program planning, research, evaluation and evidence-informed decision-making confidence, knowledge, and skills' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Proportion of service users reporting support increased their confidence in undertaking program planning, research, and/or evaluation	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of service users reporting support increased their program planning, research, and/or evaluation knowledge and/or skills	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of service users reporting support increased their ability to apply research or evaluation evidence to their work	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of service users reporting support increased their understanding of how their program fits or contributes to the broader response to sexual health and blood-borne virus issues	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Service user feedback on changes to thinking or practice that occurred because of support provided by the project	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Description of outcomes of mentorship and supervision provided to students and partners	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

For the domain '7.3 There is a culture that values research and evaluation' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Proportion of service users reporting support increased their receptiveness to new research or evaluation opportunities	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of service users reporting support increased their appreciation of the value of research or evaluation	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Service user feedback on changes to thinking or practice that occurred because of support provided by the project	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
There is a shared language for research and evaluation	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Stakeholders request research and evaluation support at the start of a project rather than towards the end	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of stakeholders reporting their organisation values research and evaluation	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

For the domain '7.4 Processes, policies, or practices that support program planning, research, and evaluation practice are developed' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator		Please describe any suggested modifications (e.g. wording changes) Suggested changes
	Desirable	Essential	
Number of requests for support to develop program planning, research and evaluation processes, policies, or practices (e.g. organisation, time spent)	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Proportion of service users reporting support led to improved program planning, research and evaluation processes, policies, or practices	<input type="radio"/>	<input type="radio"/>	<input type="text"/>
Service user feedback on changes to their thinking and practice that occurred because of support	<input type="radio"/>	<input type="radio"/>	<input type="text"/>

Block 1

This is the end of this survey. Thank you for taking the time to complete it.

Second round survey

Default Question Block

Hello,

The purpose of this survey is to provide your input into the evaluation framework that has been developed to support the ongoing monitoring and evaluation of SiREN. The questions focus on the importance of individual framework indicators in demonstrating the Project aims have been met.

I thank you for taking part in the previous survey earlier in the year. As you may recall, the purpose of the survey was to develop consensus amongst management team members on the importance of each of the framework indicators. The good news is that 85% of indicators reached consensus in the first round. Therefore, this survey will only ask you about the remaining 15% of indicators.

While undertaking the survey, I suggest that you have the evaluation framework nearby so that you can refer to it as needed. This will assist you to compare the remaining indicators included in this survey with the complete list of indicators in the framework. It is important that you complete the survey individually as each of your responses will be compared to determine if consensus has been achieved.

The survey will take approximately 10 minutes to complete. If needed you can come back and complete the survey once you have started, just click on the link again and your saved survey will reappear.

This study has approval from the Curtin University Human Research Ethics Committee (Approval Number HRE2017-0090). Your survey responses are confidential and individual responses will not be identified in any materials. The data will only be accessible by myself.

If you have any questions about the survey please contact me at rochelle.tobin@curtin.edu.au.

Thank you for taking the time to provide your input.

Kind regards,
Rochelle Tobin

Do you agree to participate in this study?

By selecting yes you agree that you:

- Have read the information statement that was emailed to you and you understand its contents;
- Voluntarily consent to take part in this research project;
- Believe you understand the purpose, extent and possible risks of your involvement; and
- Have had an opportunity to ask questions and are satisfied with the answers you have received.

Yes

No

As you have not provided consent you cannot complete this survey. If this selection was made in error please click back to adjust your response. If you do not wish to provide consent, I thank you for your time.

The following questions ask you to determine if the framework indicators are 'essential' or 'desirable' in demonstrating that its corresponding domain has been met. 'Essential' means they are very important in demonstrating the domain has been met. Essential indicators should be a part of a minimum set of indicators that can form the basis of the monitoring and evaluation of SiREN. 'Desirable' is somewhat important but not essential to the monitoring and evaluation of SiREN.

This survey asks you about the indicators that have not reached agreement as either essential or desirable. Therefore, we recommend you refer to the complete framework to consider all the indicators before selecting your response.

You may notice that the wording of some indicators has changed when compared to the original framework. This is because they have been updated to reflect feedback received from you in the last survey round.

The following section relates to evaluation question one *'What influences stakeholder capacity to engage in research, evaluation and evidence-informed decision making?'*

For the domain *'1.1 Factors influencing stakeholder capacity to engage in research, evaluation and evidence-informed decision making are identified'* please select if the below indicator is essential or desirable in demonstrating it has been

met.

	Importance of indicator	
	Desirable	Essential
Low levels of engagement (e.g. accessing the Projects services) by individual stakeholders are monitored and investigated	<input type="radio"/>	<input type="radio"/>

This section relates to evaluation question two 'How is the project perceived by stakeholders?'

For the domain '2.1 There is awareness of the project and the kinds of resources and services it offers' please select if the below indicator is essential or desirable in demonstrating it has been met.

	Importance of indicator	
	Desirable	Essential
Proportion of surveyed stakeholders who are aware of the project's resources and services	<input type="radio"/>	<input type="radio"/>

For the domain '2.2 The project is perceived as credible' please select if the below indicator is essential or desirable in demonstrating it has been met.

	Importance of indicator	
	Desirable	Essential
Proportion of surveyed stakeholders who report they perceive the project as credible	<input type="radio"/>	<input type="radio"/>

For the domain '2.3 The project is perceived as trustworthy' please select if the below indicator is essential or desirable in demonstrating it has been met.

	Importance of indicator	
	Desirable	Essential
Proportion of surveyed stakeholders who report they perceive the project as trustworthy	<input type="radio"/>	<input type="radio"/>

This section relates to evaluation question three 'How well do the project's internal processes support implementation?'

For the domain '3.2 All key stakeholder groups are reached' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator	
	Desirable	Essential
Proportion and type of surveyed stakeholders who report they have accessed the project's services or resources (e.g. job title, organisation type, region)	<input type="radio"/>	<input type="radio"/>
Number of new, repeat, and total requests for support (e.g. job title, organisation type, region)	<input type="radio"/>	<input type="radio"/>
Linkages and partnerships are established and maintained with all key stakeholder groups(e.g. organisation, purpose)	<input type="radio"/>	<input type="radio"/>

For the domain '3.3 There is expertise within the project team' please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator	
	Desirable	Essential
Professional development needs of staff are identified and supported	<input type="radio"/>	<input type="radio"/>
Resources allocated for staff professional development and/or free of charge professional development activities are identified	<input type="radio"/>	<input type="radio"/>
Number and type of professional development activities undertaken by project staff	<input type="radio"/>	<input type="radio"/>

This section relates to evaluation question four *'How well is the project adapting to respond to new opportunities or address threats?'*

For the domain **'4.1 Project activities are aligned with stakeholder needs'** please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator	
	Desirable	Essential
Proportion of surveyed stakeholders that report the project's activities align with their needs (e.g. flexible, timely, acceptable)	<input type="radio"/>	<input type="radio"/>
Research priority setting process with key stakeholders (e.g. topics identified, stakeholder input, justification of action taken)	<input type="radio"/>	<input type="radio"/>

For the domain **'4.2 New opportunities are responded to and threats are addressed'** please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator	
	Desirable	Essential
Established relationships with stakeholders enable efficient partnership-based responses to emerging opportunities	<input type="radio"/>	<input type="radio"/>
Resources are allocated to generate and develop ideas (e.g. new grant proposals)	<input type="radio"/>	<input type="radio"/>
Number of new funding applications (e.g. subject, partners, amount)	<input type="radio"/>	<input type="radio"/>

This section relates to evaluation question five *'To what extent is the project developing relationships for research and evaluation?'*

For the domain **'5.1 There are trusting relationships with partners and service users'** please select if the below indicator is essential or desirable in demonstrating it has been met.

	Importance of indicator	
	Desirable	Essential
Stakeholder reported reasons for not accessing or not intending to access the project services or resources	<input type="radio"/>	<input type="radio"/>

For the domain **'5.2 Networks and partnerships are established and developed'** please select if the below indicator is essential or desirable in demonstrating it has been met.

	Importance of indicator	
	Desirable	Essential
Number and type of stakeholder networking opportunities provided by the project	<input type="radio"/>	<input type="radio"/>

This section relates to evaluation question six *'To what extent is the project facilitating the creation, sharing and application of evidence?'*

For the domain **'6.1 The evidence agenda reflects local issues'** please select if the below indicator is essential or desirable in demonstrating it has been met.

	Importance of indicator	
	Desirable	Essential
The project highlights local issues at events (e.g. conference presentations or discussions at meetings)	<input type="radio"/>	<input type="radio"/>

For the domain **'6.3 Evidence is shared'** please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator	
	Desirable	Essential

	Importance of indicator	
	Desirable	Essential
Project website activity (e.g. visitors, page views, session duration)	<input type="radio"/>	<input type="radio"/>
Project Twitter activity (e.g. followers, tweets)	<input type="radio"/>	<input type="radio"/>

This section relates to evaluation question seven *'In what ways is the project contributing to the development of sustainable program planning, research, evaluation and evidence-informed decision-making practice?'*

For the domain *'7.3 There is a culture that values research and evaluation'* please select if the below indicators are essential or desirable in demonstrating it has been met.

	Importance of indicator	
	Desirable	Essential
Stakeholders request research and evaluation support at the start of a project rather than towards the end	<input type="radio"/>	<input type="radio"/>
Proportion of stakeholders reporting their organisation values research and evaluation	<input type="radio"/>	<input type="radio"/>

Block 1

This is the end of this survey. Thank you for taking the time to complete it.

Appendix S: Invitation to participate in pilot testing

Initial recruitment email

Dear *(insert name)*,

I am contacting you to ask you to provide your feedback on two questionnaires that have been developed to evaluate SiREN. *(Insert personal comment if they have participated in the study already)*. You have been asked to participate as you have accessed SiREN's research and evaluation support service in the last two years.

The development of these questionnaires forms part of my PhD which aims to understand the ways in which SiREN influences research and evaluation practices and to develop evaluation tools that can be used to assess SiREN. This research is important as it will contribute to understanding how models like SiREN can support effective public health practice.

To participate, I ask that you review two online questionnaires and answer a few questions on their usability and acceptability. This should take around fifteen minutes of your time and can all be done online.

Attached to this email is an information sheet that describes the research project in more detail. Please take the time to read this and let me know if you are happy to take part. I will then send a description and link for each questionnaire.

Curtin University Human Research Ethics Committee has approved this study (HRE2017-0090).

Kind regards,

Rochelle Tobin

Questionnaire link email

The below email was sent once stakeholders agreed to participate.

Hello *(insert name)*,

Thank you for agreeing to provide your input into how SiREN evaluates its services. The two questionnaires you will be reviewing have been developed to evaluate the program planning, research, and evaluation support provided by SiREN.

This support involves SiREN responding to a request for research, evaluation or program planning advice or guidance. SiREN also participates in community events and partners on grant applications. However, this is defined as collaboration and is not the focus of these questionnaires. There are two main types of support that SiREN provides; brief and extended support. These are evaluated using different questionnaires and are described below.

Brief support: This support usually occurs in one interaction (email exchange or face-to-face meeting) over a short period of time (a few days to a week). Examples of brief support include SiREN reviewing or providing advice on:

- how to undertake an aspect of program planning, research, or evaluation e.g., questionnaire development;
- an ethics or funding application;
- a conference abstract or presentation; or
- a health promotion resource.

When evaluating brief support we are interested in finding out if the information provided by SiREN was useful, if the person has (or intends to) apply the information to decision-making, and if it resulted in changes to confidence, knowledge or skills.

To review the brief support questionnaire use the link below. Please note, you only need to review the questions, you do not need to respond to them.

[Insert link](#)

Extended support: This support usually occurs over multiple interactions across an extended period of time (weeks or months) to address a program planning, research or evaluation issue. Examples of extended support include SiREN:

- partnering with the individual to write a manuscript for publication;
- providing ongoing support to develop or test an evaluation tool or plan;
- providing ongoing support with data collection, analysis or reporting; or
- co-developing an ethics application.

When evaluating extended support we are interested in the relationship established with SiREN and if the support resulted in any changes to program planning, research, evaluation thinking or practice.

To review the extended support questionnaire use the link below. Please note, you only need to review the questions, you do not need to respond to them.

[Insert link](#)

Once you have reviewed both the brief and extended support questionnaires, we ask that you answer a few questions on their usability and acceptability using the link below.

[Insert unique link](#)

Curtin University Human Research Ethics Committee has approved this study (HRE2017-0090).

Kind regards,
Rochelle Tobin

Appendix T: SiREN service users and partners questionnaire pilot testing

Do you agree to participate in this study? (Yes/No)

By selecting yes you agree that you:

- Have read, the information statement that was emailed to you and you understand its contents;
- Voluntarily consent to take part in this research project;
- Believe you understand the purpose, extent and possible risks of your involvement; and
- Have had an opportunity to ask questions and are satisfied with the answers you have received.

Skip To: End of Survey If Do you agree to participate in this study? By selecting yes you agree that you: - Have read, th... = No

Q1 Are the instructions on the brief and extended support questionnaires clear? (Yes/No)

Display This Question:

If Are the instructions on the brief and extended support questionnaires clear? = No

Q2 Please describe which parts of the instructions were unclear and why. (Open response format)

Q3 Are the questions in the brief and extended support questionnaires clear? (Yes/No format)

Display This Question:

If Are the questions in the brief and extended support questionnaires clear? = No

Q4 Please describe which questions were unclear and why. (Open response format)

Q5 We estimate that the brief support questionnaire will take approximately two minutes to complete. Do you think this time is acceptable? (Yes/No)

Display This Question:

If We estimate that the brief support questionnaire will take approximately two minutes to complete. Do you... = No

Q6 What do you think an acceptable time is? (Open response format)

Q7 We estimate that the extended support questionnaire will take approximately five minutes to complete. Do you think this time is acceptable? (Yes/No)

Display This Question:

If We estimate that the extended support questionnaire will take approximately five minutes to complete. Do... = No

Q8 What do you think an acceptable time is? (Open response format)

Q9 Have you requested SiREN program planning, research, or evaluation support in the last 12 months? (Open response format)

Display This Question:

If Have you requested SiREN program planning, research, or evaluation support in the last 12 months? = Yes

Q10 Thinking about the support you received, do you feel the questions asked in the questionnaires would enable you to give an accurate picture of this support and any changes that occurred as a result? (Yes/No)

Display This Question:

If Thinking about the support you received, do you feel the questions asked in the questionnaires would ena... = No

Q11 Why do you feel the questions wouldn't enable you to give an accurate picture of the support and any changes that occurred as a result? (Open response format)

Display This Question:

If Have you requested SiREN program planning, research, or evaluation support in the last 12 months? = Yes

Q12 Thinking about the support you received, do you feel any of the questionnaire questions were irrelevant to the support you received and any changes that occurred as a result? (Yes/No)

Display This Question:

If Thinking about the support you received, do you feel any of the questionnaire questions were irrelevant... = Yes

Q13 Which questions do you feel were irrelevant and why? (Open response format)

Q14 Please note any other feedback you have on the questionnaires here. (Open response format)

Q15 Would you be happy to be contacted by phone if any of your responses needed clarifying? (Yes/No)

Appendix U: Information sheets and consent form

SiREN service users and partners interviews and workshops

Examining a research and evaluation capacity building partnership



PARTICIPANT INFORMATION STATEMENT

HREC Project Number:	HRE2017-0090
Project Title:	Examining a research and evaluation capacity building partnership: A systems approach.
Principal Investigator:	Rochelle Tobin, PhD Student
Version Number:	Grp2v1
Version Date:	10th December 2016

What is the project about?

Public health challenges benefit from evidence-informed and coordinated responses, this has been demonstrated through Australia's response to HIV/AIDS where evidence-informed and collaborative strategies were used, resulting in far fewer new infections and deaths when compared to other countries. Despite the successes attributed to this response, similar inroads have not been made across all sexual health and blood borne virus issues. To effectively respond to sexual health and blood-borne viruses, the sector needs to be supported to undertake and utilise evaluation and research. This can lead to more successful programs and policies; efficient use of resources; increased generation and access to quality information on what works; and improved population health outcomes.

This study aims to understand the ways in which SiREN influences research and evaluation practices and to develop an evaluation framework and evaluation tools that can be used to assess the impacts and outcomes of SiREN. This research is important as it will contribute to understanding how models like SiREN can support effective public health policy and practice.

Who is doing the research?

The results of this project will be used by Rochelle Tobin to obtain a Doctor of Philosophy at Curtin University and is funded by a Curtin Research Scholarship and a Research Training Program Stipend Scholarship.

Why am I being asked to take part and what will I have to do?

You have been asked to take part in this study because you have engaged with SiREN in the last 24 months. To take part in this study we ask that you participate in an interview that should take no more than one hour of your time. In this interview we will discuss your use of evaluation and research and your involvement with SiREN. Following this, you will be invited to participate in a workshop to refine a diagram illustrating the influence of SiREN.

Are there any benefits' to participating in the research project?

We hope the results of this research will enable SiREN to better meet the needs of people like you. You will not be paid for participating in this project. To thank you for your contribution to this study we can offer to work with your organisation where appropriate to determine its research and evaluation capacity and create an action plan to enhance research and evaluation practices.

Are there any risks, side-effects, discomforts or inconveniences from being in the research project?

There will be no costs to you apart from giving up your time. We do not expect that there will be any risks or inconveniences associated with taking part in this study.

Who will have access to my information?

The information collected in this research will be re-identifiable (coded). This means that we will remove identifying information on any data and replace it with a code. Only the research team have access to the code to match your name if it is necessary to do so. Any information we collect will be treated as confidential and used only in this project unless otherwise specified. The following people will have access

to the information we collect in this research: the research team and, in the event of an audit or investigation, staff from the Curtin University Office of Research and Development.

Electronic data will be password-protected and hard copy data will be in locked storage. The information we collect in this project will be kept under secure conditions at Curtin University for 7 years after the research has ended and then it will be destroyed. The results of this research will be presented at conferences, published in professional journals and made available on the SiREN website. You will not be identified in any results that are published or presented.

All care will be taken to maintain privacy and confidentiality of any information shared in the workshop. Study participants will sign a consent form agreeing not to repeat information discussed in the workshop.

Do I have to take part in the research project?

Taking part in this research project is voluntary. It is your choice to take part or not. You do not have to agree if you do not want to. If you decide to take part and then change your mind, that is okay, you can withdraw from the project. You do not have to give us a reason; just tell us that you want to stop. Please let us know you want to stop so we can make sure you are aware of any thing that needs to be done so you can withdraw safely. If you choose not to take part or start and then stop the study, it will not affect your relationship with SiREN or Curtin University. If you choose to leave the study we will use any information collected unless you tell us not to.

What happens next and who can I contact about the research?

If you have any questions about this research you can contact Rochelle Tobin on 0412 881 594 or rochelle.tobin@curtin.edu.au.

If you decide to take part in this research we will ask you to sign the consent form. By signing it is telling us that you have read and understood this information sheet and what has been discussed. Signing the consent indicates that you agree to be in the research project and have your information used as described. Please take your time and ask any questions you have before you decide what to do. You will be given a copy of this information and the consent form to keep.

Ethics

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number HRE2017-0090). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au.

SiREN management team workshops and meetings

Examining a research and evaluation capacity building partnership



PARTICIPANT INFORMATION STATEMENT

HREC Project Number:	HRE2017-0090
Project Title:	Examining a research and evaluation capacity building partnership: A systems approach
Principal Investigator:	Rochelle Tobin, PhD Student
Version Number:	Grp3V1
Version Date:	23 rd March 2018

What is the project about?

Public health challenges benefit from evidence-informed and coordinated responses, this has been demonstrated through Australia's response to HIV/AIDS where evidence-informed and collaborative strategies were used, resulting in far fewer new infections and deaths when compared to other countries. Despite the successes attributed to this response, similar inroads have not been made across all sexual health and blood borne virus issues. To effectively respond to sexual health and blood-borne viruses, the sector needs to be supported to undertake and utilise evaluation and research. This can lead to more successful programs and policies; efficient use of resources; increased generation and access to quality information on what works; and improved population health outcomes.

This study aims to understand the ways in which SiREN influences research and evaluation practices within the WA sexual health and blood-borne virus sector and to develop an evaluation framework and evaluation tools that can be used to determine the impacts and outcomes of SiREN. This research is important as it will contribute to understanding how models like SiREN can support effective public health policy and practice.

Who is doing the research?

The results of this project will be used by Rochelle Tobin to obtain a Doctor of Philosophy at Curtin University and is funded by a Curtin Research Scholarship and a Research Training Program Stipend Scholarship.

