

1 **Abstract**

2

3 **Background**

4 Rural settings challenge healthcare providers to provide optimal medication services in a timely and
5 quality manner. Extending the roles of rural healthcare providers is often necessary to improve access
6 to medication services; however, there appears to be a lack of pharmacy-based involvement and
7 support within the medication system.

8

9 **Objectives**

10 This paper explores medication supply and management issues in rural settings, based on the
11 governance perspectives of key informants on regulatory aspects, policy and professional practice.
12 Specific objectives were to:

- 13 • Identify the key issues and existing facilitators, and
14 • Explore the potential role of pharmacy to improve medication supply and management services.

15

16 **Methods**

17 Semi-structured interviews were conducted with representatives within regulatory or professional
18 organisations. The participants were key informants who held leadership, managerial and/or
19 leadership roles within their respective organisations, and were recruited to provide insights from a
20 governance perspective prior to data collection in the community. An interview guide, informed by
21 the literature, assisted the flow of the interviews, exploring topics such as key issues, existing
22 initiatives and potential pharmacy-based facilitators in relation to medication supply and management
23 in rural settings.

24

25 **Results**

26 Issues identified that hindered the provision of optimal medication supply and management services
27 in the rural areas centred on workforce, inter-professional communication, role structures and funding
28 opportunities. Legislative and electronic developments and support mechanisms aim to facilitate
29 medication processes in rural areas. Potential initiatives to further enhance medication services and
30 processes could explore extended roles for pharmacists and pharmacy support staff, as well as
31 alternative service delivery models to enhance pharmacy workforce capacity.

32

33 **Conclusions**

34 The study provided an overview of key issues with medication supply and management and
35 highlighted the potential for increased pharmacy involvement to improve and support medication
36 services in rural areas. The governance views of these key informants could be used to inform policy
37 and practice related to rural medication services.

38 **INTRODUCTION**

39

40 Medication management is a complex process that involves a range of healthcare providers and tasks:
41 prescribing, recording of the medication order or prescription (data entry), review of the medication
42 order or prescription, issue of the medication, provision of medication information, distribution and
43 storage, administration of medication, monitoring for the patient's response, and transfer of verified
44 information between healthcare providers.¹

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46 In Australia, the management of medication services is complicated by the division of responsibilities,
47 funding and regulatory aspects of healthcare delivery between the Commonwealth (national)
48 Government and State/Territory Governments. For example, the Commonwealth Government
49 oversees registration, credentialing and scopes of practice of a range of healthcare practitioners
50 through the National Registration and Accreditation Scheme (as of July 2010) and the subsidy of
51 pharmaceuticals under the national Pharmaceuticals Benefits Scheme (PBS).^{2,3} By comparison,
52 regulatory aspects relevant to the handling of medications (also referred to as drugs and poisons) by
53 healthcare practitioners and providers falls under the jurisdiction of States and Territories, and can
54 differ between jurisdictions.^{2,3}

55

56 Rural settings impose further complexity in the medication management cycle. Australia is one of the
57 few developed countries with vast areas comprising small and highly-dispersed communities,
58 resulting in low population densities and long distances between communities.^{4,5} Access to the full
59 complement of medical, other health professional and community services is at least 80km or an hour
60 away by road.⁵ In Queensland, almost 98% of the state is classified as “outer regional”, “remote” or
61 “very remote”, where approximately 22% of people live, in comparison to the corresponding
62 Australian average of 13%.⁴ The geographical, social and professional isolations have been identified
63 to compromise rural health workforce and the viability of healthcare services, which in turn
64 challenges existing rural healthcare providers to provide optimal healthcare, including medication
65 services, in a timely and quality manner.^{2,3,6,7} As such, rural healthcare often requires extended clinical
66 skills and overlapping or changing roles of healthcare providers to cope with healthcare demands.^{5,7}
67 For example, in Queensland, registered nurses, midwives, paramedics and Indigenous health workers,
68 often practise with endorsed roles in medication initiation, supply and administration to improve
69 access to medications in rural areas.^{3,7,8} Some of these extended roles are outside the traditional
70 scopes of practice of these healthcare providers, and support structures, ideally pharmacy-based, are
71 required for these providers to assist them in medication *management* processes, and thus promote
72 “Quality Use of Medicines” (QUM) in the community.^{2,3,7,9,10}