Why am I being asked to take part and what will I have to do?

You have been asked to take part in this study because you are a member of the SiREN management team. To take part in this study, we ask that you participate a series of workshops and meetings that will cover your perspectives of SiREN and how it contributes towards building research and evaluation capacity.

Are there any benefits' to participating in the research project?

We hope the results of this research will enable SiREN to better meet the needs of the sector and contribute to the understanding how models like SiREN can support effective public health policy and practice.

Are there any risks, side-effects, discomforts or inconveniences from being in the research project?

Apart from giving up your time, we do not expect that there will be any risks or inconveniences associated with taking part in this study.

Who will have access to my information?

The information collected in this research will be anonymous. This means that we do not need to collect individual names. No one, not even the research team will be able to identify your information. Any information we collect and use during this research will be treated as confidential. The following people will have access to the information we collect in this research: the research team and, in the event of an audit or investigation, staff from the Curtin University Office of Research and Development.

Electronic data will be password-protected and hard copy data will be in locked storage. The information we collect in this project will be kept under secure conditions at Curtin University for 7 years after the research has ended and then it will be destroyed. The results of this research will be presented at conferences, published in professional journals and made available on the SiREN website.

Do I have to take part in the research project?

Taking part in this research project is voluntary. It is your choice to take part or not. You do not have to agree if you do not want to. If you decide to take part and then change your mind, that is okay, you can withdraw from the project. You do not have to give us a reason; just tell us that you want to stop. Please let us know you want to stop so we can make sure you are aware of any thing that needs to be done so you can withdraw safely. If you choose not to take part or start and then stop the study, it will not affect your relationship with SiREN or Curtin University. If you chose to leave the study we will be unable to destroy your information because it has been collected in an anonymous way.

What happens next and who can I contact about the research?

If you have any questions about this research you can contact Rochelle Tobin on 0412 881 594 or rochelle.tobin@curtin.edu.au.

If you decide to take part in this research we will ask you to sign the consent form. By signing it is telling us that you have read and understood this information statement and what has been discussed. Signing the consent indicates that you agree to be in the research project and have your information used as described. Please take your time and ask any questions you have before you decide what to do. You will be given a copy of this information and the consent form to keep.

Ethics

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number HRE2017-0090). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au.

SiREN staff interviews and workshop

Examining a research and evaluation capacity building partnership



PARTICIPANT INFORMATION STATEMENT

HREC Project Number:	HRE2017-0090
Project Title:	Examining a research and evaluation capacity building partnership: A systems approach
Supervisor:	Dr Jonathan Hallett
Student Investigator:	Rochelle Tobin, PhD Student
Version Number:	Grp4v1
Version Date:	4 th April 2020

What is the project about?

Public health challenges benefit from evidence-informed and coordinated responses, this has been demonstrated through Australia's response to HIV/AIDS where evidence-informed and collaborative strategies were used, resulting in far fewer new infections and deaths when compared to other countries. Despite the successes attributed to this response, similar inroads have not been made across all sexual health and blood borne virus issues. To effectively respond to sexual health and blood-borne viruses, the sector needs to be supported to undertake and utilise evaluation and research. This can lead to more successful programs and policies; efficient use of resources; increased generation and access to quality information on what works; and improved population health outcomes.

This study aims to understand the ways in which SiREN influences research and evaluation practices and to develop an evaluation framework and evaluation tools that can be used to assess the impacts and outcomes of SiREN. This research is important as it will contribute to understanding how models like SiREN can support effective public health policy and practice.

Who is doing the research?

The results of this project will be used by Rochelle Tobin to obtain a Doctor of Philosophy at Curtin University and is funded by a Curtin Research Scholarship and a Research Training Program Stipend Scholarship.

Why am I being asked to take part and what will I have to do?

You have been asked to take part in this study because you are a current or previous SiREN staff member. To take part in this study we ask that you participate in an interview that should take no more than one hour of your time. In this interview we will discuss your perceptions of SiREN and experiences working within SiREN. Following this, you will be asked to participate in a two hour workshop to review a diagram illustrating the operation of SiREN.

Are there any benefits' to participating in the research project?

We hope the results of this research will enable SiREN to better meet the needs of those working to address sexual health and blood-borne virus issues. You will not be paid for participating in this project, however, to thank you for your contribution to this study you will be provided with a \$10 gift voucher.

Are there any risks, side-effects, discomforts or inconveniences from being in the research project?

There will be no costs to you apart from giving up your time. We do not expect that there will be any risks or inconveniences associated with taking part in this study.

Who will have access to my information?

The information collected in this research will be re-identifiable (coded). This means that we will remove identifying information on any data and replace it with a code. Only the student researcher will have access to the code to match your name if it is necessary to do so. Any information we collect will be treated as confidential and used only in this project unless otherwise specified. The following people will have access

to the information we collect in this research: the research team and, in the event of an audit or investigation, staff from the Curtin University Office of Research and Development.

Electronic data will be password-protected and hard copy data will be in locked storage. The information we collect in this project will be kept under secure conditions at Curtin University for 7 years after the research has ended and then it will be destroyed. The results of this research will be presented at conferences, published in professional journals and made available on the SiREN website. You will not be identified in any results that are published or presented.

Do I have to take part in the research project?

Taking part in this research project is voluntary. It is your choice to take part or not. You do not have to agree if you do not want to. If you decide to take part and then change your mind, that is okay, you can withdraw from the project. You do not have to give us a reason; just tell us that you want to stop. Please let us know you want to stop so we can make sure you are aware of any thing that needs to be done so you can withdraw safely. If you choose not to take part or start and then stop the study, it will not affect your relationship with SiREN or Curtin University. If you choose to leave the study we will use any information collected unless you tell us not to.

What happens next and who can I contact about the research?

If you have any questions about this research you can contact Rochelle Tobin on rochelle.tobin@curtin.edu.au or Dr Jonathan Hallett j.hallett@exchange.curtin.edu.au.

If you decide to take part in this research we will ask you to sign the consent form. By signing it is telling us that you have read and understood this information sheet and what has been discussed. Signing the consent indicates that you agree to be in the research project and have your information used as described. Please take your time and ask any questions you have before you decide what to do. You will be given a copy of this information and the consent form to keep.

Ethics

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number HRE2017-0090). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au.

PARTICIPANT INFORMATION STATEMENT

HREC Project Number:	HRE2017-0090
Project Title:	Examining a research and evaluation capacity building partnership: A systems approach
Principal Investigator:	Rochelle Tobin, PhD Student
Version Number:	Framework 1
Version Date:	21 st November 2020

What is the project about?

Public health challenges benefit from evidence-informed and coordinated responses. This has been demonstrated through Australia's response to HIV/AIDS where evidence-informed and collaborative strategies were used, resulting in far fewer new infections and deaths when compared to other countries. Despite the successes attributed to this response, similar inroads have not been made across all sexual health and blood borne virus (SHBBV) issues. Individuals and organisations working to address SHBBV issues need to be supported to undertake and utilise the findings of SHBBV programs/policy and engage in evaluation and research. This can lead to more successful programs and policies; efficient use of resources; increased generation and access to quality information on what works; and improved population health outcomes.

This study aims to understand the processes, impacts and outcomes of SiREN and to develop an evaluation framework and evaluation tools that can be used to assess the processes, impacts and outcomes of SiREN. This research is important as it will contribute to understanding how partnership models like SiREN can support effective public health policy and practice.

Who is doing the research?

The results of this project will be used by Rochelle Tobin to obtain a Doctor of Philosophy at Curtin University and who is funded by a Curtin Research Scholarship and a Research Training Program Stipend Scholarship.

Why am I being asked to take part and what will I have to do?

You have been asked to participate as you are a member of the SiREN management team and will be involved in the implementation of the framework. To participate, you are required review the evaluation framework and complete an online survey. The survey questions will focus on the ability of the framework to support the evaluation of SiREN and the importance of individual framework indicators in demonstrating that project aims have been met. Reviewing the framework and completing the survey should take about one hour of your time.

Part of the purpose of the survey is to develop consensus amongst members of the management team on what evaluation indicators are most important. Therefore, there may be a follow up survey to establish agreement on some framework indicators.

Are there any benefits to participating in the research project?

Your feedback will ensure the framework is practical and relevant to SiREN's needs. The results of this research are expected to provide valuable insight into the functioning of SiREN which will be used to support the ongoing monitoring and evaluation of SiREN.

Are there any risks, side-effects, discomforts or inconveniences from being in the research project?

There will be no costs to you apart from giving up your time. No risks or inconveniences associated with taking part in this study are anticipated.

Who will have access to my information?

The information collected in this research will be re-identifiable (coded). This means that any identifying information will be removed and replaced with a code. Only the PhD student will have access to the code to match your name if it is necessary to do so. Any information collected will be treated as confidential and used only in this project unless otherwise specified. The following people will have access to the information we collect in this research: the Principle Investigator and, in the event of an audit or investigation, staff from the Curtin University Office of Research and Development.

Electronic data will be password-protected and hard copy data will be in locked storage. The information we collect in this project will be kept under secure conditions at Curtin University for 7 years after the research has ended and then it will be destroyed. The results of this research will be presented at conferences, published in professional journals and made available on the SiREN website. You will not be identified in any results that are published or presented.

Do I have to take part in the research project?

Taking part in this research project is voluntary. It is your choice to take part or not. If you decide to take part and then change your mind, that is okay, you can withdraw from the project. You do not have to give a reason. If you choose not to take part or start and then stop the study, it will not affect your relationship with SiREN or Curtin University. If you choose to leave the study any information collected will continue to be used unless you ask otherwise.

What happens next and who can I contact about the research?

If you have any questions about this research you can contact Rochelle Tobin rochelle.tobin@curtin.edu.au.

If you decide to take part in this research you will be asked to provide informed consent. By providing consent it shows you have read and understood this information sheet and what has been discussed. Signing the consent indicates that you agree to be in the research project and have your information used as described. Please take your time and ask any questions you have before you decide what to do. You will be given a copy of this information and the consent form to keep.

Ethics

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number HRE2017-0090). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au.

PARTICIPANT INFORMATION STATEMENT

HREC Project Number:	HRE2017-0090
Project Title:	Examining a research and evaluation capacity building partnership: A systems approach
Principal Investigator:	Rochelle Tobin, PhD Student
Version Number:	1
Version Date:	27th August 2018

What is the project about?

Public health challenges benefit from evidence-informed and coordinated responses, this has been demonstrated through Australia's response to HIV/AIDS where evidence-informed and collaborative strategies were used, resulting in far fewer new infections and deaths when compared to other countries. Despite the successes attributed to this response, similar inroads have not been made across all sexual health and blood borne virus issues. To effectively respond to sexual health and blood-borne viruses, the sector needs to be supported to undertake and utilise evaluation and research. This can lead to more successful programs and policies; efficient use of resources; increased generation and access to quality information on what works; and improved population health outcomes.

This study aims to understand the ways in which SiREN influences research and evaluation practices and to develop an evaluation framework and evaluation tools that can be used to assess the impacts and outcomes of SiREN. This research is important as it will contribute to understanding how models like SiREN can support effective public health policy and practice.

Who is doing the research?

The results of this project will be used by Rochelle Tobin to obtain a Doctor of Philosophy at Curtin University and is funded by a Curtin Research Scholarship and a Research Training Program Stipend Scholarship.

Why am I being asked to take part and what will I have to do?

You have been asked to take part in this study because you have used SiREN's research or evaluation support services or are a member of the SiREN Project Steering Group. To take part in this study we ask that you review two surveys that have been developed to evaluate SiREN and provide your feedback on their usability. This can all be done online and should take approximately 15 minutes of your time.

Are there any benefits' to participating in the research project?

We hope the results of this research will enable SiREN to better meet the needs of people like you. You will not be paid for participating in this project, however, to thank you for your contribution to this study you will be provided with a \$10 gift voucher.

Are there any risks, side-effects, discomforts or inconveniences from being in the research project?

There will be no costs to you apart from giving up your time. We do not expect that there will be any risks or inconveniences associated with taking part in this study.

Who will have access to my information?

The information collected in this research will be re-identifiable (coded). This means that we will remove identifying information on any data and replace it with a code. Only the research team have access to the code to match your name if it is necessary to do so. Any information we collect will be treated as confidential and used only in this project unless otherwise specified. The following people will have access to the information we collect in this research: the research team and, in the event of an audit or investigation, staff from the Curtin University Office of Research and Development.

Electronic data will be password-protected and hard copy data will be in locked storage. The information we collect in this project will be kept under secure conditions at Curtin University for 7 years after the research has ended and then it will be destroyed. The results of this research will be presented at conferences, published in professional journals and made available on the SiREN website. You will not be identified in any results that are published or presented.

Do I have to take part in the research project?

Taking part in this research project is voluntary. It is your choice to take part or not. You do not have to agree if you do not want to. If you decide to take part and then change your mind, that is okay, you can withdraw from the project. You do not have to give us a reason; just tell us that you want to stop. Please let us know you want to stop so we can make sure you are aware of anything that needs to be done so you can withdraw safely. If you choose not to take part or start and then stop the study, it will not affect your relationship with SiREN or Curtin University. If you choose to leave the study we will use any information collected unless you tell us not to.

What happens next and who can I contact about the research?

If you have any questions about this research you can contact Rochelle Tobin on 0412 881 594 or rochelle.tobin@curtin.edu.au.

If you decide to take part in this research we will ask you to sign the consent form. By signing it is telling us that you have read and understood this information sheet and what has been discussed. Signing the consent indicates that you agree to be in the research project and have your information used as described. Please take your time and ask any questions you have before you decide what to do. You will be given a copy of this information and the consent form to keep.

Ethics

Curtin University Human Research Ethics Committee (HREC) has approved this study (HREC number HRE2017-0090). Should you wish to discuss the study with someone not directly involved, in particular, any matters concerning the conduct of the study or your rights as a participant, or you wish to make a confidential complaint, you may contact the Ethics Officer on (08) 9266 9223 or the Manager, Research Integrity on (08) 9266 7093 or email hrec@curtin.edu.au.

Consent form



CONSENT FORM

HREC Project Number:	HRE2017-0090
Project Title:	Examining a research and evaluation capacity building partnership: A systems approach.
Principal Investigator:	Rochelle Tobin, PhD Student
Version Number:	V1
Version Date:	10 th December 2016

- I have read, the information statement version listed above and I understand its contents.
- I believe I understand the purpose, extent and possible risks of my involvement in this project.
- I agree to maintain confidentiality of all information discussed during this project.
- I voluntarily consent to take part in this research project.
- I have had an opportunity to ask questions and I am satisfied with the answers I have received.
- I understand that this project has been approved by Curtin University Human Research Ethics Committee and will be carried out in line with the National Statement on Ethical Conduct in Human Research (2007).
- I understand I will receive a copy of this Information Statement and Consent Form.

Participant Name	
Participant Signature	
Date	

Declaration by researcher: I have supplied an Information Letter and Consent Form to the participant who has signed above, and believe that they understand the purpose, extent and possible risks of their involvement in this project.

Researcher Name	Rochelle Tobin
Researcher Signature	
Date	

Appendix V: Ethics approval



Office of Research and Development

GPO Box U1987
Perth Western Australia 6845

Telephone +61 8 9266 7863
Facsimile +61 8 9266 3793
Web research.curtin.edu.au

08-Mar-2017

Name: Jonathan Hallett
Department/School: Department of Health Promotion and Sexology
Email: J.Hallett@exchange.curtin.edu.au

Dear Jonathan Hallett

RE: Ethics approval
Approval number: HRE2017-0090

Thank you for submitting your application to the Human Research Ethics Office for the project **The influence of a network on public health policy and practice: A systems approach to developing an evaluation framework and tool**.

Your application was reviewed through the Curtin University low risk ethics review process.

The review outcome is: **Approved**.

Your proposal meets the requirements described in National Health and Medical Research Council's (NHMRC) *National Statement on Ethical Conduct in Human Research (2007)*.

Approval is granted for a period of one year from **08-Mar-2017** to **07-Mar-2018**. Continuation of approval will be granted on an annual basis following submission of an annual report.

Personnel authorised to work on this project:

Name	Role
Hallett, Jonathan	CI
Lobo, Rosanna	Co-Inv
Marycock, Bruce	Co-Inv
Tobin, Rochelle	Student

Standard conditions of approval

1. Research must be conducted according to the approved proposal
2. Report in a timely manner anything that might warrant review of ethical approval of the project including:
 - proposed changes to the approved proposal or conduct of the study

- unanticipated problems that might affect continued ethical acceptability of the project
 - major deviations from the approved proposal and/or regulatory guidelines
 - serious adverse events
3. Amendments to the proposal must be approved by the Human Research Ethics Office before they are implemented (except where an amendment is undertaken to eliminate an immediate risk to participants)
 4. An annual progress report must be submitted to the Human Research Ethics Office on or before the anniversary of approval and a completion report submitted on completion of the project
 5. Personnel working on this project must be adequately qualified by education, training and experience for their role, or supervised
 6. Personnel must disclose any actual or potential conflicts of interest, including any financial or other interest or affiliation, that bears on this project
 7. Changes to personnel working on this project must be reported to the Human Research Ethics Office
 8. Data and primary materials must be retained and stored in accordance with the [Western Australian University Sector Disposal Authority \(WAUDDA\)](#) and the [Curtin University Research Data and Primary Materials policy](#)
 9. Where practicable, results of the research should be made available to the research participants in a timely and clear manner
 10. Unless prohibited by contractual obligations, results of the research should be disseminated in a manner that will allow public scrutiny; the Human Research Ethics Office must be informed of any constraints on publication
 11. Ethics approval is dependant upon ongoing compliance of the research with the [Australian Code for the Responsible Conduct of Research](#), the [National Statement on Ethical Conduct in Human Research](#), applicable legal requirements, and with Curtin University policies, procedures and governance requirements
 12. The Human Research Ethics Office may conduct audits on a portion of approved projects.

Special Conditions of Approval

None.

This letter constitutes ethical approval only. This project may not proceed until you have met all of the Curtin University research governance requirements.

Should you have any queries regarding consideration of your project, please contact the Ethics Support Officer for your faculty at the Ethics Office at ethics@curtin.edu.au or on 9266 2794.

Yours sincerely



Dr Catherine Gungall
Manager, Research Integrity

Appendix W: Description of CLD variables

This was the Supplementary File 2 for Publication 2

1. **Tobin, R.,** Crawford, G., Hallett, J., Maycock, B., Lobo, R. (2022). Critical factors that affect the functioning of a research and evaluation capacity building partnership: A causal loop diagram. PLoS ONE 17(1): e0262125. [doi:10.1371/journal.pone.0262125](https://doi.org/10.1371/journal.pone.0262125) (Impact factor: 3.04)

Table 1. Description of CLD variables.

Variable	Description
Ability to access new funding sources	How able SiREN is to identify, apply for, and be awarded new sources of funding.
Ability to recruit experienced staff	SiREN aims to recruit staff with the highest level of experience relevant to the role.
Access to additional human resources	SiREN has a core team of staff with access to additional human resources as required. This includes new contract staff, and University research students, and volunteers.
Access to University resources	Being situated within a University enables SiREN to access University resources including office space, ethics review facilities, students, volunteers, support for the management team to use some of their research allocation to support SiREN's activities, and funding for higher degree by research students.
Adaptability	How SiREN learns from the system and adjusts its processes and activities to respond (e.g., changes in epidemiology).
Alignment between SiREN and personal career goals	The degree to which the activities and aims of SiREN align with the career interests and goals of management team members.
Alignment with funders needs	How well SiREN meets the expectations of stakeholders that provide financial support (e.g., The University). SiREN has a history of meeting stakeholder expectations. This includes funding conditions which results in successful negotiation for continued funding.
Alignment with the University's strategic plan	Aligning SiREN with the University's strategic plan ensures a connection between SiREN's activities and the University achieving its aims.

Variable	Description
Association with credible others	SiREN has relationships with credible others including high profile researchers, which builds credibility by association (Lasker et al., 2001).
Association with the University	Being based within the University gives SiREN source credibility (Hovland & Weiss, 1951)
Attractiveness of employment terms	Due to limited funding, SiREN usually employs staff on part-time, fixed term basis. This results in a reduction in the attractiveness of advertised positions to more experienced candidates.
Belief in the ability of SiREN to create change	The team believe in the ability of SiREN to indirectly improve health outcomes for people affected by sexual health and blood-borne virus issues.
Boundary-spanning skills	How the SiREN team demonstrate an understanding of different ways of working, position themselves as approachable, develop relationships and facilitate learning across diverse groups.
Capability	The extent to which SiREN can undertake its activities and achieve its aims.
Capacity building	SiREN's activities that aim to build the research, evaluation, and evidence-informed practice of those working in the system.
Commitment to a flexible approach	SiREN is flexible in the kinds of activities it undertakes to achieve its aims. Demonstrated by the team continually seeking to improve its structure and activities. The team are curious about new ways of working and are confident to try new approaches and work in different areas.
Community-minded team	The team is motivated to increase research and evaluation capacity within the system. The community-mindedness of the team can be traced back to their personal values, a history of working in stakeholder organisations and a commitment to health promotion values.
Conditions of funding agreements are exceeded	On occasion, SiREN has exceeded expected outcomes from a funding agreement. While this demonstrates SiREN's capability, it is not sustainable as it can deplete limited staff resources.
Cooperation between management team members	The team trust in, and understand how to complement, each other's efforts and abilities. When engaging in dialogue they actively listen and build on each other's ideas.
Credibility	The extent to which SiREN is a trusted and believable source of knowledge.
Educational attainment of team	The level of education acquired by the team.

Variable	Description
Expertise of team	The SiREN team have a high level of knowledge and skills across a diverse range of fields (e.g., research, evaluation) as well as subject areas.
In-kind time provided by management team	The time that the management team spend on SiREN can form part of their research allocation provided by the University, they may volunteer their time, or a combination of both.
Insider knowledge	The team have experience working with and within stakeholder organisations. From this, they have established relationships with stakeholders and an understanding of 'how things get done.'
Insufficient funding	Inadequate financial resources to support SiREN's activities and ability to achieve its aims.
Key person reliant	The SiREN manager is relied on to maintain stakeholder relationships and oversee SiREN activities. Shared leadership and the in-kind time of the management team can be used to reduce this reliance through sharing the supervision of SiREN activities.
Knowledge of the system	SiREN informed is of the system and changes that are occurring within it e.g., changes to epidemiology, evidence needs, evaluation support needs. This knowledge needs to be shared between team members to enable action to be taken.
Learning culture	The dynamic culture (norms, values and assumptions) of the team that directs its learning. Within SiREN, staff continuously seek opportunities to learn and apply new skills.
Like-minded team	Most members of the team have a shared history of working in stakeholder organisations and the University which has contributed to similarities in how they think.
Longevity of SiREN	SiREN has been funded for eight years. This longevity increases the credibility of SiREN.
Meeting stakeholder expectations	SiREN has the qualities stakeholders had anticipated or hoped for. This includes meeting informal expectations e.g., responding to a request for support as well as formal expectations e.g., meeting funding agreement terms.
Mentoring	The process where the team share their knowledge, skills, and experiences with less experienced staff, students and volunteers.

Variable	Description
Need for management team support	As the expertise of the team grows there is less need for the in-kind time of the management team.
New funding awarded	New financial resources are obtained e.g., research grants.
Participation in professional development events	Opportunities to participate in knowledge and skill building events. While mentoring, sponsorship and postgraduate supervision are forms of professional development they are separate variables to illustrate the different effect they have on the functioning of SiREN.
Personal connection to HIV epidemic	The management team lived and worked through the HIV epidemic where they saw people they cared about infected and affected by HIV. This experience extended beyond HIV to other sexual health and blood borne virus issues and to marginalised groups. This motivated them to contribute to improving health outcomes within these communities.
Quality communication	Communications (e.g., emails, publications, presentations) that are timely, consistent, accurate, and informative build credibility.
Rapport and respect between management team	Rapport and respect between management team members increases their willingness to give their time.
Research impact and quality	Research impact is about the effect research has on practice or policy and its use to inform further research (National Health and Medical Research Council, 2020). This is often assessed through journal ranking and article citations. To the team, quality research is co-created, respectful, and shared widely.
Researcher profile	Encompasses the research profiles of individuals and the team. Research profile is established through research achievements such as grants, partnerships, publications, and awards.
Shared leadership	Developing the vision and activities of SiREN is shared with a steering group and management team. Sharing leadership supports inclusive and transparent decision-making.
Shared values	Formed through personal and professional experience predating the inception of SiREN. Shared values are implicit, but without them the cooperative nature of the team would be compromised. They guide the actions of the team.

Variable	Description
Shared vision	Shared vision is what SiREN needs to accomplish and was shaped by the main funder and stakeholders. Its presence unites the team and stakeholders and supports functioning.
Sponsorship	Some management team members sponsor less experienced team members. This process involves advocating and promoting career advancement opportunities for them.
Staff changes	Staff leaving and new staff commencing.
Staffing efficiencies	Efficiency relates to appropriate levels and utilisation of staff for SiREN to meet its aims.
Stakeholder knowledge networks	Stakeholders act as receptors, feeding knowledge about the system (e.g., changes in epidemiology) back to SiREN team which can be used to inform adaptation. These can be formal structures e.g., the steering group or informal e.g., relationships with stakeholders. Stakeholders need to want to share information with the SiREN team, which requires the presence of trusting relationships.
Stakeholder partnerships	Partnerships require SiREN and its stakeholders to combine their knowledge, skills, or resources to achieve a shared aim. An example is research co-creation.
Supervision of postgraduate students	The supervision of postgraduate students is predominately undertaken by the SiREN manager and the management team. Supervision speaks to maturity of SiREN as there must be capacity within the team to commit time and expertise to guiding the student through to completion.
Support available for team	Support comes from the shared leadership structure, specifically the steering group and the management team. These groups give their time in-kind to provide their insight, act as a sounding board, and validate ideas.
Support from main funder	The main funder has maintained a clear vision of what it wants SiREN to achieve and supported a flexible approach to how it gets there. It has provided time and support to build relationships. It also encourages stakeholders to seek support from, or partner with, SiREN.
Sustainability and growth	The ability of SiREN to acquire and utilise resources to maintain and grow its activities and achieve its aims. Resources include financial, human resources and partnerships.

Variable	Description
Time away from system	Most management team members have worked with and within stakeholder organisations. For some, this was over a decade ago, and the relevance of their insider knowledge gained has diminished.
Time spent meeting University requirements	Working within the University requires SiREN to adhere to its policies and processes e.g., contracts, ethics. This uses up time that could be used on other activities such as building partnerships or pursuing new grant opportunities.
Time spent supervising staff	Supervision of staff is predominately undertaken by the SiREN manager and the management team.
Time taken to recruit and train staff	New staff need support with navigating University processes, building an understanding of stakeholder organisations, and developing the knowledge and skills required for their role. This is a time intensive process.
Time to generate and develop ideas	The team are often busy 'doing' rather than taking the time to identify and develop alternative ways of working. When this occurs it can have a negative impact on adaptation.
University recognition	How the University acknowledges the work of SiREN and its contribution to the University aims. The contribution made by SiREN to the University's aims is limited by its small size making recognition difficult to achieve.
Unknown cost of SiREN	The in-kind time provided by the management team is not properly accounted for which means that the real cost of SiREN is not known.
Visibility of SiREN	SiREN regularly hosts and presents at events (e.g., conferences, seminars). This helps build credibility and demonstrate capability. SiREN hosts a biennial symposium which is attended by high profile researchers from the east coast. This visibility increases SiREN's credibility.
Willingness of management team to contribute	The willingness of the management team to contribute their time in-kind is influenced by the dynamics between team members, motivation to improve health outcomes in communities affected by sexual health and blood-borne virus issues, a belief in SiREN's ability to create change and the alignment between SiREN and their personal career goals.
Willingness of stakeholders to engage	How willing stakeholders are to partner with, or request support from, SiREN.

Variable	Description
Workload pressure	Occurs when time allocated for research in workloads is reduced, during busy times of semester (e.g., marking student assignments), or from pressure from other areas of role.

Appendix X: Example search strategy

Search	Terms
Search one	<p>In abstract: (communit* OR organi*ation OR service*) AND (partner*collaborat* OR alliance) AND (Reliab* OR valid* OR assess* OR “internal consistency” OR “factor structure”) AND (trust OR communication OR expectations OR useful* OR satisfaction OR “evidence*based practice” OR “evidence*informed practice” OR “evidence*informed decision making” OR “research skills” OR “research knowledge” OR “research attitudes” OR “research capacity” OR “evaluation skills” OR “evaluation knowledge” OR “evaluation attitudes” OR “evaluation capacity” OR “knowledge translation” OR “knowledge mobili*ation”). In title: (evaluat* OR measur* OR tool* OR instrument* OR questionnaire* OR survey* OR scale* OR assessment)</p> <p>Limitations: Peer reviewed, English</p>
Search two	<p>In title: (evaluat* OR measur* OR tool* OR instrument* OR questionnaire* OR survey* OR scale* OR assessment) AND (“evidence*based practice” OR “evidence*informed practice” OR “evidence*informed decision making” OR “research capacity” or “evaluation capacity”)</p> <p>Limitations: Peer reviewed, English</p>

Appendix Y: RECB-Q and instructions

Questionnaire instructions

What is the purpose of this questionnaire?

This questionnaire assesses the processes and outcomes of the program planning, evaluation and research support provided by SiREN from the perspective of service users.

Who should complete this questionnaire?

Individuals (service providers, policymakers) or organisations who have received support that has involved two-way knowledge exchange (between SiREN and the individual) over multiple interactions across an extended period of time (weeks or months) to address a program planning, research or evaluation issue. If support has been provided to a team or entire organisation then this tool should be administered to all individuals that SiREN directly supported, alternatively a representative could collate evidence for the team.

Examples of support include:

- partnering to write a manuscript for publication;
- providing support to develop a program plan;
- providing support to develop or test an evaluation tool or plan;
- providing support with data collection;
- providing support with data analysis;
- providing support with reporting;
- partnering to develop a funding application;
- co-developing an ethics application.

What is needed prior to completing this questionnaire

A list of all the support SiREN has provided in the past activity reporting period.

When should this questionnaire be completed

This questionnaire should be emailed once the request for support has been completed.

The RECB-Q

1. Did the support provided by SiREN change your... (Multiple choice response options: increase, decrease, no change, not relevant to the support I received.)

- Level of confidence in undertaking program planning, research, or evaluation?
- Program planning, research, or evaluation knowledge or skills?
- Level of receptiveness to new research or evaluation opportunities?
- Ability to apply research or evaluation evidence to your work?
- Confidence in sharing your work at conferences or forums?
- Understanding of how your program fits or contributes to the broader response to sexual health and blood-borne virus issues?

2. Did the support provided by SiREN lead to... (Multiple choice response options: agree, disagree, not relevant to the support I received.)

- The development of new, or the improvement of existing, research or evaluation methods?
- The development of professional networks for practice, research, or evaluation?
- Improvements in your organisation's program planning, evaluation, or research related processes, policies, or practices?
- Changes in the activities, services, or programs provided by your organisation?
- Outcomes that you, or your organisation, could not have achieved otherwise?

3. Based on the support you received from SiREN, please rate the following statements.

(Multiple choice response options: always; often; sometimes; rarely; never)

- The support I received from SiREN met my expectations.
- The information I received from SiREN was relevant to my work.
- SiREN can be relied on to do what they say they will do.
- SiREN and I worked together to effectively problem-solve and overcome difficulties.

4. If there were any other changes you experienced as a result of the support you received from SiREN, please describe them here. (Open text box response format)

5. Consider one change that occurred as result of the support provided by SiREN that you feel was most important to your thinking or practice.

- What was this change? (Open text box response format)
- How did the support provided by SiREN contribute to this change? (Open text box response format)
- Why was this change important to your work? (Open text box response format)
- What other factors contributed to this change? (E.g., support provided by your organisation, funders or program partners.) (Open text box response format)

6. Are there supporting documents (e.g., evaluation tools, reports, program plans) that you would like to share that demonstrate the changes you described above? (Yes/No, if yes an option to upload documents is provided)

7. Reflecting on the support provided by SiREN, is there anything you would have liked to have been different? (Open text box response format)

8. Please write any other comments on the support you received from SiREN below.
(Open text box response format)

9. SiREN may wish to contact you via phone to briefly discuss the feedback you have provided. Are you happy to be contacted? (Yes/No)

Appendix Z: Questionnaire implementation processes

This document provides guidance on the processes for evaluating the program planning, research and evaluation support provided by SiREN to service providers and policymakers working to address sexual health and blood-borne virus issues in WA.

Support record keeping processes

Details of support (contact name, type of support, duration etc.) are recorded in the 'stakeholder support record' spreadsheet as soon as the request for support is received and regularly updated to reflect progress. To ensure this spreadsheet is updated frequently there is a reoccurring agenda item at the SiREN team meeting. The SiREN team member responsible for evaluation records when the evaluation questionnaire is sent and when it is completed in this spreadsheet.

Differentiating between different types of support

SiREN provides brief and extended program planning, research and evaluation support to service providers and policymakers working to address sexual health and blood-borne virus issues. Brief support and extended support are evaluated with different questionnaires. To determine which questionnaire to use, review the descriptions and the decision tree below.

Please note, participating in a community event or presenting at a forum is not support, this is classed as engagement. Support involves a request for research, evaluation or program planning advice.

Brief/Transactional support: The knowledge exchanged in this kind of support is generally one-directional (from SiREN to the individual/s) and occurs in one or two interactions (email exchange or face-to-face meeting) over a short period of time (a few days to a week).

Examples of brief support include SiREN reviewing or providing advice on:

- an evaluation tool or program plan;
- how to undertake an aspect of program planning, research, or evaluation e.g., survey development;
- a funding application;

- an ethics application;
- a manuscript for publication;
- a conference abstract or presentation;
- linking with students, volunteers or subject matter expert;
- a health promotion resource; or
- how to deliver program planning, research, or evaluation training.

Extended/Synergistic support: The knowledge exchanged in this kind of support is generally bi-directional (between SiREN and the individual/s) over multiple interactions across an extended period of time (weeks or months) to address a program planning, research or evaluation issue. Examples of extended support include SiREN:

- partnering with the individual to write a manuscript for publication;
- providing support to develop a program plan;
- providing support to develop or test an evaluation tool or plan;
- providing support with data collection;
- providing support with data analysis;
- providing support with reporting;
- providing support to develop a funding application; or
- providing support to develop an ethics application.

Sending the questionnaire via Qualtrics

Both questionnaires are saved in Qualtrics <https://curtin.au1.qualtrics.com>.

The questionnaire will need to be duplicated (click on three dots and choose copy project) and saved with identifying details of the support e.g., organisation acronym and staff name.

To email a questionnaire link with a unique identifier in Qualtrics, follow the steps below.

Select on the questionnaire then: Distributions– Emails – Compose Email

To prepare the email

- Ensure from name is 'SiREN' and Reply to email is siren@curtin.edu.au.
- Select appropriate time to send the email.
- The email subject should be 'SiREN support evaluation'
- Create a new contact list using the person's name as the name of the contact list and add in their email. If they are already listed, use their existing contact.
- Select email template for the relevant questionnaire (brief or extended support) next to the tab where it says message.
- Enter relevant details into the email including person's name. If it is for extended support, list details of the support provided including dates.

After you have sent the email, you are given the option in Qualtrics to send one reminder to non-respondents. Set this for two weeks. You will need to set reminders in Outlook to follow-up. Do not send any more than two reminders for brief support and three reminders for extended support.

- Reminder email template saved as "Reminder email." Can select email template from next to the tab where it says message.
- The email subject should be 'Reminder: SiREN support evaluation.' This is a generic support email that can be sent for both brief and extended support.

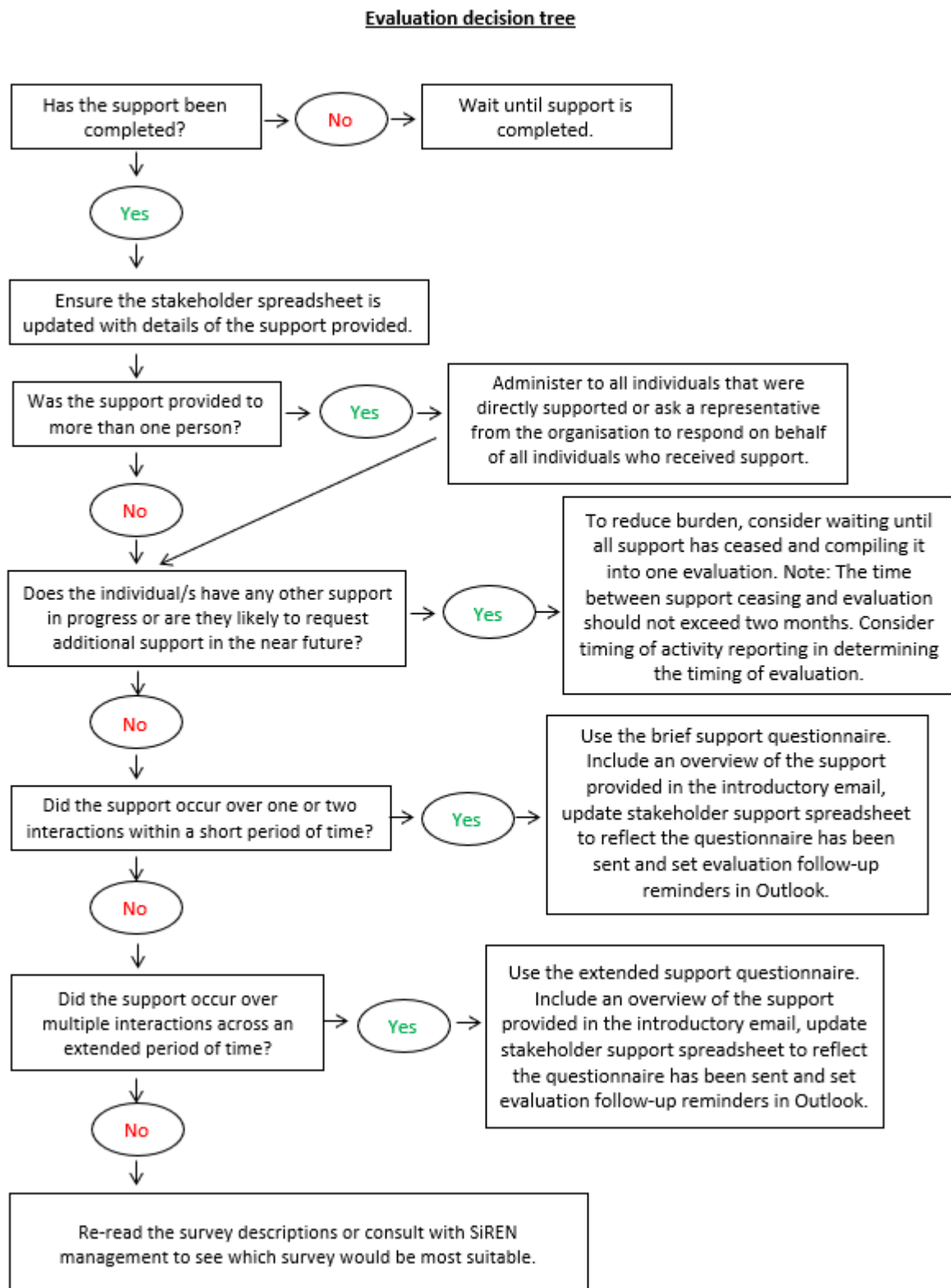
Compiling evaluation results

Questionnaire responses should be reviewed as they are received in case anything needs to be followed up.

Data should be analysed and presented in each activity report. Prepare a report using Qualtrics and save in the SiREN Evaluation folder J:\Public Health\R&D\Research Centres\WA Centre for Health Promotion Research (WACHPR)\SiREN\19 – Evaluation

Write a narrative summary for both kinds of support in the activity report and provide the Qualtrics reports as appendices.

Evaluation decision tree



Bibliography

I have made every reasonable effort to correctly acknowledge the owners of copyright material. I welcome any feedback from a copyright owner who has been omitted or incorrectly acknowledged.