73

74 A Pharmacy Workforce Planning Study reported that the majority of pharmacists are concentrated in
75 major cities and inner regional areas, with less than 10% of the workforce distributed across outer
76 regional, remote and very remote areas.¹¹ Other data showed that the number of community
77 pharmacists per 100,000 population in rural and remote areas ranges between 25 and 60, compared to
78 70 in major cities, whereas hospital pharmacists per 100,000 population ranges between 4 and 8,
79 compared to 13 in major cities.¹⁰ Pharmacy services in rural areas are often provided by one or few
80 community pharmacists with either one or no hospital pharmacist employed at the local hospital, and
81 nurses are relied upon to undertake pharmacy-based medication roles at non-pharmacist hospitals.¹⁰
82 Due to the limited pharmacy workforce in rural areas, the majority of rural pharmacists are required to
83 be mainly engaged with dispensing roles. This, in turn, impedes their capacity to provide additional
84 pharmacy services, despite developments in enhanced pharmacy services (e.g. weight loss, asthma,
85 diabetes, smoking cessation), pharmacist-mediated medication review services and increased roles to
86 minimise medication-related errors such as medication information liaison and multi-disciplinary
87 integrative services.^{3,6,10,12,13} Studies to apply these developments in rural areas are lacking, and there
88 is potential for research into alternative service delivery models to expand pharmacy workforce to
89 improve QUM and provide medication support in rural areas, where there is increased reliance on
90 medication therapy and often no healthcare services offering alternative or adjunct therapy.

91

92 This paper reports the first of two phases of data collection that explores medication supply and
93 management issues in rural settings, based on the governance perspectives of key informants on
94 regulatory aspects, policy and professional practice. Specific objectives were to:

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- 96 • Identify the key issues and existing facilitators, and
- 97 • Explore the potential role(s) of pharmacy (pharmacists and pharmacy support staff) to improve
98 medication supply and management services.

99

100 **METHODS**

101

102 Ethical approval was granted by the Griffith University Human Research Ethics Committee, the
103 University of Southern Queensland Human Research Ethics Committee, the University of Queensland
104 Behavioural & Social Sciences Ethical Review Committee, and the Darling Downs-West Moreton
105 (Toowoomba & Darling Downs) Health Service District Human Research Ethics Committee. The
106 multiple approvals were required for access to interviewees beyond the immediate regions of the
107 researchers.

108

109 Following a review of the literature, the data collection stage relevant to this paper involved semi-
110 structured interviews with key informants with roles and expertise in medication services governance.

111 Information reported elsewhere presents the full scope of the project, which also included subsequent
112 identification of a rural community of interest and data collection with rural healthcare providers and
113 consumers within that study community to further contextualise the data from the key informant
114 research stage presented here.¹⁴

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116 This exploratory research phase involved purposive sampling¹⁵ to elucidate a range of perspectives
117 and experiences from representatives within organisations involved in policy, regulatory and/or
118 professional aspects of healthcare that may impact on medication services delivery in rural
119 communities. Twelve key informants, who held leadership, managerial and/or administrative roles in
120 their respective organisations, were contacted to participate in individual semi-structured interviews:

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- 122 • A representative from the Australian Health Practitioner Regulation Agency (AHPRA),
- 123 • A representative from the Australian Health Workforce Institute (AHWI),
- 124 • A representative from the Australia Pharmacy Council (APC),
- 125 • Two representatives from Medication Services Queensland (MSQ), Queensland Health, of
126 which one was from a non-pharmacy background,
- 127 • A representative from Pharmaceutical Defence Limited (PDL),
- 128 • A representative from the Pharmaceutical Society Australia (PSA),
- 129 • A representative from the Pharmacy Guild of Australia (the Guild),
- 130 • A representative from the Queensland Health Drugs and Poisons (QHD&P) Unit,
- 131 • Two hospital pharmacists, one with managerial experience in a multiple-pharmacist regional
132 hospital, and the other with experience as a sole pharmacist in a rural hospital, and
- 133 • A sole hospital pharmacy assistant, with practice experience under the supervision of a
134 registered nurse in a non-pharmacist rural hospital.