- Ackoff, R. L. (1979). Resurrecting the Future of Operational Research. *The Journal of the Operational Research Society*, 30(3), 189-199. <https://doi.org/10.2307/3009600>
- Adebayo, O. W., Salerno, J. P., Francillon, V., & Williams, J. R. (2018). A systematic review of components of community-based organisation engagement. *Health and Social Care in the Community*, 26(4), e474-e484. <https://doi.org/10.1111/hsc.12533>
- Akintobi, T. H., Wilkerson, D. E., Rodgers, K., Escoffery, C., Haardoefer, R., & Kegler, M. (2016). Assessment of the Building Collaborative Research Capacity Model: Bridging the community-academic researcher divide. *Journal of the Georgia Public Health Association*, 6, 123-132. <https://doi.org/10.21633/jghpa.6.213>
- Akintobi, T. H., Yancey, E. M., Daniels, P., Mayberry, R. M., Jacobs, D., & Berry, J. (2012). Using evaluability assessment and evaluation capacity-building to strengthen community-based prevention initiatives. *J Health Care Poor Underserved*, 23(2 Suppl), 33-48. <https://doi.org/10.1353/hpu.2012.0077>
- Ali, A. K. (2005). Using the Delphi technique to search for empirical measures of local planning agency power. *The qualitative report*, 10(4), 718-744. <https://doi.org/10.46743/2160-3715/2005.1829>
- Andrews, J. O., Newman, S. D., Meadows, O., Cox, M. J., & Bunting, S. (2010). Partnership readiness for community-based participatory research. *Health Education Research*, 27(4), 555-571. <https://doi.org/10.1093/her/cyq050>
- Arbour, G. (2020). Frameworks for program evaluation: Considerations on research, practice, and institutions. *Evaluation*, 26(4), 422-437. <https://doi.org/10.1177/1356389020920890>
- Arkesteijn, M., Van Mierlo, B., & Leeuwis, C. (2015). The need for reflexive evaluation approaches in development cooperation. *Evaluation*, 21(1), 99-115. <https://doi.org/10.1177/1356389014564719>
- Arksey, H., & O'Malley, L. (2005). Scoping studies: towards a methodological framework. *International journal of social research methodology*, 8(1), 19-32. <https://doi.org/10.1080/1364557032000119616>
- Armstrong, R., Waters, E., Crockett, B., & Keleher, H. (2007). The nature of evidence resources and knowledge translation for health promotion practitioners. *Health Promotion International*, 22(3), 254-260. <https://doi.org/10.1093/heapro/dam017>
- Armstrong, R., Waters, E., Dobbins, M., Anderson, L., Moore, L., Petticrew, M., Clark, R., Pettman, T., Burns, C., Moodie, M., Conning, R., & Swinburn, B. (2013). Knowledge translation strategies to improve the use of evidence in public health decision making in local government: Intervention design and implementation plan. *Implementation Science*, 8(1), 121. <https://doi.org/10.1186/1748-5908-8-121>
- Armstrong, R., Waters, E., Moore, L., Dobbins, M., Pettman, T., Burns, C., Swinburn, B., Anderson, L., & Petticrew, M. (2014). Understanding evidence: a statewide survey to explore evidence-informed public health decision-making in a local government setting. *Implementation Science*, 9, 188. <https://doi.org/10.1186/s13012-014-0188-7>
- Arnstein, S. R. (1969). A ladder of citizen participation. *Journal of the American Institute of planners*, 35(4), 216-224. <https://doi.org/10.1080/01944366908977225>
- Arora, P. G., Krumholz, L. S., Guerra, T., & Leff, S. S. (2015). Measuring community-based participatory research partnerships: The initial development of an assessment instrument.

- Progress in Community Health Partnerships: Research, Education, and Action*, 9(4), 549-560. <https://doi.org/0.1353/cpr.2015.0077>
- Asselin, M. (2003). Insider Research: Issues to Consider When Doing Qualitative Research in Your Own Setting. *Journal for Nurses in Staff Development*, 19(2).
- Astbury, B., & Leeuw, F. L. (2010). Unpacking Black Boxes: Mechanisms and Theory Building in Evaluation. *American Journal of Evaluation*, 31(3), 363-381. <https://doi.org/10.1177/1098214010371972>
- Australian Bureau of Statistics. (2021a). *Area of Australia - States and Territories*. <https://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/3218.0Main+Features12017-18?OpenDocument>
- Australian Bureau of Statistics. (2021b). *Migration, Australia*. <https://www.abs.gov.au/statistics/people/population/migration-australia/latest-release>
- Australian Bureau of Statistics. (2021c). *Snapshot of Western Australia*. <https://www.abs.gov.au/articles/snapshot-wa-2021>
- Australian Bureau of Statistics. (2022). *Location: Census*. <https://www.abs.gov.au/statistics/people/people-and-communities/location-census/2021>
- Australian Government. (2019). *Engagement and Impact Assessment 2018-19*. <https://dataportal.arc.gov.au/EI/NationalReport/2018/>
- Australian Government. (2021a). *Blood Borne Viruses and Sexually Transmissible Infections*. Retrieved October 2021 from <https://www1.health.gov.au/internet/main/publishing.nsf/Content/ohp-bbvs-1>
- Australian Government. (2021b). *First National Blood Borne Viruses and Sexually Transmissible Infections Research Strategy*. Retrieved from <https://www1.health.gov.au/internet/main/publishing.nsf/Content/ohp-bbvs-1>
- Ayers, T. D. (1987). Stakeholders as partners in evaluation: A stakeholder-collaborative approach. *Evaluation and Program Planning*, 10(3), 263-271. [https://doi.org/10.1016/0149-7189\(87\)90038-3](https://doi.org/10.1016/0149-7189(87)90038-3)
- Bagnall, A.-M., Radley, D., Jones, R., Gately, P., Nobles, J., Van Dijk, M., Blackshaw, J., Montel, S., & Sahota, P. (2019). Whole systems approaches to obesity and other complex public health challenges: a systematic review. *BMC Public Health*, 19(1). <https://doi.org/10.1186/s12889-018-6274-z>
- Barbrook-Johnson, P., & Penn, A. (2022). *Systems Mapping How to build and use causal models of systems* Palgrave MacMillan.
- Bates, I., Akoto, A. Y. O., Ansong, D., Karikari, P., Bedu-Addo, G., Critchley, J., Agbenyega, T., & Nsiah-Asare, A. (2006). Evaluating health research capacity building: an evidence-based tool. *PLoS Medicine*, 3(8), 1224-1229. <https://doi.org/10.1353/hpu.2012.0077>
- Baugh Littlejohns, L., Hill, C., & Neudorf, C. (2021). Diverse Approaches to Creating and Using Causal Loop Diagrams in Public Health Research: Recommendations From a Scoping Review. *Public Health Reviews* 42. <https://doi.org/10.3389/phrs.2021.1604352>
- Beckett, K., Farr, M., Kothari, A., Wye, L., & Le May, A. (2018). Embracing complexity and uncertainty to create impact: exploring the processes and transformative potential of co-produced research through development of a social impact model. *Health Research Policy and Systems*, 16(1). <https://doi.org/10.1186/s12961-018-0375-0>
- BeLue, R., Carmack, C., Myers, K. R., Weinreb-Welch, L., & Lengerich, E. J. (2012). Systems thinking tools as applied to community-based participatory research a case study. *Health Education and Behavior*, 39(6), 745-751. <https://doi.org/10.1177/1090198111430708>
- Bengtsson, M. (2016). How to plan and perform a qualitative study using content analysis. *NursingPlus Open*, 2, 8-14. <https://doi.org/10.1016/j.npls.2016.01.001>
- Bergen, N., & Labonté, R. (2020). "Everything Is Perfect, and We Have No Problems": Detecting and Limiting Social Desirability Bias in Qualitative Research. *Qualitative health research*, 30(5), 783-792. <https://doi.org/10.1177/1049732319889354>

- Better Evaluation. (2020). *Approaches*. Retrieved August 2017 from <https://www.betterevaluation.org/en/approaches>
- Biroscak, B. J. (2014). *Use of System Dynamics Modeling to Explicate the Theory-of-Change of a Social Marketing Innovation* [University of South Florida].
- Borkowski, D., McKinstry, C., Cotchett, M., Williams, C., & Haines, T. (2016). Research culture in allied health: a systematic review. *Australian Journal of Primary Health, 22*(4), 294-303. <https://doi.org/http://dx.doi.org/10.1071/PY15122>
- Botha, N., Coutts, J., Turner, J. A., White, T., & Williams, T. (2017). Evaluating for learning and accountability in system innovation: Incorporating reflexivity in a logical framework. *Outlook on Agriculture, 46*(2), 154-160. <https://doi.org/10.1177/0030727017707406>
- Bourgeois, I., & Cousins, J. B. (2013). Understanding Dimensions of Organizational Evaluation Capacity. *American Journal of Evaluation, 34*(3), 299-319. <https://doi.org/10.1177/1098214013477235>
- Bourgeois, I., Simmons, L., & Buetti, D. (2018). Building evaluation capacity in Ontario's public health units: promising practices and strategies. *Public Health, 159*, 89-94. <https://doi.org/10.1016/j.puhe.2018.01.031>
- Bowen, S., Botting, I., Graham, I., & Huebner, L. (2016). Beyond “two cultures”: guidance for establishing effective researcher/health system partnerships. *International Journal of Health Policy Management, 5*. <https://doi.org/10.15171/ijhpm.2016.71>
- Bowen, S., Botting, I., & Graham, I. D. (2021). Re-imagining Health Research Partnership in a Post-COVID World: A Response to Recent Commentaries. *International journal of health policy and management, 10*, 39-41. <https://doi.org/10.34172/ijhpm.2020.69>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3*, 77-101. <https://doi.org/10.1191/1478088706qp063oa>
- Breen, L. J. (2007). The researcher ‘in the middle’: Negotiating the insider/outsider dichotomy *The Australian Community Psychologist, 19*(1). <https://espace.curtin.edu.au/handle/20.500.11937/22045>
- Brennan, L. K., Sabounchi, N. S., Kemner, A. L., & Hovmand, P. (2015). Systems thinking in 49 communities related to healthy eating, active living, and childhood obesity. *Journal Public Health Management Practrice, 21*, S55-S69. <https://doi.org/10.1097/PHH.0000000000000248>
- Bronstein, L. R. (2002). Index of interdisciplinary collaboration. *Social Work Research, 26*(2), 113-126. <https://doi.org/10.1093/swr/26.2.113>
- Brown, G., Johnston, K., Ellard, J., & Carman, M. (2013). Evidence synthesis and application for policy and practice project full report.
- Brown, G., Reeders, D., Cogle, A., Madden, A., Kim, J., & O'Donnell, D. (2018). A Systems Thinking Approach to Understanding and Demonstrating the Role of Peer-Led Programs and Leadership in the Response to HIV and Hepatitis C: Findings From the W3 Project [Original Research]. *Frontiers in Public Health, 6*(231). <https://doi.org/10.3389/fpubh.2018.00231>
- Brownson, R. C., Fielding, J. E., & Green, L. W. (2018). Building capacity for evidence-based public health: reconciling the pulls of practice and the push of research. *Annual Review of Public Health, 39*, 27-53. <https://doi.org/10.1146/annurev-publhealth-040617-014746>
- Brownson, R. C., Fielding, J. E., & Maylahn, C. M. (2009). Evidence-based public health: a fundamental concept for public health practice. *Annual Review of Public Health, 30*, 175-201. <https://doi.org/10.1146/annurev.publhealth.031308.100134>
- Brush, B. L., Baiardi, J. M., & Lapides, S. (2011). Moving toward synergy: lessons learned in developing and sustaining community-academic partnerships. *Progress in Community Health Partnerships: Research, Education, and Action, 5*(1), 27-34. <https://doi.org/10.1353/cpr.2011.0003>
- Brush, B. L., Mentz, G., Jensen, M., Jacobs, B., Saylor, K. M., Rowe, Z., Israel, B. A., & Lachance, L. (2020). Success in Long-Standing Community-Based Participatory Research (CBPR)

- Partnerships: A Scoping Literature Review. *Health Education and Behavior*, 47(4), 556-568. <https://doi.org/10.1177/1090198119882989>
- Bryson, J. M., Patton, M. Q., & Bowman, R. A. (2011). Working with evaluation stakeholders: A rationale, step-wise approach and toolkit. *Evaluation and Program Planning*, 34(1), 1-12. <https://doi.org/10.1016/j.evalprogplan.2010.07.001>
- Buckley, J., Hargraves, M., & Moorman, L. (2021). The relational nature of Evaluation Capacity Building: Lessons from facilitated evaluation partnerships. *New Directions for Evaluation*, 2021(169), 47-64. <https://doi.org/10.1002/ev.20445>
- Cabrera, D., & Cabrera, L. (2019). What Is Systems Thinking? In M. J. Spector, B. B. Lockee, & M. D. Childress (Eds.), *Learning, Design, and Technology: An International Compendium of Theory, Research, Practice, and Policy* (pp. 1-28). Springer International Publishing. https://doi.org/10.1007/978-3-319-17727-4_100-1
- Cabrera, D., Colosi, L., & Lobdell, C. (2008). Systems thinking. *Evaluation and Program Planning*, 31(3), 299-310. <https://doi.org/10.1016/j.evalprogplan.2007.12.001>
- Cabrera, D., & Trochim, W. M. (2006). *A theory of systems evaluation* [Cornell University]. https://www.researchgate.net/publication/349869802_A_Theory_of_Systems_Evaluation
- Calderón, J. L., Norris, K. C., Hardigan, P. C., Calderón, L. A., & Hays, R. D. (2015). Case Study of an Unsustainable Community-Academic Partnership: Toward Core Standards for the Structure of Emerging Participatory Research. *Ethnicity & Disease*, 25(3), 363-372. <https://doi.org/10.18865/ed.25.3.363>
- Campbell Collaboration. (2022). *Portals and databases*. Retrieved March 27 from <https://www.campbellcollaboration.org/evidence-portals>
- Canadian Institutes of Health Research. (2022). *Glossary of funding-related terms*. Retrieved March 27, 2022 from <http://www.cihr-irsc.gc.ca/e/34190.html#d>
- Caretta, M. A., & Vacchelli, E. (2015). Re-thinking the boundaries of the focus group: A reflexive analysis on the use and legitimacy of group methodologies in qualitative research. *Sociology Research Online*, 20(4), 58-70. <https://doi.org/10.5153/sro.3812>
- Carey, G., Malbon, E., Carey, N., Joyce, A., Crammond, B., & Carey, A. (2015). Systems science and systems thinking for public health: a systematic review of the field. *BMJ Open*, 5(12), e009002. <https://doi.org/10.1136/bmjopen-2015009002>
- Carlton, E. L., Whiting, J. B., Bradford, K., Dyk, P. H., & Vail, A. (2009). Defining factors of successful university-community collaborations: an exploration of one healthy marriage project. *Family Relations*, 58(1), 28-40. <https://doi.org/10.1111/j.1741-3729.2008.00532.x>
- Cassidy, R., Tomoaia-Cotisel, A., Semwanga, A. R., Binyaruka, P., Chalabi, Z., Blanchet, K., Singh, N. S., Maiba, J., & Borghi, J. (2021). Understanding the maternal and child health system response to payment for performance in Tanzania using a causal loop diagram approach. *Social Science & Medicine*, 285, 114277. <https://doi.org/https://doi.org/10.1016/j.socscimed.2021.114277>
- Centers for Disease Control and Prevention. (2021). *Indicators* Retrieved March 27, 2022 from <https://www.cdc.gov/evaluation/indicators/>
- Centre for Social Research in Health. (2022). *Gay Community Periodic Surveys*. Retrieved February, 2022 from <https://www.unsw.edu.au/arts-design-architecture/our-research/research-centres-institutes/centre-social-research-health/our-projects/gay-community-periodic-surveys>
- CERIPH. (2010). *Perth Gay Community Periodic Survey (2002-2010)*. Retrieved February, 2022 from <https://ceriph.curtin.edu.au/projects/detail/PGCPS.cfm>
- Chauveron, L. M., Urban, J. B., Samtani, S., Cox, M., Moorman, L., Hargraves, M., Buckley, J., & Linver, M. R. (2021). Promoting evaluation in youth character development through enhanced Evaluation Capacity Building: Empirical findings from the PACE Project. *New Directions for Evaluation*, 2021(169), 79-95. <https://doi.org/10.1002/ev.20447>
- Checkland, P. (1981). *Systems thinking, systems practice*.

- Checkland, P. (1999). Systems thinking. In W. Currie & B. Galliers (Eds.), *Rethinking Management Information Systems: An Interdisciplinary Perspective*. Oxford University Press.
https://books.google.com.au/books?id=QJJE-p5LdG4C&printsec=frontcover&source=gbs_ge_summary_r&cad=0#v=onepage&q&f=false
- Chen, H. T. (2016). Interfacing theories of program with theories of evaluation for advancing evaluation practice: Reductionism, systems thinking, and pragmatic synthesis. *Evaluation and Program Planning*, 59, 109-118. <https://doi.org/10.1016/j.evalprogplan.2016.05.012>
- Chou, T., & Frazier, S. L. (2020). Supporting ethical practice in community-engaged research with 4R: Respond, Record, Reflect, and Revise. *Ethics & Behavior*, 30(5), 311-325.
<https://doi.org/10.1080/10508422.2019.1645665>
- Churchman, C. (1971). *The Design of Inquiring Systems*. New York: Basic Books.
- Clarivate Analytics. (2019). *EndNote X9*. In Philadelphia, PA, USA
- Clarke, B., Kwon, J., Swinburn, B., & Sacks, G. (2021). Understanding the dynamics of obesity prevention policy decision-making using a systems perspective: A case study of Healthy Together Victoria. *PLoS One*, 16(1), e0245535.
<https://doi.org/10.1371/journal.pone.0245535>
- Clayton, A.-M., & Thorne, T. (2000). Diary data enhancing rigour: analysis framework and verification tool. *Journal of Advanced Nursing*, 32(6), 1514-1521. <https://doi.org/10.1046/j.1365-2648.2000.01609.x>
- Communicable Disease Control Directorate, D. o. H. (2009). *Sexual Health and Blood-borne Virus Program*. Retrieved October 2021 from <https://doh.getquickmail.com/stockpdfs/10813-doh-sexual-health-program.pdf>
- Conte, K. P., & Davidson, S. (2020). Using a 'rich picture' to facilitate systems thinking in research coproduction. *Health Research Policy and Systems*, 18(1). <https://doi.org/10.1186/s12961-019-0514-2>
- Cooke, J. (2005). A framework to evaluate research capacity building in health care. *BMC Family practice*, 6(1), 1. <https://doi.org/10.1186/1471-2296-6-44>
- Cooke, J. (2020). Building Research Capacity for Impact in Applied Health Services Research Partnerships Comment on "Experience of Health Leadership in Partnering With University-Based Researchers in Canada – A Call to "Re-imagine" Research". *International journal of health policy and management*. <https://doi.org/10.15171/ijhpm.2020.11>
- Cooke, J., Ariss, S., Smith, C., & Read, J. (2015). On-going collaborative priority-setting for research activity: a method of capacity building to reduce the research-practice translational gap. *Health Research Policy and Systems*, 13(1). <https://doi.org/10.1186/s12961-015-0014-y>
- Cooke, J., Gardois, P., & Booth, A. (2018). Uncovering the mechanisms of research capacity development in health and social care: a realist synthesis. *Health Research Policy and Systems*, 16(1), 93. <https://doi.org/10.1016/j.puhe.2018.01.031>
- Cooke, J., Nancarrow, S., Dyas, J., & Williams, M. (2008). An evaluation of the 'Designated Research Team' approach to building research capacity in primary care. *BMC Family practice*, 9(1), 37. <https://doi.org/10.1186/1471-2296-9-37>
- Corbin, J. H., Fernandez, M. E., & Mullen, P. D. (2015). Evaluation of a community-academic partnership lessons from latinos in a network for cancer control. *Health Promotion Practice*, 16(3), 345-353. <https://doi.org/10.1177/1524839914558514>
- Corbin, J. H., Jones, J., & Barry, M. M. (2016). What makes intersectoral partnerships for health promotion work? A review of the international literature. *Health Promotion International*. <https://doi.org/10.1093/heapro/daw061>
- Corbin, S., & Strauss, A. (2008). *Basics of Qualitative Research, 3rd ed.* Sage Publications.
- Cousins, B. J., Goh, S. C., Clark, S., & Lee, L. E. (2004). Integrating evaluative inquiry into the organizational culture: a review and synthesis of the knowledge base. *Canadian Journal of Program Evaluation*, 19(2), 99-141.

- https://www.researchgate.net/publication/288115939_Integrating_evaluative_inquiry_into_the_organizational_culture_A_review_and_synthesis_of_the_knowledge_base
- Cousins, J. B., Elliott, C., Amo, C., Bourgeois, I., Chouinard, J., Goh, S. C., & Lahey, R. (2008). Organizational capacity to do and use evaluation: Results of a pan-canadian survey of evaluators [Article]. *Canadian Journal of Program Evaluation*, 23(3), 1-35. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-80054696785&partnerID=40&md5=5bcda539c99c40a262370915b750b234>
- Cousins, J. B., Shulha, L., Whitmore, E., Hudib, H., & Gilbert, N. (2020). Situating Evidence-Based Principles to Guide Practice in Collaborative Approaches to Evaluation (CAE). *Collaborative approaches to evaluation: principles in use*. Thousand Oaks: SAGE Publications.
- Cousins, J. B., Whitmore, E., & Shulha, L. (2013). Arguments for a common set of principles for collaborative inquiry in evaluation. *American Journal of Evaluation*, 34(1), 7-22.
- Couture, A. L., Zaidi, A. U., & Maticka-Tyndale, E. (2012). Reflexive accounts: an intersectional approach to exploring the fluidity of insider/outsider status and the researcher's impact on culturally sensitive post-positivist qualitative research. *Qualitative Sociology Review*, 8(1). <https://www.semanticscholar.org/paper/Reflexive-Accounts-%3A-an-Intersectional-Approach-to-Couture-Zaidi/9bc0f602c60ec15574c25a2f82497f609a0459d4>
- Coyle, G. (2000). Qualitative and quantitative modelling in system dynamics: some research questions. *System Dynamics Review*, 16(3), 225-244. [https://doi.org/10.1002/1099-1727\(200023\)16:3<225::aid-sdr195>3.0.co;2-d](https://doi.org/10.1002/1099-1727(200023)16:3<225::aid-sdr195>3.0.co;2-d)
- Crawford, G., Lobo, R., Brown, G., & Maycock, B. (2016). The influence of population mobility on changing patterns of HIV acquisition: lessons for and from Australia. *Health Promotion Journal of Australia*, 27(2), 153-154. <https://doi.org/10.1071/HE15042>
- Cunningham, F. C., Ranmuthugala, G., Westbrook, J. I., & Braithwaite, J. (2019). Tackling the wicked problem of health networks: the design of an evaluation framework. *BMJ Open*, 9(5), e024231. <https://doi.org/10.1136/bmjopen-2018-024231>
- Currie, M., King, G., Rosenbaum, P., Law, M., Kertoy, M., & Specht, J. (2005). A model of impacts of research partnerships in health and social services. *Evaluation and Program Planning*, 28(4), 400-412. <https://doi.org/10.1016/j.evalprogplan.2005.07.004>
- Curtin University. (2021a). Brand Images. In *Canto*.
- Curtin University. (2021b). *Research Data and Primary Materials Policy*. Retrieved October 2021 from https://policies.curtin.edu.au/local/docs/policy/Research_Data_and_Primary_Materials_Policy.pdf
- Curtin University. (2022). *Facts and figures*. Retrieved February, 2022 from <https://about.curtin.edu.au/history-facts/facts-figures/>
- Darling, M., Gonzalez, F., Graves, K., Sheppard, V. B., Hurtado-De-Mendoza, A., Leventhal, K.-G., & Caicedo, L. (2015). Practical Tips for Establishing Partnerships With Academic Researchers: A Resource Guide for Community-Based Organizations. *Progress in Community Health Partnerships: Research, Education, and Action*, 9(2), 203-212. <https://doi.org/10.1353/cpr.2015.0042>
- Dart, J., & Davies, R. (2003). A Dialogical, Story-Based Evaluation Tool: The Most Significant Change Technique. *American Journal of Evaluation*, 24(2), 137-155. <https://doi.org/10.1177/109821400302400202>
- Datta, J., & Petticrew, M. (2013). Challenges to evaluating complex interventions: a content analysis of published papers. *BMC Public Health*, 13(1), 568. <https://doi.org/10.1186/1471-2458-13-568>
- DeCorby-Watson, K., Mensah, G., Bergeron, K., Abdi, S., Rempel, B., & Manson, H. (2018). Effectiveness of capacity building interventions relevant to public health practice: a systematic review. *BMC Public Health*, 18(1), 684. <https://doi.org/10.1186/s12889-018-5591-6>

- Dicicco-Bloom, B., & Crabtree, B. F. (2006). The qualitative research interview. *Medical Education*, 40(4), 314-321. <https://doi.org/10.1111/j.1365-2929.2006.02418.x>
- Dillman, D., Smyth, J., & Christian, L. (2014). *Internet, phone, mail, and mixed-mode surveys : the tailored design method (4th ed.)*. Indianapolis: Wiley.
- Dobbins, M., Hanna, S. E., Ciliska, D., Manske, S., Cameron, R., Mercer, S. L., O'Mara, L., DeCorby, K., & Robeson, P. (2009). A randomized controlled trial evaluating the impact of knowledge translation and exchange strategies [journal article]. *Implementation Science*, 4(1), 1-16. <https://doi.org/10.1186/1748-5908-4-61>
- Dobbins, M., Jack, S., Thomas, H., & Kothari, A. (2007). Public health decision-makers' informational needs and preferences for receiving research evidence. *Worldviews on Evidence-Based Nursing*, 4(3), 156-163. <https://doi.org/10.1111/j.1741-6787.2007.00089.x>
- Donabedian, A. (1982). *The criteria and standards of quality*. Health Administration Press.
- Doodle. (2017). *Doodle*. In <https://doodle.com/en/>
- Douglas, R. B. D., Grant, J., & Wells, J. (2020). *Advancing University Engagement: University engagement and global league tables*. <https://nousgroup.com/wp-content/uploads/2020/07/Engagement-Report-Digital.pdf>
- Douthwaite, B., & Hoeffcker, E. (2017). Towards a complexity-aware theory of change for participatory research programs working within agricultural innovation systems. *Agricultural Systems*, 155, 88-102. <https://doi.org/10.1016/j.agsy.2017.04.002>
- Drahota, A., Meza, R. D., Brikho, B., Naaf, M., Estabillo, J. A., Gomez, E. D., Vejnaska, S. F., Dufek, S., Stahmer, A. C., & Aarons, G. A. (2016). Community-Academic Partnerships: A Systematic Review of the State of the Literature and Recommendations for Future Research. *The Milbank Quarterly*, 94(1), 163-214. <http://onlinelibrary.wiley.com/store/10.1111/1468-0009.12184/asset/milq12184.pdf?v=1&t=y0xbh2r&s=e87712dcd564ef439804f1d79f9fdb9a2d390674>
- Dubois, A., & Lévesque, M. (2020). Canada's National Collaborating Centres: Facilitating evidence-informed decision-making in public health. *Canada communicable disease report = Relevé des maladies transmissibles au Canada*, 46(2-3), 31-35. <https://doi.org/10.14745/ccdr.v46i23a02>
- Durand Thomas, M., Blacksmith, J., & Reno, J. (2000). Pearls, Pith, and Provocation: Utilizing Insider-Outsider Research Teams in Qualitative Research. *Qualitative health research*, 10(6), 819-828. <https://doi.org/10.1177/104973200129118840>
- Dyehouse, M., Bennett, D., Harbor, J., Childress, A., & Dark, M. (2009). A comparison of linear and systems thinking approaches for program evaluation illustrated using the Indiana Interdisciplinary GK-12. *Evaluation and Program Planning*, 32(3), 187-196. <https://doi.org/10.1016/j.evalprogplan.2009.03.001>
- Earl, S., Carden, F., & Smutylo, T. (2001). *Outcome Mapping: Building Learning and Reflection into Development Programs*. IDRC. <https://www.idrc.ca/en/book/outcome-mapping-building-learning-and-reflection-development-programs>
- Edwards, B., Stickney, B., Milat, A., Campbell, D., & Thackway, S. (2016). Building research and evaluation capacity in population health: the NSW Health approach. *Health Promotion Journal of Australia*, 27(3), 264-267. <https://doi.org/10.1071/HE16045>
- Eoyang, G., & Berkas, T. (1998). Evaluating performance in a CAS. *Circle Pines, MN: Human Systems Dynamics Institute*. Retrieved June, 21, 2010.
- Esmail, R., Hanson, H. M., Holroyd-Leduc, J., Brown, S., Strifler, L., Straus, S. E., Niven, D. J., & Clement, F. M. (2020). A scoping review of full-spectrum knowledge translation theories, models, and frameworks. *Implementation Science*, 15(1). <https://doi.org/10.1186/s13012-020-0964-5>
- ESSENCE on Health Research. (2016). *Planning, Monitoring and Evaluation Framework for Research Capacity Strengthening* (ESSENCE Good Practice Document Series. , Issue. https://www.who.int/tdr/publications/Essence_frwk_2016_web.pdf

- Eubank, B. H., Mohtadi, N. G., Lafave, M. R., Wiley, J. P., Bois, A. J., Boorman, R. S., & Sheps, D. M. (2016). Using the modified Delphi method to establish clinical consensus for the diagnosis and treatment of patients with rotator cuff pathology. *BMC Medical Research Methodology*, 16(1), 56. <https://doi.org/10.1186/s12874-016-0165-8>
- Feather, J. L. (2018). Developing programme theories as part of a realist evaluation of a healthcare quality improvement programme. *International Journal of Care Coordination*, 21(3), 68-72. <https://doi.org/10.1177/2053434518779753>
- Fielden, S. J., Rusch, M. L., Masinda, M. T., Sands, J., Frankish, J., & Evoy, B. (2007). Key considerations for logic model development in research partnerships: A Canadian case study. *Evaluation and Program Planning*, 30(2), 115-124. <https://doi.org/10.1016/j.evalprogplan.2007.01.002>
- Finegood, D. T. (2011). *The Complex Systems Science of Obesity* Oxford University Press <https://doi.org/10.1093/oxfordhb/9780199736362.013.0013>
- Fonner, V. A., Dalglish, S. L., Kennedy, C. E., Baggaley, R., O'Reilly, K. R., Koechlin, F. M., Rodolph, M., Hodges-Mameletzis, I., & Grant, R. M. (2016). Effectiveness and safety of oral HIV preexposure prophylaxis for all populations. *AIDS*, 30(12), 1973-1983. <https://doi.org/10.1097/qad.0000000000001145>
- Forrester, J. W. (1961). *Industrial dynamics*.
- Forrester, J. W. (1993). System dynamics and the lessons of 35 years. In *A systems-based approach to policymaking* (pp. 199-240). Springer.
- Forrester, J. W. (2007). System dynamics—the next fifty years. *System Dynamics Review*, 23(2-3), 359-370. <https://doi.org/10.1002/sdr.381>
- Foster-Fishman, P. G., Nowell, B., & Yang, H. (2007). Putting the system back into systems change: A framework for understanding and changing organizational and community systems. *American Journal of Community Psychology*, 39(3-4), 197-215. <https://doi.org/10.1007/s10464-007-9109-0>
- Fransman, J., Hall, B., Hayman, R., Narayanan, P., Newman, K., & Tandon, R. (2021). Beyond partnerships: embracing complexity to understand and improve research collaboration for global development. *Canadian Journal of Development Studies / Revue canadienne d'études du développement*, 42(3), 326-346. <https://doi.org/10.1080/02255189.2021.1872507>
- Fredericks, K. A., Deegan, M., & Carman, J. G. (2008). Using System Dynamics as an Evaluation Tool: Experience From a Demonstration Program. *American Journal of Evaluation*, 29(3), 251-267. <https://doi.org/10.1177/1098214008319446>
- Frerichs, L., Kim, M., Dave, G., Cheney, A., Hassmiller Lich, K., Jones, J., Young, T. L., Cene, C. W., Varma, D. S., Schaal, J., Black, A., Striley, C. W., Vassar, S., Sullivan, G., Cottler, L. B., Brown, A., Burke, J. G., & Corbie-Smith, G. (2016). Stakeholder Perspectives on Creating and Maintaining Trust in Community–Academic Research Partnerships. *Health Education and Behavior*, 44(1), 182-191. <https://doi.org/10.1177/1090198116648291>
- Funnell, S. C., & Rogers, P. J. (2011). *Purposeful program theory*. Jossey-Bass.
- Gadsby, E. W. (2011). Research capacity strengthening: donor approaches to improving and assessing its impact in low- and middle-income countries. *The International Journal of Health Planning and Management*, 26(1), 89-106. <https://doi.org/10.1002/hpm.1031>
- Gagliardi, A. R., Berta, W., Kothari, A., Boyko, J., & Urquhart, R. (2015). Integrated knowledge translation (IKT) in health care: a scoping review. *Implementation Science*, 11(1), 38. <https://doi.org/10.1186/s13012-016-0399-1>
- Gates, E. F. (2016). Making sense of the emerging conversation in evaluation about systems thinking and complexity science. *Evaluation and Program Planning*, 59, 62-73. <https://doi.org/10.1016/j.evalprogplan.2016.08.004>
- Gaveikaite, V., Grundstrom, C., Lourida, K., Winter, S., Priori, R., Chouvarda, I., & Maglaveras, N. (2020). Developing a strategic understanding of telehealth service adoption for COPD care

- management: A causal loop analysis of healthcare professionals. *PLoS One*, 15(3), e0229619. <https://doi.org/10.1371/journal.pone.0229619>
- Gerritsen, S., Harré, S., Rees, D., Renker-Darby, A., Bartos, A. E., Waterlander, W. E., & Swinburn, B. (2020). Community Group Model Building as a Method for Engaging Participants and Mobilising Action in Public Health. *International journal of environmental research and public health*, 17(10), 3457. <https://doi.org/10.3390/ijerph17103457>
- Gibson, R., & Robichaud, S. (2020). Evaluating Dancing With Parkinson's: Reflections from the perspective of a community organization. *Evaluation and Program Planning*, 80, 101449. <https://doi.org/10.1016/j.evalprogplan.2017.05.010>
- Given, L. (2008). The SAGE Encyclopedia of Qualitative Research Methods. <https://doi.org/10.4135/9781412963909>
- Government of Western Australia. (2020). *WA Sexual Health and Blood-borne Virus Strategies 2019-2023*. Retrieved from https://ww2.health.wa.gov.au/Articles/U_Z/WA-Sexual-Health-and-Blood-borne-Virus-Strategies-2019-2023
- Government of Western Australia, D. o. H. (2019). *Western Australia (WA) Sexually Transmissible Infections Strategy 2019–2023*. https://ww2.health.wa.gov.au/~/_media/Files/Corporate/general-documents/Sexual-Health/PDF/Strategy/2019-2023/STI-strategy.pdf
- Grack Nelson, A., King, J. A., Lawrenz, F., Reich, C., Bequette, M., Pattison, S., Kunz Kollmann, E., Illes, M., Cohn, S., & Iacovelli, S. (2018). Using a complex adaptive systems perspective to illuminate the concept of evaluation capacity building in a network. *American Journal of Evaluation*, 1098214018773877. <https://doi.org/10.1177/1098214018773877>
- Granner, M. L., & Sharpe, P. A. (2004). Evaluating community coalition characteristics and functioning: a summary of measurement tools. *Health Education Research*, 19(5), 514-532. <https://doi.org/10.1093/her/cyg056>
- Greenhalgh, T. (2019). Bridging the 'Two Cultures' of Research and Service: Can Complexity Theory Help? Comment on "Experience of Health Leadership in Partnering With University-Based Researchers in Canada – A Call to 'Re-imagine' Research". *International journal of health policy and management*, 9(2), 87-88. <https://doi.org/10.15171/ijhpm.2019.89>
- Greenhalgh, T., Jackson, C., Shaw, S., & Janamian, T. (2016). Achieving Research Impact Through Co-creation in Community-Based Health Services: Literature Review and Case Study. *The Milbank Quarterly*, 94(2), 392-429. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4911728/pdf/MILQ-94-392.pdf>
- Greenhalgh, T., & Wieringa, S. (2011). Is it time to drop the 'knowledge translation' metaphor? A critical literature review. *Journal of the Royal Society of Medicine*, 104(12), 501-509. <https://doi.org/10.1258/jrsm.2011.110285>
- Grove, J. T. (2015). Aiming for Utility in 'Systems-based Evaluation': A Research-based Framework for Practitioners. *IDS Bulletin*, 46(1), 58-70. <https://doi.org/10.1111/1759-5436.12121>
- Grulich, A. E., Guy, R., Amin, J., Jin, F., Selvey, C., Holden, J., Schmidt, H.-M. A., Zablotska, I., Price, K., & Whittaker, B. (2018). Population-level effectiveness of rapid, targeted, high-coverage roll-out of HIV pre-exposure prophylaxis in men who have sex with men: the EPIC-NSW prospective cohort study. *The lancet HIV*, 5(11), e629-e637. [https://doi.org/10.1016/S2352-3018\(18\)30215-7](https://doi.org/10.1016/S2352-3018(18)30215-7)
- Haapanen, K. A., & Christens, B. D. (2021). Community-engaged Research Approaches: Multiple Pathways To Health Equity. *American Journal of Community Psychology*, 37(3-4), 331-337. <https://doi.org/10.1002/ajcp.12529>
- Hammoud, M. A., Maher, L., Holt, M., Degenhardt, L., Jin, F., Murphy, D., Bavinton, B., Grulich, A., Lea, T., Haire, B., Bourne, A., Saxton, P., Vaccher, S., Ellard, J., Mackie, B., Batrouney, C., Bath, N., & Prestage, G. (2020). Physical Distancing Due to COVID-19 Disrupts Sexual Behaviors Among Gay and Bisexual Men in Australia: Implications for Trends in HIV and

- Other Sexually Transmissible Infections. *JAIDS Journal of Acquired Immune Deficiency Syndromes*, 85(3), 309-315. <https://doi.org/10.1097/qai.0000000000002462>
- Hamzeh, J., Kaur, N., Bush, P. L., Hudon, C., Schuster, T., Vedel, I., Hong, Q. N., & Pluye, P. (2019). Towards a comprehensive Questionnaire Origin and Development Appraisal tool: A literature review and a modified nominal group. *Education for information*, 35(1), 7-20. <https://doi.org/10.3233/EFI-180216>
- Hanlon, C., Semrau, M., Alem, A., Abayneh, S., Abdulmalik, J., Docrat, S., Evans-Lacko, S., Gureje, O., Jordans, M., Lempp, H., Mugisha, J., Petersen, I., Shidhaye, R., & Thornicroft, G. (2018). Evaluating capacity-building for mental health system strengthening in low- and middle-income countries for service users and caregivers, service planners and researchers. *Epidemiology and Psychiatric Sciences*, 27(1), 3-10. <https://doi.org/10.1017/S2045796017000440>
- Hargraves, M., Buckley, J., Urban, J. B., Linver, M. R., Chauveron, L. M., Samtani, S., Archibald, T., & Moorman, L. (2021). Resonance, stickiness, and the value propositions of Evaluation Capacity Building: Key takeaways and future directions. *New Directions for Evaluation*, 2021(169), 97-116. <https://doi.org/10.1002/ev.20442>
- Hargreaves, M. B. (2010). Evaluating system change: A planning guide. <https://beamexchange.org/resources/198/>
- Hassmiller Lich, K., Frerichs, L., Fishbein, D., Bobashev, G., & Pentz, M. A. (2016). Translating research into prevention of high-risk behaviors in the presence of complex systems: definitions and systems frameworks. *Translational Behavioural Medicine*, 6(1), 17-31. <https://doi.org/10.1007/s13142-016-0390-z>
- Hasson, F., Keeney, S., & McKenna, H. (2000). Research guidelines for the Delphi survey technique. *Journal of Advanced Nursing*, 32(4), 1008-1015. <https://onlinelibrary.wiley.com/doi/abs/10.1046/j.1365-2648.2000.t01-1-01567.x?sid=nlm%3Apubmed>
- Hawe, P., Bond, L., & Butler, H. (2009). Knowledge theories can inform evaluation practice: What can a complexity lens add? *New Directions for Evaluation*, 124, 89-100. <https://doi.org/10.1002/ev.316>
- Hawe, P., Shiell, A., & Riley, T. (2009). Theorising interventions as events in systems. *American Journal of Community Psychology*, 43(3-4), 267-276. <https://doi.org/10.1007/s10464-009-9229-9>
- Hayfield, N., & Huxley, C. (2015). Insider and Outsider Perspectives: Reflections on Researcher Identities in Research with Lesbian and Bisexual Women. *Qualitative Research in Psychology*, 12(2), 91-106. <https://doi.org/10.1080/14780887.2014.918224>
- Haynes, A., Rowbotham, S., Grunseit, A., Bohn-Goldbaum, E., Slaytor, E., Wilson, A., Lee, K., Davidson, S., & Wutzke, S. (2020). Knowledge mobilisation in practice: an evaluation of the Australian Prevention Partnership Centre. *Health Research Policy and Systems*, 18(1), 13. <https://doi.org/10.1186/s12961-019-0496-0>
- Haynes, S. N., Richard, D., & Kubany, E. S. (1995). Content validity in psychological assessment: A functional approach to concepts and methods. *Psychological assessment*, 7(3), 238-247. <https://doi.org/10.1037/1040-3590.7.3.238>
- Hellard, M., Sacks-Davis, R., & Doyle, J. (2016). Hepatitis C elimination by 2030 through treatment and prevention: think global, act in local networks. *Journal of epidemiology and community health*, 70(12), 1151-1154. <https://doi.org/10.1136/jech-2015-205454>
- Henderson, J., Javanparast, S., Mackean, T., Freeman, T., Baum, F., & Ziersch, A. (2018). Commissioning and equity in primary care in Australia: Views from Primary Health Networks. *Health and Social Care in the Community*, 26(1), 80-89. <https://doi.org/10.1111/hsc.12464>
- Herriot, M., Schirmer, K., & Velardo, S. (2022). *An evidence-informed review to support the development of the South Australian Health Promotion Workforce Strategy*.

https://www.healthpromotion.org.au/images/docs/SA_HP_Workforce_Strategy_Report_web.pdf

- Heslop, C., Burns, S., & Lobo, R. (2018). Managing qualitative research as insider-research in small rural communities. *Rural and Remote Health*, 18(3), 4576. <https://doi.org/10.22605/RRH4576>
- Hinkin, T. R. (1995). A Review of Scale Development Practices in the Study of Organizations. *Journal of management*, 21(5), 967-988. <https://doi.org/10.1177/014920639502100509>
- Hoekstra, F., Mrklas, K., Khan, M., McKay, R., Vis-Dunbar, M., Sibley, K., Nguyen, T., Graham, I., & Gainforth, H. (2020). A review of reviews on principles, strategies, outcomes and impacts of research partnerships approaches: a first step in synthesising the research partnership literature. *Health Research Policy and Systems*, 18(1), 1-23. <https://doi.org/10.1186/s12961-020-0544-9>
- Holden, L., Pager, S., Golenko, X., & Ware, R. S. (2012). Validation of the research capacity and culture (RCC) tool: measuring RCC at individual, team and organisation levels. *Australian Journal of Primary Health*, 18(1), 62-67. <https://doi.org/10.1071/PY10081>
- Hollister, D. C., Litwak, E., & Meyer, H. (1977). The role of linkage mechanisms between bureaucracies and families: Education and health as empirical cases in point. In *Power, Paradigms and Community Research*. Sage Publications Ltd.
- Homer, J., & Oliva, R. (2001). Maps and models in system dynamics: a response to Coyle. *System Dynamics Review*, 17(4), 347-355. <https://doi.org/10.1002/sdr.224>
- Hornby, A. S. (1995). *Oxford advanced learner's dictionary of current English*. Oxford University Press.
- Hovland, C. I., & Weiss, W. (1951). The Influence of Source Credibility on Communication Effectiveness. *Public Opin Q*, 15(4), 635. <https://doi.org/10.1086/266350>
- Hovmand, P., Rouwette, E., Andersen, D., Richardson, G., Calhoun, A., Rux, K., & Hower, T. (2011). Scriptapedia: a handbook of scripts for developing structured group model building sessions.
- Hovmand, P. S. (2014). Group Model Building and Community-Based System Dynamics Process. In (pp. 17-30). Springer New York. https://doi.org/10.1007/978-1-4614-8763-0_2
- Hsieh, H.-F., & Shannon, S. E. (2005). Three Approaches to Qualitative Content Analysis. *Qualitative health research*, 15(9), 1277-1288. <https://doi.org/10.1177/1049732305276687>
- Hsu, C.-C., & Sandford, B. A. (2007). The Delphi technique: making sense of consensus. *Practical Assessment, Research, and Evaluation*, 12(1), 10. <https://doi.org/10.7275/pdz9-th90>
- Huckel Schneider, C., Milat, A. J., & Moore, G. (2016). Barriers and facilitators to evaluation of health policies and programs: Policymaker and researcher perspectives. *Evaluation and Program Planning*, 58, 208-215. <https://doi.org/10.1016/j.evalprogplan.2016.06.011>
- Hulcombe, J., Sturgess, J., Souvlis, T., & Fitzgerald, C. (2014). An approach to building research capacity for health practitioners in a public health environment: an organisational perspective. *Australian Health Review*, 38(3), 252–258. <https://doi.org/10.1071/ah13066>
- Hummelbrunner, R. (2011). Systems thinking and evaluation. *Evaluation*, 17(4), 395-403. <https://doi.org/10.1177/1356389011421935>
- Humphreys, J., Wakerman, J., Kuipers, P., Wells, B., Russell, D., Sieglhoff, S., & Kerry Homer, K. (2017). *Improving workforce retention: developing An integrated logic model to maximise sustainability of small rural and remote health care services*. [https://openresearch-repository.anu.edu.au/bitstream/1885/119205/3/full_report_10797%20\(1\).pdf](https://openresearch-repository.anu.edu.au/bitstream/1885/119205/3/full_report_10797%20(1).pdf)
- Israel, B. A., Lachance, L., Coombe, C. M., Lee, S.-Y. D., Jensen, M., Wilson-Powers, E., Mentz, G., Muhammad, M., Rowe, Z., & Reyes, A. G. (2020). Measurement Approaches to Partnership Success: Theory and Methods for Measuring Success in Long-Standing Community-Based Participatory Research Partnerships. *Progress in Community Health Partnerships: Research, Education, and Action*, 14(1), 129-140. <https://doi.org/10.1353/cpr.2020.0015>
- Jagosh, J., Bush, P. L., Salsberg, J., Macaulay, A. C., Greenhalgh, T., Wong, G., Cargo, M., Green, L. W., Herbert, C. P., & Pluye, P. (2015). A realist evaluation of community-based participatory

- research: partnership synergy, trust building and related ripple effects. *BMC Public Health*, 15, 725. <https://doi.org/10.1186/s12889-015-1949-1>
- Jagosh, J., Pluye, P., Wong, G., Cargo, M., Salsberg, J., Bush, P. L., Herbert, C. P., Green, L. W., Greenhalgh, T., & Macaulay, A. C. (2014). Critical reflections on realist review: insights from customizing the methodology to the needs of participatory research assessment. *Research synthesis methods*, 5(2), 131-141. <https://doi.org/10.1002/jrsm.1099>
- Jakobsen, M. W., Eklund Karlsson, L., Skovgaard, T., & Aro, A. R. (2019). Organisational factors that facilitate research use in public health policy-making: a scoping review. *Health Research Policy and Systems*, 17(1). <https://doi.org/10.1186/s12961-019-0490-6>
- Jalali, M. S., Rahmandad, H., Bullock, S. L., Lee-Kwan, S. H., Gittelsohn, J., & Ammerman, A. (2019). Dynamics of intervention adoption, implementation, and maintenance inside organizations: The case of an obesity prevention initiative. *Social Science Medicine*, 224, 67-76. <https://doi.org/10.1016/j.socscimed.2018.12.021>
- Jancey, J., Crawford, G., Hunt, K., Wold, C., Leavy, J., & Hallett, J. (2020). The injury workforce in Western Australia: Findings from a cross-sectional survey. *Health Promotion Journal of Australia*, 31(3), 411-417. <https://doi.org/10.1002/hpja.269>
- John Scougall Consulting Services. (2015). *SiREN evaluation final report*. <http://siren.org.au/wp-content/uploads/2015/07/SiREN-evaluation-report-July-2015.pdf>
- Johns, J. L. (1996). A concept analysis of trust. *Journal of Advanced Nursing*, 24(1), 76-83. <https://doi.org/10.1046/j.1365-2648.1996.16310.x>
- Jones, J., & Barry, M. M. (2011a). Developing a scale to measure trust in health promotion partnerships. *Health Promotion International*, 26(4), 484-491. <https://doi.org/10.1093/heapro/dar007>
- Jones, J., & Barry, M. M. (2011b). Exploring the relationship between synergy and partnership functioning factors in health promotion partnerships. *Health Promotion International*, 26(4), 408-420. <https://doi.org/10.1093/heapro/dar002>
- Jones, M., Verity, F., Warin, M., Ratcliffe, J., Cobiac, L., Swinburn, B., & Cargo, M. (2016). OPALesence: Epistemological pluralism in the evaluation of a systems-wide childhood obesity prevention program. *Evaluation*, 22(1), 29-48. <https://doi.org/10.1177/1356389015623142>
- Jones, J., & Barry, M. M. (2011). Developing a scale to measure synergy in health promotion partnerships. *Global health promotion*, 18(2), 36-44. <https://doi.org/10.1177/1757975911404762>
- Jull, J., Giles, A., & Graham, I. D. (2017). Community-based participatory research and integrated knowledge translation: advancing the co-creation of knowledge. *Implementation Science*, 12(1), 150. <https://doi.org/10.1186/s13012-017-0696-3>
- Kahwa, E., Edwards, N., & Mortley, N. (2016). Research Capacity Building: A Literature Review and the Theoretical Framework. *Building and Evaluating Research Capacity in Healthcare Systems*, 11.
- Kanuha, V. K. (2000). "Being" native versus "going native": Conducting social work research as an insider *Social Work*, 45(5), 439. <https://doi.org/10.1093/sw/45.5.439>
- Kearney, S., Leung, L., Joyce, A., Ollis, D., & Green, C. (2016). Applying systems theory to the evaluation of a whole school approach to violence prevention. *Health Promotion Journal of Australia*, -. <https://doi.org/http://dx.doi.org/10.1071/HE16046>
- Kegler, M. C., Halpin, S. N., & Butterfoss, F. D. (2020). Evaluation Methods Commonly Used to Assess Effectiveness of Community Coalitions in Public Health: Results From a Scoping Review. *New Directions for Evaluation*(165), 139-157. <https://doi.org/10.1002/ev.20402>
- Kenzie, E. S. (2021). *Get Your Model Out There: Advancing Methods for Developing and Using Causal-Loop Diagrams* [Portland State University]. https://pdxscholar.library.pdx.edu/open_access_etds/5664/

- Key, K. D., Furr-Holden, D., Lewis, E. Y., Cunningham, R., Zimmerman, M. A., Johnson-Lawrence, V., & Selig, S. (2019). The Continuum of Community Engagement in Research: A Roadmap for Understanding and Assessing Progress. *Progress in Community Health Partnerships*, 13(4), 427-434. <https://doi.org/10.1353/cpr.2019.0064>
- Khan, K., Porroche-Escudero, A., Georgiou, G., & Popay, J. (2021). Building Health Research Capacity: The Impact of a United Kingdom Collaborative Programme. *Internet Journal of Allied Health Sciences and Practice*, 19(4), 7. <https://doi.org/10.46743/1540-580X/2021.2030>
- Khan, S., Moore, J. E., Gomes, T., Camacho, X., Tran, J., McAuley, G., Juurlink, D. N., Paterson, M., Laupacis, A., & Mamdani, M. M. (2014). The Ontario Drug Policy Research Network: Bridging the gap between Research and Drug Policy. *Health Policy*, 117(3), 392-398. <https://doi.org/10.1016/j.healthpol.2014.06.007>
- Kim, H., & Andersen, D. F. (2012). Building confidence in causal maps generated from purposive text data: mapping transcripts of the Federal Reserve. *System Dynamics Review*, 28(4), 311-328. <https://doi.org/10.1002/sdr.1480>
- Kim, R. E., & Mackey, B. (2014). International environmental law as a complex adaptive system. *International Environmental Agreements: Politics, Law and Economics*, 14(1), 5-24. <https://doi.org/10.1007/s10784-013-9225-2>
- King, G., Servais, M., Currie, M., Kertoy, M., Law, M., Rosenbaum, P., Specht, J., Willoughby, T., Forchuk, C., & Chalmers, H. (2003). *CIROP Respondent Form* www.impactmeasure.org
- King, G., Servais, M., Kertoy, M., Specht, J., Currie, M., Rosenbaum, P., Law, M., Forchuk, C., Chalmers, H., & Willoughby, T. (2009). A measure of community members' perceptions of the impacts of research partnerships in health and social services. *Evaluation and Program Planning*, 32(3), 289-299. <https://doi.org/10.1016/j.evalprogplan.2009.02.002>
- King, J. A. (2007). Developing evaluation capacity through process use. *New Directions for Evaluation*, 2007(116), 45-59. <https://doi.org/10.1002/ev.242>
- King, J. A. (2017). Putting evaluation capacity building in context: Reflections on the Ontario Brain Institute's Evaluation Support Program. *Evaluation and Program Planning*, 80, 101452. <https://doi.org/10.1016/j.evalprogplan.2017.05.013>
- King, K. M., Morris, D., Jones, L., Lucas-Wright, A., Jones, F., del Pino, H. E., & Group., t. H. S. (2015). The Los Angeles Healthy Community Neighborhood Initiative: A Ten Year Experience in Building and Sustaining a Successful Community-Academic Partnership. *HSOA Journal of Community Medicine & Public Health Care*, 2(2), 007. <https://pubmed.ncbi.nlm.nih.gov/27747314/>
- Kirby Institute. (2020). *National update on HIV, viral hepatitis and sexually transmissible infections in Australia: 2009–2018*. UNSW Sydney. Retrieved July 2021 from <https://kirby.unsw.edu.au/sites/default/files/kirby/report/National-update-on-HIV-viral-hepatitis-and-STIs-2009-2018.pdf>
- Kirby Institute. (2021). *HIV, viral hepatitis and sexually transmissible infections in Australia: Annual surveillance report 2021*. https://kirby.unsw.edu.au/sites/default/files/kirby/report/Annual-Suveillance-Report-2021_HIV.pdf
- Kivell, N. M., Evans, S. D., & Paterson, S. E. (2017). Community Power Structure Analysis and the Ethical Considerations of "Studying Up". *American Journal of Community Psychology*, 60(3-4), 467-475. <https://doi.org/10.1002/ajcp.12190>
- Kjellsson, G., Clarke, P., & Gerdtham, U. G. (2014). Forgetting to remember or remembering to forget: a study of the recall period length in health care survey questions. *Journal of Health Economics*, 35, 34-46. <https://doi.org/10.1016/j.jhealeco.2014.01.007>
- Kornbluh, M. (2015). Combatting challenges to establishing trustworthiness in qualitative research. *Qualitative health research*, 12(4), 397-414. <https://doi.org/10.1080/14780887.2015.1021941>

- Korstjens, I., & Moser, A. (2018). Series: Practical guidance to qualitative research. Part 4: Trustworthiness and publishing. *European Journal of General Practice*, 24(1), 120-124. <https://doi.org/10.1080/13814788.2017.1375092>
- Kothari, A., Edwards, N., Hamel, N., & Judd, M. (2009). Is research working for you? validating a tool to examine the capacity of health organizations to use research. *Implementation Science*, 4(1), 46. <https://doi.org/10.1186/1748-5908-4-46>
- Kothari, A., MacLean, L., Edwards, N., & Hobbs, A. (2011). Indicators at the interface: managing policymaker-researcher collaboration [journal article]. *Knowledge Management Research & Practice*, 9(3), 203-214. <https://doi.org/10.1057/kmrp.2011.16>
- Kothari, A., Sibbald, S., & Wathen, C. (2014). Evaluation of partnerships in a transnational family violence prevention network using an integrated knowledge translation and exchange model: A mixed methods study. *Health Research Policy and Systems*, 12, 25. <https://doi.org/http://dx.doi.org/10.1186/1478-4505-12-25>
- Kramer, M., Parkhurst, M., & Vaidyanathan, L. (2009). *Breakthroughs in Shared Measurement and Social Impact*. http://www.hewlett.org/wp-content/uploads/2016/08/Breakthroughs_in_Shared_Measurement_complete.pdf
- Krefting, L. (1991). Rigor in Qualitative Research: The Assessment of Trustworthiness. *American Journal Occupational Therapy*, 45(3), 214-222. <https://doi.org/10.5014/ajot.45.3.214>
- Labin, S. N. (2014). Developing Common Measures in Evaluation Capacity Building: An Iterative Science and Practice Process. *American Journal of Evaluation*, 35(1), 107-115. <https://doi.org/10.1177/1098214013499965>
- Labin, S. N., Duffy, J. L., Meyers, D. C., Wandersman, A., & Lesesne, C. A. (2012). A Research Synthesis of the Evaluation Capacity Building Literature. *American Journal of Evaluation*, 33(3), 307-338. <https://doi.org/10.1177/1098214011434608>
- Lamarre, A., D'Avernas, E., Raffoul, A., Riley, B., & Jain, R. (2020). A Rapid Review of Evaluation Capacity Building Strategies for Chronic Disease Prevention. *Canadian Journal of Program Evaluation*, 35(1), 1-19. <https://doi.org/10.3138/cjpe.61270>
- Langlois, E. V., Becerril Montekio, V., Young, T., Song, K., Alcalde-Rabanal, J., & Tran, N. (2016). Enhancing evidence informed policymaking in complex health systems: lessons from multi-site collaborative approaches. *Health Research Policy and Systems*, 14(1). <https://doi.org/10.1186/s12961-016-0089-0>
- LaRocca, R., Yost, J., Dobbins, M., Ciliska, D., & Butt, M. (2012). The effectiveness of knowledge translation strategies used in public health: a systematic review [journal article]. *BMC Public Health*, 12(1), 1-15. <https://doi.org/10.1186/1471-2458-12-751>
- LaSala, M. C. (2003). When Interviewing "Family". *Journal of Gay & Lesbian Social Services*, 15(1-2), 15-30. https://doi.org/10.1300/j041v15n01_02
- Lasker, R. D., Weiss, E. S., & Miller, R. (2001). Partnership synergy: a practical framework for studying and strengthening the collaborative advantage. *Milbank Quarterly*, 79(2), 179-205. <https://doi.org/10.1111/1468-0009.00203>
- Laverack, G. (2017). *Health Promotion in Disease Outbreaks and Health Emergencies (1st ed)*. CRC Press.
- Lawrenz, F., Kollmann, E. K., King, J. A., Bequette, M., Pattison, S., Nelson, A. G., Cohn, S., Cardiel, C. L., Iacovelli, S., & Eliou, G. O. (2018). Promoting evaluation capacity building in a complex adaptive system. *Evaluation and Program Planning*, 69, 53-60. <https://doi.org/10.1016/j.evalprogplan.2018.04.005>
- Levine, R., Russ-Eft, D., Burling, A., Stephens, J., & Downey, J. (2013). Evaluating health services research capacity building programs: Implications for health services and human resource development. *Evaluation and Program Planning*, 37(0), 1-11. <https://doi.org/http://dx.doi.org/10.1016/j.evalprogplan.2012.12.002>
- Liamputtong, P. (2010). *Research Methods in Health. 2nd ed*. Oxford University Press.
- Liamputtong, P. (2013). *Qualitative research methods. 4th ed*. Oxford University Press.

- Lin, L.-H. (2015). The Social Outcomes of Older Adult Learning in Taiwan: Evaluation Framework and Indicators. *Educational Gerontology, 41*(4), 292-304.
<https://doi.org/10.1080/03601277.2014.958021>
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic Inquiry*. Sage Publications.
- Lindeman, P. T., Bettin, E., Beach, L. B., Adames, C. N., Johnson, A. K., Kern, D., Stonehouse, P., Greene, G. J., & Phillips II, G. (2018). Evaluation capacity building—Results and reflections across two years of a multisite empowerment evaluation in an HIV prevention context. *Evaluation and Program Planning, 71*, 83-88.
<https://doi.org/10.1016/j.evalprogplan.2018.09.001>
- Litwak, E., Shiroy, E., Zimmerman, L., & Bernstein, J. (1970). Community participation in bureaucratic organizations: Principles and strategies. *Interchange, 1*(4), 44-60.
<https://doi.org/10.1007/BF02214879>
- Lobe, B., Morgan, D., & Hoffman, K. A. (2020). Qualitative Data Collection in an Era of Social Distancing. *International Journal of Qualitative Methods, 19*, 160940692093787.
<https://doi.org/10.1177/1609406920937875>
- Lobo, R., Crawford, G., Hallett, J., Laing, S., Mak, D. B., Jancey, J., Rowell, S., McCausland, K., Bastian, L., & Sorenson, A. (2016). A research and evaluation capacity building model in Western Australia. *Health Promotion International, daw088*. <https://doi.org/10.1093/heapro/daw088>
- Lobo, R., D'Costa, B., Forbes, L., & Ward, J. (2020). Young Deadly Free: impact evaluation of a sexual health youth peer education program in remote Australian communities. *Sexual Health, 17*(5), 397. <https://doi.org/10.1071/sh20069>
- Lobo, R., McCausland, K., Bates, J., Hallett, J., Donovan, B., & Selvey, L. A. (2021). Sex workers as peer researchers – a qualitative investigation of the benefits and challenges. *Culture, Health & Sexuality, 23*(10), 1435-1450. <https://doi.org/10.1080/13691058.2020.1787520>
- Lobo, R., Petrich, M., & Burns, S. K. (2014). Supporting health promotion practitioners to undertake evaluation for program development. *BMC Public Health, 14*(1), 1.
<https://doi.org/10.1186/1471-2458-14-1315>
- Lokot, M., & Wake, C. (2021). Research as usual in humanitarian settings? Equalising power in academic-NGO research partnerships through co-production. *Conflict and Health, 15*(1).
<https://doi.org/10.1186/s13031-021-00399-w>
- Luger, T. M., Hamilton, A. B., & True, G. (2020). Measuring Community-Engaged Research Contexts, Processes, and Outcomes: A Mapping Review. *The Milbank Quarterly, 98*(2), 493-553.
<https://doi.org/10.1111/1468-0009.12458>
- Mackay, K. (1999). *Evaluation capacity development: a diagnostic guide and action framework*. World Bank, Operations Evaluation Department.
http://documents1.worldbank.org/curated/en/807321468765312873/016824232_200309275053013/additional/multi-page.pdf
- MacLellan-Wright, M. F., Patten, S., dela Cruz, A. M., & Flaherty, A. (2007). A participatory approach to the development of an evaluation framework: Process, pitfalls, and payoffs. *Canadian Journal of Program Evaluation, 22*(1), 99.
https://www.researchgate.net/publication/252628060_A_participatory_approach_to_the_development_of_an_evaluation_framework_Process_pitfalls_and_payoffs
- Mador, R., Zarinpoush, F., Gibson-Wood, H., & Dattadeen, J.-A. (2019). Processes and practices for building strong collaborative research partnerships: lessons learned from the Locally-Driven Collaborative Projects programme. *Evidence & Policy, 15*(4), 607-619.
<https://doi.org/10.1332/174426417X15057479217862>
- Marek, L. I., Brock, D. J. P., & Savla, J. (2014). Evaluating Collaboration for Effectiveness: Conceptualization and Measurement. *American Journal of Evaluation, 36*(1), 67-85.
<https://doi.org/10.1177/1098214014531068>
- Markiewicz, A., & Patrick, I. (2016). *Developing Monitoring and Evaluation Frameworks*. In Thousand Oaks, CA: SAGE.

- Matus, J., Walker, A., & Mickan, S. (2018). Research capacity building frameworks for allied health professionals - a systematic review. *BMC Health Service Research*, 18(1), 716. <https://doi.org/10.1186/s12913-018-3518-7>
- Mayne, J. (2008). *Contribution analysis: An approach to exploring cause and effect*. The Institutional Learning and Change (ILAC) Initiative. https://www.betterevaluation.org/resources/guides/contribution_analysis/ilac_brief
- Mayne, J. (2012). Contribution analysis: Coming of age? *Evaluation*, 18(3), 270-280. <https://doi.org/10.1177/1356389012451663>
- Mayne, J. (2017). Building evaluative culture in community services: Caring for evidence. *Evaluation and Program Planning*, 80, 101450. <https://doi.org/10.1016/j.evalprogplan.2017.05.011>
- McGill, E., Er, V., Penney, T., Egan, M., White, M., Meier, P., Whitehead, M., Lock, K., Anderson De Cuevas, R., Smith, R., Savona, N., Rutter, H., Marks, D., De Vocht, F., Cummins, S., Popay, J., & Petticrew, M. (2021). Evaluation of public health interventions from a complex systems perspective: A research methods review. *Social Science & Medicine*, 272, 113697. <https://doi.org/10.1016/j.socscimed.2021.113697>
- McGill, E., Marks, D., Er, V., Penney, T., Petticrew, M., & Egan, M. (2020). Qualitative process evaluation from a complex systems perspective: A systematic review and framework for public health evaluators. *PLoS Med*, 17(11), e1003368. <https://doi.org/10.1371/journal.pmed.1003368>
- McKellar, K. A., Pitzul, K. B., Juliana, Y. Y., & Cole, D. C. (2014). Evaluating communities of practice and knowledge networks: A systematic scoping review of evaluation frameworks. *EcoHealth*, 11(3), 383-399. <https://doi.org/10.1007/s10393-014-0958-3>
- Meadows, D. (1999). *Leverage Points: Places to Intervene in a System*. Leverage Points: Places to Intervene in a System. http://donellameadows.org/wp-content/userfiles/Leverage_Points.pdf
- Meadows, D. H. (2008). *Thinking in systems: a primer*. Chelsea Green Publishing.
- Mercer, J. (2007). The challenges of insider research in educational institutions: wielding a double-edged sword and resolving delicate dilemmas. *Oxford Review of Education*, 33(1), 1-17. <https://doi.org/10.1080/03054980601094651>
- Merrill, J. A., Deegan, M., Wilson, R. V., Kaushal, R., & Fredericks, K. (2013). A system dynamics evaluation model: implementation of health information exchange for public health reporting. *Journal of the American Medical Informatics Association*, 20(e1), e131-e138. <https://doi.org/10.1136/amiainl-2012-001289>
- Microsoft Corporation. (2020). *Microsoft Teams*. In Redmond, Washington.
- Midgley, G. (2003). *Systems thinking*. Sage London, Thousand Oaks, CA.
- Midgley, G. (2006). Systems thinking for evaluation. In *Systems concepts in evaluation: An expert anthology* (pp. 11-34). http://www.managingforimpact.org/sites/default/files/resource/system_concepts_in_evaluation.pdf
- Midgley, G. (2008). Systems thinking, complexity and the philosophy of science. *Emergence: Complexity and Organization*, 10(4), 55-73. <https://doi.org/10.17357.a7ba7e7cf2ed80ce4517c6052dc486de>
- Milat, A. J., Bauman, A. E., & Redman, S. (2015). A narrative review of research impact assessment models and methods. *Health Research Policy and Systems*, 13(1). <https://doi.org/10.1186/s12961-015-0003-1>
- Mills, S. D., Golden, S. D., O'Leary, M. C., Logan, P., & Lich, K. H. (2021). Using systems science to advance health equity in tobacco control: a causal loop diagram of smoking. *Tobacco control*, 1-9. <https://doi.org/10.1136/tobaccocontrol-2021-056695>
- Mitchell, R. J., Williamson, A. M., & O'Connor, R. (2009). The development of an evaluation framework for injury surveillance systems. *BMC Public Health*, 9(1), 260. <https://doi.org/10.1186/1471-2458-9-260>

- Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLoS Medicine*, 6(7), 1-6.
<https://doi.org/10.1371/journal.pmed.1000097>
- Moon, K., & Blackman, D. (2014). A Guide to Understanding Social Science Research for Natural Scientists. *Conservation Biology*, 28(5), 1167-1177. <https://doi.org/10.1111/cobi.12326>
- Moreau, K. A. (2017). Twelve tips for planning and conducting a participatory evaluation. *Medical Teacher*, 39(4), 334-340. <https://doi.org/10.1080/0142159x.2017.1286310>
- Morse, J. M. (1995). The significance of saturation. *Qualitative health research*, 5(2), 147-149.
<https://doi.org/10.1177/104973239500500201>
- Moullin, J. C., Dickson, K. S., Stadnick, N. A., Albers, B., Nilsen, P., Broder-Fingert, S., Mukasa, B., & Aarons, G. A. (2020). Ten recommendations for using implementation frameworks in research and practice. *Implementation Science Communications*, 1(1).
<https://doi.org/10.1186/s43058-020-00023-7>
- Mullen, C. A., & Klimaitis, C. C. (2021). Defining mentoring: a literature review of issues, types, and applications. *Annals of the New York Academy of Sciences*, 1483(1), 19-35.
<https://doi.org/10.1111/nyas.14176>
- Munn, Z., Peters, M. D. J., Stern, C., Tufanaru, C., McArthur, A., & Aromataris, E. (2018). Systematic review or scoping review? Guidance for authors when choosing between a systematic or scoping review approach. *BMC Medical Research Methodology*, 18(1).
<https://doi.org/10.1186/s12874-018-0611-x>
- Murunga, V. I., Oronje, R. N., Bates, I., Tagoe, N., & Pulford, J. (2020). Review of published evidence on knowledge translation capacity, practice and support among researchers and research institutions in low-and middle-income countries. *Health Research Policy and Systems*, 18(1).
<https://doi.org/10.1186/s12961-019-0524-0>
- National Collaborating Centre for Methods and Tools. (n.d.). *A Model for Evidence-Informed Decision Making in Public Health*. Retrieved March 27, 2022 from
<https://www.nccmt.ca/uploads/media/media/0001/01/4504c27e14836059b8fd3ce3b3eaaac2ed2ce6ed6.pdf>
- National Disability Insurance Agency. (2020). *What is a service provider?* Retrieved March 27, 2022 from
<https://www.ndis.gov.au/participants/working-providers/what-service-provider?msclkid=d32e41a1ad8211ec8f8e920a2c7444fc>
- National Health and Medical Research Council. (2020). *Research Impact [Internet]*
<https://www.nhmrc.gov.au/research-policy/research-translation-and-impact/research-impact>
- National Health and Medical Research Council, A. R. C., and Universities Australia,. (2018). *Australian Code for the Responsible Conduct of Research*. <https://www.nhmrc.gov.au/about-us/publications/australian-code-responsible-conduct-research-2018#block-views-block-file-attachments-content-block-1>
- Nederhof, A. J. (1985). Methods of coping with social desirability bias: A review. *European Journal of Social Psychology*, 15, 263-280. <https://doi.org/10.1002/ejsp.2420150303>
- Nguyen, T., Graham, I. D., Mrklas, K. J., Bowen, S., Cargo, M., Estabrooks, C. A., Kothari, A., Lavis, J., Macaulay, A. C., & MacLeod, M. (2020). How does integrated knowledge translation (IKT) compare to other collaborative research approaches to generating and translating knowledge? Learning from experts in the field. *Health Research Policy and Systems*, 18, 1-20.
<https://doi.org/10.1186/s12961-020-0539-6>
- Nichols, N., McFarlane, K., Gibson, P., Millard, F., Packer, A., & McDonald, M. (2018). Skills, systems and supports: An Aboriginal Community Controlled Health Service (Apunipima) approach to building health promotion evaluation capacity of staff. *Health Promotion Journal of Australia*, 29(1), 18-22. <https://doi.org/10.1002/hpja.18>

- Nielsen, S. B., Lemire, S., & Skov, M. (2011). Measuring Evaluation Capacity—Results and Implications of a Danish Study. *American Journal of Evaluation*, 32(3), 324-344. <https://doi.org/10.1177/1098214010396075>
- Nilsen, P. (2015). Making sense of implementation theories, models and frameworks. *Implementation Science*, 10(1). <https://doi.org/10.1186/s13012-015-0242-0>
- Norris, K. C., Brusuelas, R., Jones, L., Miranda, J., Duru, O. K., & Mangione, C. M. (2007). Partnering with community-based organizations: an academic institution's evolving perspective. *Ethnicity & Disease*, 17, S27-32. <https://pubmed.ncbi.nlm.nih.gov/17598314/>
- Norton, S., Milat, A., Edwards, B., & Giffin, M. (2016). Narrative review of strategies by organizations for building evaluation capacity. *Evaluation and Program Planning*, 58, 1-19. <https://doi.org/10.1016/j.evalprogplan.2016.04.004>
- Nyström, M. E., Karlton, J., Keller, C., & Andersson Gäre, B. (2018). Collaborative and partnership research for improvement of health and social services: researcher's experiences from 20 projects. *Health Research Policy and Systems*, 16(1). <https://doi.org/10.1186/s12961-018-0322-0>
- Ohr, S. O., Maguire, D., Lord, N., Talluri, C., & Solman, A. (2021). A Unique Model for Developing Continuing Education Resources for Health Professionals in Geographically Dispersed Health Organizations. *Journal of Continuing Education in the Health Professions*, 41(3), 221-225. <https://doi.org/10.1097/ceh.0000000000000320>
- Oliver, K., Innvar, S., Lorenc, T., Woodman, J., & Thomas, J. (2014). A systematic review of barriers to and facilitators of the use of evidence by policymakers. *BMC Health Service Research*, 14, 2. <https://doi.org/10.1186/1472-6963-14-2>
- Oliver, K., Kothari, A., & Mays, N. (2019). The dark side of coproduction: do the costs outweigh the benefits for health research? *Health Research Policy and Systems*, 17(1). <https://doi.org/10.1186/s12961-019-0432-3>
- Ortiz, K., Nash, J., Shea, L., Oetzel, J., Garoutte, J., Sanchez-Youngman, S., & Wallerstein, N. (2020). Partnerships, Processes, and Outcomes: A Health Equity-Focused Scoping Meta-Review of Community-Engaged Scholarship. *Annual Review of Public Health*, 41(1), 177-199. <https://doi.org/10.1146/annurev-publhealth-040119-094220>
- Ortlipp, M. (2008). Keeping and using reflective journals in the qualitative research process. *The qualitative report*, 13(4), 695-705. <https://doi.org/10.46743/2160-3715/2008.1579>
- Ovretveit, J., Hempel, S., L. Magnabosco, J., S. Mittman, B., V. Rubenstein, L., & A. Ganz, D. (2014). Guidance for research-practice partnerships (R-PPs) and collaborative research. *Journal of Health Organization and Management*, 28(1), 115-126. <https://doi.org/10.1108/JHOM-08-2013-0164>
- Owen, B., Brown, A. D., Kuhlberg, J., Millar, L., Nichols, M., Economos, C., & Allender, S. (2018). Understanding a successful obesity prevention initiative in children under 5 from a systems perspective. *PLoS One*, 13(3), e0195141. <https://doi.org/10.1371/journal.pone.0195141>
- Pager, S., Holden, L., & Golenko, X. (2012). Motivators, enablers, and barriers to building allied health research capacity. *Journal of Multidisciplinary Healthcare* 5(53), e9. <https://doi.org/10.2147/JMDH.S27638>
- Paina, L., & Peters, D. H. (2011). Understanding pathways for scaling up health services through the lens of complex adaptive systems. *Health Policy and Planning*, 27(5), 365-373. <https://doi.org/10.1093/heapol/czr054>
- Palinkas, L. A., Garcia, A. R., Aarons, G. A., Finno-Velasquez, M., Holloway, I. W., Mackie, T. I., Leslie, L. K., & Chamberlain, P. (2016). Measuring Use of Research Evidence: The Structured Interview for Evidence Use. *Research on Social Work Practice*, 26(5), 550-564. <https://doi.org/10.1177/1049731514560413>
- Parrott, J. S., Findley, P., Rosenthal, M., & Rothpletz-Pugila, P. (2016). Developing a Recursive Evaluation Plan of a Complex Interprofessional Healthcare Education Initiative. *Journal of*

- Research in Interprofessional Practice and Education*, 6(1).
<https://doi.org/10.22230/jripe.2016v6n1a220>
- Patton, M. (2002). *Qualitative and research evaluation methods*. 3rd ed. Sage.
- Patton, M. Q. (1997). *Utilization-focused evaluation: the new century text*. SAGE.
- Patton, M. Q. (2008). *Utilization-focused evaluation: The new century text*. 4th ed. Sage
- Patton, M. Q. (2012). A utilization-focused approach to contribution analysis. *Evaluation*, 18(3), 364-377. <https://doi.org/10.1177/1356389012449523>
- Pawson, R., & Tilley, N. (1997). *Realistic Evaluation*.
- Peters, D. H. (2014). The application of systems thinking in health: why use systems thinking? [journal article]. *Health Research Policy and Systems*, 12(1), 1-6.
<https://doi.org/10.1186/1478-4505-12-51>
- Pettman, T. L., Armstrong, R., Jones, K., Waters, E., & Doyle, J. (2013). Cochrane update: building capacity in evidence-informed decision-making to improve public health. *Journal of Public Health*, 35(4), 624-627. <https://doi.org/10.1093/pubmed/fdt119>
- Phillippi, J., & Lauderdale, J. (2017). A Guide to Field Notes for Qualitative Research: Context and Conversation. *Qualitative health research*, 28(3), 381-388.
<https://doi.org/10.1177/1049732317697102>
- Pinto, R. M. (2009). Community Perspectives on Factors That Influence Collaboration in Public Health Research. *Health Education & Behavior*, 36(5), 930-947.
<https://doi.org/10.1177/1090198108328328>
- Pinto, R. M., Wall, M. M., & Spector, A. Y. (2014). Modeling the structure of partnership between researchers and front-line service providers: Strengthening collaborative public health research. *Journal of mixed methods research*, 8(1), 83-106.
<https://doi.org/10.1177/1558689813490835>
- Prashanth, N. S., Marchal, B., Devadasan, N., Kegels, G., & Criel, B. (2014). Advancing the application of systems thinking in health: a realist evaluation of a capacity building programme for district managers in Tumkur, India [journal article]. *Health Research Policy and Systems*, 12(1), 42. <https://doi.org/10.1186/1478-4505-12-42>
- Preskill, H. (2008). Evaluation's Second Act. *American Journal of Evaluation*, 29(2), 127-138.
<https://doi.org/10.1177/1098214008316896>
- Preskill, H., & Boyle, S. (2008). A multidisciplinary model of evaluation capacity building. *American Journal of Evaluation*, 29(4), 443-459. <https://doi.org/10.1177/1098214008324182>
- Preskill, H., Gopal, S., Mack, K., & Cook, J. (2015). *Evaluating Complexity: Propositions for Improving Practice*. <https://www.fsg.org/publications/evaluating-complexity#download-area>
- Preskill, H., & Torres, R. (1999). Building Capacity for Organizational Learning Through Evaluative Inquiry. *Evaluation*, 5, 42-60. <https://doi.org/10.1177/13563899922208814>
- Preskill, H., Zuckerman, B., & Matthews, B. (2003). An exploratory study of process use: Findings and implications for future research. *American Journal of Evaluation*, 24(4), 423-442.
<https://doi.org/10.1177/109821400302400402>
- Pulford, J., Price, N., Amegee Quach, J., & Bates, I. (2020). Measuring the outcome and impact of research capacity strengthening initiatives: A review of indicators used or described in the published and grey literature. *F1000Research*, 9, 517.
<https://doi.org/10.12688/f1000research.24144.1>
- Punton, M. (2016). *How can capacity development promote evidence-informed policy making? Literature Review for the Building Capacity to Use Research Evidence (BCURE) Programme*.
<http://www.itad.com/wp-content/uploads/2016/04/BCURE-Literature-Review-FINAL-010416.pdf>
- QSR International. (2018). *NVivo 12*. In
- Qualtrics. (2019). *Qualtrics*. In <http://www.qualtrics.com>
- Quinn, R. (1988). *Beyond rational management: Mastering the paradoxes and competing demands of high performance*. JosseyBass.

- Regeer, B. J., De Wildt-Liesveld, R., Van Mierlo, B., & Bunders, J. F. G. (2016). Exploring ways to reconcile accountability and learning in the evaluation of niche experiments. *Evaluation*, 22(1), 6-28. <https://doi.org/10.1177/1356389015623659>
- Renger, R., Atkinson, L., Renger, J., Renger, J., & Hart, G. (2019). The connection between logic models and systems thinking concepts. *Evaluation Journal of Australasia*, 19(2), 79-87. <https://doi.org/10.1177/1035719X19853660>
- Renmans, D., Holvoet, N., & Criel, B. (2017). Combining theory-driven evaluation and causal loop diagramming for opening the 'Black Box' of an Intervention in the health sector: a case of performance-based financing in Western Uganda. *International journal of environmental research and public health*, 14(9), 1007. <https://doi.org/10.3390/ijerph14091007>
- Richardson, G. P. (1986). Problems with causal-loop diagrams. *System Dynamics Review*, 2(2), 158-170. <https://doi.org/10.1002/sdr.4260020207>
- Richardson, G. P., & Andersen, D. F. (1995). Teamwork in group model building. *System Dynamics Review*, 11(2), 113-137. <https://doi.org/10.1002/sdr.4260110203>
- Rickles, D., Hawe, P., & Shiell, A. (2007). A simple guide to chaos and complexity. *Journal of epidemiology and community health*, 61(11), 933-937. <https://doi.org/10.1136/jech.2006.054254>
- Rijswijk, K., Bewsell, D., Small, B., & Blackett, P. (2015). Reflexive monitoring in New Zealand: Evaluation lessons in supporting transformative change. *Evaluation Journal of Australasia*, 15(4), 38-43. <https://doi.org/10.1177/1035719x1501500405>
- Rodgers, K. C., Akintobi, T., Thompson, W. W., Evans, D., Escoffery, C., & Kegler, M. C. (2014). A model for strengthening collaborative research capacity: Illustrations from the Atlanta Clinical Translational Science Institute. *Health Education and Behavior*, 41(3), 267-274. <https://doi.org/10.1177/1090198113511815>
- Rogers, E. (1995). *Diffusion of innovations (4th ed.)*. Free Press.
- Rogers, P. J. (2008). Using Programme Theory to Evaluate Complicated and Complex Aspects of Interventions. *Evaluation*, 14(1), 29-48. <https://doi.org/10.1177/1356389007084674>
- Rosas, S., & Knight, E. (2018). Evaluating a complex health promotion intervention: case application of three systems methods. *Critical Public Health*, 29(3), 337-352. <https://doi.org/10.1080/09581596.2018.1455966>
- Rosenberg, S., Lobo, R., & Hallett, J. (2019). *An evidence review from Australia, Aotearoa/New Zealand and Canada for the WA Aboriginal Sexual Health and Blood-borne Viruses Strategy*. <https://siren.org.au/wp-content/uploads/2019/07/ASHBBV-Evidence-Review.pdf>
- Ross, L. F., Loup, A., Nelson, R. M., Botkin, J. R., Kost, R., Smith, G. R., & Gehlert, S. (2010). The Challenges of Collaboration for Academic and Community Partners in a Research Partnership: Points to Consider. *Journal of Empirical Research on Human Research Ethics*, 5(1), 19-31. <https://doi.org/10.1525/jer.2010.5.1.19>
- Rossi, P., Lipsey, M., & Freeman, H. (2004). *Evaluation: A Systematic Approach*. SAGE.
- Rüegg, S. R., Nielsen, L. R., Buttigieg, S. C., Santa, M., Aragrande, M., Canali, M., Ehlinger, T., Chantziaras, I., Boriani, E., Radeski, M., Bruce, M., Queenan, K., & Häslar, B. (2018). A Systems Approach to Evaluate One Health Initiatives. *Frontiers in Veterinary Science*, 5(23). <https://doi.org/10.3389/fvets.2018.00023>
- Rutter, H., Savona, N., Glonti, K., Bibby, J., Cummins, S., Finegood, D. T., Greaves, F., Harper, L., Hawe, P., & Moore, L. (2017). The need for a complex systems model of evidence for public health. *The Lancet*, 390(10112), 2602-2604. [https://doi.org/10.1016/S0140-6736\(17\)31267-9](https://doi.org/10.1016/S0140-6736(17)31267-9)
- Rwashana, A. S., Nakubulwa, S., Nakakeeto-Kijjambu, M., & Adam, T. (2014). Advancing the application of systems thinking in health: understanding the dynamics of neonatal mortality in Uganda. *Health Research Policy and Systems*, 12(1), 1. <https://doi.org/10.1186/1478-4505-12-36>

- Rycroft-Malone, J., Burton, C. R., Wilkinson, J., Harvey, G., McCormack, B., Baker, R., Dopson, S., Graham, I. D., Staniszewska, S., & Thompson, C. (2016). Collective action for implementation: a realist evaluation of organisational collaboration in healthcare. *Implementation Science*, 11(1), 1-17. <https://doi.org/10.3310/hsdr03440>
- Salignac, F., Marjolin, A., Noone, J., & Carey, G. (2019). Measuring dynamic collaborations: Collaborative health assessment tool. *Australian Journal of Public Administration*, 78(2), 227-249. <https://doi.org/10.1111/1467-8500.12386>
- Sapag, J. C., Rush, B., & Barnsley, J. (2015). Evaluation Dimensions for Collaborative Mental Health Services in Primary Care Systems in Latin America: Results of a Delphi Group. *Administration and Policy in Mental Health and Mental Health Services Research*, 42(3), 252-264. <https://doi.org/10.1007/s10488-014-0567-z>
- Sarkies, M. N., Bowles, K. A., Skinner, E. H., Haas, R., Lane, H., & Haines, T. P. (2017). The effectiveness of research implementation strategies for promoting evidence-informed policy and management decisions in healthcare: a systematic review. *Implementation Science*, 12, Article 132. <https://doi.org/10.1186/s13012-017-0662-0>
- Sauter, A., Lindacher, V., Rueter, J., Curbach, J., & Loss, J. (2020). How Health Promoters Can Assess Capacity Building Processes in Setting-Based Approaches-Development and Testing of a Monitoring Instrument. *International journal of environmental research and public health*, 17(2), 407. <https://doi.org/10.3390/ijerph17020407>
- Schulz, A. J., Israel, B. A., & Lantz, P. (2003). Instrument for evaluating dimensions of group dynamics within community-based participatory research partnerships. *Evaluation and Program Planning*, 26(3), 249-262. [https://doi.org/10.1016/S0149-7189\(03\)00029-6](https://doi.org/10.1016/S0149-7189(03)00029-6)
- Schwarzman, J., Bauman, A., Gabbe, B. J., Rissel, C., Shilton, T., & Smith, B. J. (2019a). The Funding, Administrative, and Policy Influences on the Evaluation of Primary Prevention Programs in Australia. *Prevention science*, 20(6), 959-969. <https://doi.org/10.1007/s11121-019-00997-4>
- Schwarzman, J., Bauman, A., Gabbe, B. J., Rissel, C., Shilton, T., & Smith, B. J. (2019b). Understanding the factors that influence health promotion evaluation: The development and validation of the evaluation practice analysis survey. *Evaluation and Program Planning*, 74, 76-83. <https://doi.org/10.1016/j.evalprogplan.2019.03.002>
- Schwarzman, J., Bauman, A., Gabbe, B. J., Rissel, C., Shilton, T., & Smith, B. J. (2021). How practitioner, organisational and system-level factors act to influence health promotion evaluation capacity: validation of a conceptual framework. *Evaluation and Program Planning*, 102019. <https://doi.org/10.1016/j.evalprogplan.2021.102019>
- Scott, R. J., Cavana, R. Y., & Cameron, D. (2016). Recent evidence on the effectiveness of group model building. *European Journal of Operational Research*, 249(3), 908-918. <https://doi.org/10.1016/j.ejor.2015.06.078>
- Sim, J., & Waterfield, J. (2019). Focus group methodology: some ethical challenges. *Quality & Quantity*, 53(6), 3003-3022. <https://doi.org/10.1007/s11135-019-00914-5>
- Siokou, C., Morgan, R., & Shiell, A. (2014). Group model building: a participatory approach to understanding and acting on systems. *Public Health Research & Practice*, 25(1). <https://doi.org/10.17061/phrp2511404>
- SiREN. (2018). *SiREN sector needs assessment survey [Internet]*. Curtin University. Retrieved July 2021 from <https://siren.org.au/wp-content/uploads/2019/07/2018-SiREN-SHBBV-Sector-Needs-Assessment-Survey-Report.pdf>
- SiREN. (2022). *Research And Evaluation Projects*. <https://siren.org.au/research/>
- Smith, H., Wright, D., Morgan, S., Dunleavy, J., & Moore, M. (2002). The 'Research Spider': a simple method of assessing research experience. *Primary Health Care Research and Development*, 3(3), 139-140. <https://doi.org/10.1191/1463423602pc102xx>
- Sridharan, S., & Nakaima, A. (2017). Valuing and embracing complexity: How an understanding of complex interventions needs to shape our evaluation capacities building initiatives.

- Evaluation and Program Planning*, 80, 101440.
<https://doi.org/10.1016/j.evalprogplan.2017.05.001>
- Stack, R., Leal, N., Stamp, S., Reveruzzi, B., Middlin, K., & Lennon, A. (2018). Complex evaluations in the political context: Engaging stakeholders in evaluation design. *Evaluation Journal of Australasia*, 18(2), 122-131. <https://doi.org/10.1177/1035719x18778699>
- Stamatakis, K. A., Ferreira Hino, A. A., Allen, P., McQueen, A., Jacob, R. R., Baker, E. A., & Brownson, R. C. (2017). Results from a psychometric assessment of a new tool for measuring evidence-based decision making in public health organizations. *Evaluation and Program Planning*, 60, 17-23. <https://doi.org/10.1016/j.evalprogplan.2016.08.002>
- Sterman, J. (2000). *Business Dynamics: Systems Thinking and Modeling for a Complex World*. McGraw-Hill.
- Sterman, J. D. (2006). Learning from evidence in a complex world. *American Journal of Public Health*, 96(3), 505-514. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1470513/pdf/0960505.pdf>
- Stewart, M. K., Felix, H. C., Cottoms, N., Olson, M., Shelby, B., Huff, A., Colley, D., Sparks, C., & McKindra, F. (2013). Capacity building for long-term community-academic health partnership outcomes. *International Public Health Journal*, 5(1), 115-128. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4349567/>
- Strifler, L., Cardoso, R., McGowan, J., Cogo, E., Nincic, V., Khan, P. A., Scott, A., Ghassemi, M., MacDonald, H., & Lai, Y. (2018). Scoping review identifies significant number of knowledge translation theories, models, and frameworks with limited use. *Journal of Clinical Epidemiology*, 100, 92-102. <https://doi.org/10.1016/j.jclinepi.2018.04.008>
- Suarez-Balcazar, Y., Harper, G. W., & Lewis, R. (2005). An interactive and contextual model of community-university collaborations for research and action. *Health Education & Behavior*, 32(1), 84-101. <https://doi.org/10.1177/1090198104269512>
- Taghreed, A., & De Savigny, D. (2012). Systems thinking for strengthening health systems in LMICs: need for a paradigm shift. *Health Policy and Planning*, 27(4), iv1-iv3. <https://doi.org/10.1093/heapol/czs084>
- Taylor-Ritzler, T., Suarez-Balcazar, Y., Garcia-Iriarte, E., Henry, D. B., & Balcazar, F. E. (2013). Understanding and measuring evaluation capacity: A model and instrument validation study. *American Journal of Evaluation*, 34(2), 190-206. <https://doi.org/10.1177/1098214012471421>
- Taylor-Powell, E., & Boyd, H. H. (2008). Evaluation capacity building in complex organizations. *New Directions for Evaluation*, 2008(120), 55-69. <https://doi.org/10.1002/ev.276>
- Times Higher Education. (2021). *World University Rankings 2021 [Internet]*. Retrieved July 2021 from https://www.timeshighereducation.com/world-university-rankings/2021/world-ranking#!/page/0/length/25/sort_by/rank/sort_order/asc/cols/stats
- Times Higher Education. (2022). *Impact Rankings 2022: partnerships for the goals (SDG 17) methodology*. Retrieved June 13, 2022 from <https://www.timeshighereducation.com/impact-rankings-2022-partnerships-goals-sdg-17-methodology>
- Tobin, R., Crawford, G., Hallett, J., Maycock, B. R., & Lobo, R. (2022). Utilizing causal loop diagramming to explore a research and evaluation capacity building partnership. *Frontiers in Public Health*, 10, 857918. <https://doi.org/10.3389/fpubh.2022.857918>
- Tobin, R., Hallett, J., Lobo, R., & Maycock, B. R. (2019). Taking a systems approach to explore the impacts and outcomes of a research and evaluation capacity building partnership: a protocol. *BMJ Open*, 9(9), e026706. <https://doi.org/10.1136/bmjopen-2018-026706>
- Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*, 19(6), 349-357. <https://doi.org/10.1093/intqhc/mzm042>
- Torres-Cuello, M. A., Pinzón-Salcedo, L., & Midgley, G. (2018). Developing a Systemic Program Evaluation Methodology: A Critical Systems Perspective. *Systems Research and Behavioral Science*, 35(5), 538-547. <https://doi.org/10.1002/sres.2561>

- Traeger, M., Asselin, J., El Hayek, C., Dittmer, J., Wright, E., Carter, A., Vickers, T., Patel, P., Fairley, C., & Donovan, B. (2021). Trends in incidence of bacterial sexually transmitted infections among gay and bisexual men using PrEP in Australia. *Journal of the International AIDS Society*, 24(S1), 39-40. <https://go.gale.com/ps/i.do?id=GALE%7CA656303566&sid=googleScholar&v=2.1&it=r&linkaccess=abs&issn=17582652&p=AONE&sw=w&userGroupName=anon%7E91d58ddf>
- Ulrich, W. (2010). Critical systems heuristics. In Reynolds M & H. S (Eds.), *Systems Approaches to Managing Change: A Practical Guide*. Springer: London.
- Valcourt, N., Walters, J., Javernick-Will, A., & Linden, K. (2020). Assessing the efficacy of group model building workshops in an applied setting through purposive text analysis. *System Dynamics Review*, 36(2), 135-157. <https://doi.org/10.1002/sdr.1657>
- Van Mierlo, B., Regeer, B., van Amstel, M., Arkesteijn, M., Beekman, V., Bunders, J., de Cock, T., Elzen, B., Hoes, A., C., & Leeuwis, C. (2010). *Reflective monitoring in action. A guide for monitoring system innovation projects*. <https://edepot.wur.nl/149471>
- Van Mullem, C., Burke, L. J., Dohmeyer, K., Farrell, M., Harvey, S., John, L., Kraly, C., Rowley, F., Sebern, M., & Twite, K. (1999). Strategic planning for research use in nursing practice. *JONA: The Journal of Nursing Administration*, 29(12), 38-45. <https://doi.org/10.1097/00005110-199912000-00008>
- Van Selm, M., & Jankowski, N. W. (2006). Conducting Online Surveys. *Quality and Quantity*, 40(3), 435-456. <https://doi.org/10.1007/s11135-005-8081-8>
- Vandenbroeck, P., Goossens, J., & Clemens, M. (2007). *Foresight, tackling obesities: future choices building the obesity system map*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/295154/07-1179-obesity-building-system-map.pdf
- Vang, K., Moore, M., & Nicklin, C. (2021). Applying a systems and complexity lens to building evaluation capacity: Learning from a multicountry donor's experience. *New Directions for Evaluation*, 2021(170), 101-111. <https://doi.org/10.1002/ev.20463>
- Varghese, J., Kutty, V. R., Paina, L., & Adam, T. (2014). Advancing the application of systems thinking in health: understanding the growing complexity governing immunization services in Kerala, India. *Health Research Policy and Systems*, 12(1), 1. <https://doi.org/10.1186/1478-4505-12-47>
- Vaughn, L. M., Jacquez, F., & Zhen-Duan, J. (2018). Perspectives of Community Co-Researchers About Group Dynamics and Equitable Partnership Within a Community–Academic Research Team. *Health Education & Behavior*, 45(5), 628-689. <https://doi.org/10.1177/1090198118769374>
- Vennix, J. A. (1999). Group model-building: tackling messy problems. *System Dynamics Review: The Journal of the System Dynamics Society*, 15(4), 379-401.
- Ventana Systems Inc. (2015). *Vensim Software*. Retrieved July 5, 2016 from <http://vensim.com/vensim-software/>
- Veritas Health Innovation. (2020). *Covidence systematic review software*. <https://www.covidence.org/>
- von Bertalanffy, L. (1969). *General systems theory; foundations, development and applications*.
- Von Der Gracht, H. A. (2012). Consensus measurement in Delphi studies. *Technological Forecasting and Social Change*, 79(8), 1525-1536. <https://doi.org/10.1016/j.techfore.2012.04.013>
- Vujcich, D., Roberts, M., Gu, Z., Kao, S.-C., Lobo, R., Mao, L., Oudih, E., Phoo, N. N. N., Wong, H., & Reid, A. (2021). Translating best practice into real practice: Methods, results and lessons from a project to translate an English sexual health survey into four Asian languages. *PLoS One*, 16(12), e0261074. <https://doi.org/10.1371/journal.pone.0261074>
- Wade, J., & Kallemeyn, L. (2020). Evaluation capacity building (ECB) interventions and the development of sustainable evaluation practice: An exploratory study. *Evaluation and Program Planning*, 79. <https://doi.org/10.1016/j.evalprogplan.2019.101777>

- Wallerstein, N., Oetzel, J., Duran, B., Tafoya, G., Belone, L., & Rae, R. (2008). What predicts outcomes in CBPR? In M. Minkler & N. Wallerstein (Eds.), *Community-Based Participatory Research for Health: From Process to Outcomes* (2nd edition ed., pp. 371- 393). San Francisco: Jossey-Bass.
- Wilkinson, H., Hills, D., Penn, A., & Barbrook-Johnson, P. (2021). Building a system-based Theory of Change using Participatory Systems Mapping. *Evaluation*, 27(1), 80-101.
<https://doi.org/10.1177/1356389020980493>
- Wilkinson, J., Goff, M., Rusoja, E., Hanson, C., & Swanson, R. C. (2018). The application of systems thinking concepts, methods, and tools to global health practices: an analysis of case studies. *Journal of evaluation in clinical practice*, 24(3), 607-618. <https://doi.org/10.1111/jep.12842>
- Williams, B., & Hummelbrunner, R. (2010). *Systems Concepts in Action: A Practitioner's Toolkit*. Stanford University Press.
- Williams, B., & Imam, I. (2006). *Systems concepts in evaluation: An expert anthology*. EdgePress of Inverness Point Reyes, CA.
- Williamson, A., Tait, H., El Jardali, F., Wolfenden, L., Thackway, S., Stewart, J., O'Leary, L., & Dixon, J. (2019). How are evidence generation partnerships between researchers and policy-makers enacted in practice? A qualitative interview study. *Health Research Policy and Systems*, 17(1). <https://doi.org/10.1186/s12961-019-0441-2>
- Williamson, D. A., & Chen, M. Y. (2020). Emerging and Reemerging Sexually Transmitted Infections. *New England Journal of Medicine*, 382(21), 2023-2032.
<https://doi.org/10.1056/nejmra1907194>
- Wilson, M. G., Lavis, J. N., & Guta, A. (2012). Community-based organizations in the health sector: a scoping review. *Health Research Policy and Systems*, 10(1), 36.
<https://doi.org/10.1186/1478-4505-10-36>
- Wilson, M. G., Lavis, J. N., Travers, R., & Rourke, S. B. (2010). Community-based knowledge transfer and exchange: Helping community-based organizations link research to action. *Implementation Science* 33. <https://doi.org/10.1186/1748-5908-5-33>
- WK Kellogg Foundation. (2004). *WK Kellogg Foundation logic model development guide*. WK Kellogg Foundation. <https://hmstrust.org.au/wp-content/uploads/2018/08/LogicModel-Kellogg-Fdn.pdf>
- World Health Organization. (2021). *Evidence, policy, impact: WHO guide for evidence-informed decision-making*. <https://www.who.int/publications/i/item/9789240039872>
- Wright, N. M., Olomi, J. M., & Deprince, A. P. (2020). Community-Engaged Research: Exploring a Tool for Action and Advocacy. *Journal of Trauma & Dissociation*, 21(4), 452-467.
<https://doi.org/10.1080/15299732.2020.1770150>
- Wye, L., Cramer, H., Beckett, K., Farr, M., Le May, A., Carey, J., Robinson, R., Anthwal, R., Rooney, J., & Baxter, H. (2020). Collective knowledge brokering: the model and impact of an embedded team. *Evidence & Policy*, 16(3), 429-452.
<https://doi.org/10.1332/174426419x15468577044957>
- Yourkavitch, J., Hassmiller Lich, K., Flax, V. L., Okello, E. S., Kadzandira, J., Katahoire, A. R., Munthali, A. C., & Thomas, J. C. (2018). Interactions among poverty, gender, and health systems affect women's participation in services to prevent HIV transmission from mother to child: A causal loop analysis. *PLoS One*, 13(5), e0197239. <https://doi.org/10.1371/journal.pone.0197239>
- Zampini, G. F. (2018). Evidence and morality in harm-reduction debates: can we use value-neutral arguments to achieve value-driven goals? *Palgrave Communications*, 4(1), 1-10.
<https://doi.org/10.1057/s41599-018-0119-3>
- Zappala, G. (2020). Meaningful Evaluation: a holistic and systemic approach to understanding and assessing outcomes. *Cosmopolitan Civil Societies: An Interdisciplinary Journal*, 12(2-3).
<https://doi.org/10.5130/ccs.v12.i2-3.7034>

Zych, M. M., Berta, W. B., & Gagliardi, A. R. (2020). Conceptualising the initiation of researcher and research user partnerships: a meta-narrative review. *Health Research Policy and Systems*, 18(1), 24-24. <https://doi.org/10.1186/s12961-020-0536-9>