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136 The limited geographical focus of the data collection was necessitated by the scope of the subsequent
137 research stage and accessibility of the key informants. The involvement of Queensland-based key
138 informants from various organisations was considered valuable in contextualising the findings from a
139 range of governance perspectives relevant to legislative, practice and role development specific to
140 Queensland. Key informants from pharmacy-based organisations (APC, PDL, PSA, and the Guild)
141 were specifically recruited to gain information about medication-related policies and issues, with
142 particular focus on rural settings, and to explore potential solutions involving pharmacists and/or
143 pharmacy staff in both hospital and community settings. The administrative perspective of the
144 hospital pharmacists and pharmacy assistant was considered valuable in discussions relating to
145 hospitals with multiple pharmacists, hospitals with a single pharmacist and hospitals functioning
146 without a pharmacist (common in rural areas). Key informants from AHPRA, AHWI and QHD&P

147 were recruited to provide an overview of workforce and regulatory issues. Representatives from
148 MSQ, Queensland Health's corporate directorate responsible for QUM, provided insights into
149 medication-related initiatives, policies and issues in public hospital settings, focusing on rural
150 hospitals which were predominantly serviced by Queensland Health. Two of the key informants (de-
151 identified) had nursing practice experience and were able to also provide opinions from nursing
152 perspectives.

153

154 The purpose and nature of the study was explained to the participants prior to their interviews, and
155 again at the start of the interview. While the participants were approached as representatives from
156 their respective organisations, participants who held multiple roles, either in practice and/or
157 representatively, and either at the time of the interview or in previous positions, were allowed to
158 provide opinions from both governance and practice perspectives. Representatives who declined to
159 participate in the study, mainly due to work responsibilities, provided the name of another
160 representative within that organisation. All participants provided consent to their participation and
161 recording of the interviews.

162

163 An interview guide (Table 1) was developed, informed by the literature, to assist the flow of the
164 interviews. Interviews started with a brief discussion of major issues in the provision of medication
165 services in rural settings, specifically focusing on medication supply and management. This was
166 followed by a discussion of a range of topics, with a degree of flexibility to allow key informants to
167 expand on topics according to their area of expertise, as per semi-structured interview methods.^{15,16}

168 Topics of interest included:

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- 170 • Current medication roles, including extended roles, of rural healthcare providers.
- 171 • Current and potential facilitators relevant to medication supply and management, and associated
172 challenges.

173

174 As the parent study focused on rural settings in Queensland, interviews with key informants referred
175 to the medication-related authorities and roles in the Queensland Health (Drugs and Poisons)
176 Regulation 1996,⁸ although participants could reference provisions in other States or Territories as
177 comparison. Interviews also referred to Commonwealth Government policies such as the provisions in
178 the PBS and the objectives of the National Medicines Policy,² namely, (1) timely access to affordable
179 medications, (2) responsible and quality delivery of medication services with best practice regulatory
180 systems in place, and (3) QUM.

181

182 Interviews were conducted between August and November 2010, for approximately 45-60 minutes
183 each, jointly by two of the researchers (AT, VJ) to enhance the quality of the data collection process.

184 The interviews were conducted face-to-face (with the exception of one telephone interview as the
185 informant was not in Brisbane at the time of interview), and recorded, with signed consent from each
186 participant.

187

188 Upon reaching theme saturation, the interviews were transcribed verbatim. Qualitative techniques
189 were applied for data analysis to identify themes, general trends, major issues, differences and unique
190 individual responses. These were manually identified from the transcripts, to ensure accuracy of
191 interpretation and contextualisation of the participants' comments to prevent misinterpretation of data
192 that is possible with electronic-based analysis. The dominant themes from the data analysis are
193 reported below and were also used to strengthen identified issues, or build on issues otherwise
194 unidentified, in the literature to formulate interview topics for subsequent data collection in the study
195 rural community.

196

197 **RESULTS**

198

199 To maintain confidentiality in reporting the findings, the key informants are coded as K1 through to
200 K12, without affiliation with their organisation or sector. Some key informants revealed relevant
201 rural practice experience, as reported below.

202

203 **Major Issues in Provision of Medication Supply and Management Services in Rural Settings**

204

205 **Rural healthcare environment:** The workforce shortage was perceived to impede the continuity of
206 therapy and patient care in the primary healthcare sector. This not only burdens the primary healthcare
207 workforce, but also results in patients utilising secondary-care services as a first port of call:

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209 *"[There is a] very limited pool of people ... The queue to see the GP is long and passers-by and other*
210 *people cannot get into the GP, so they turn up at the hospital, and the hospital is functioning like a*
211 *GP clinic on some days."* (K4)

212

213 Working in rural areas imposes social challenges such as lack of collegial support, interaction and
214 communication. Lack of professional support for sole practitioners or recent graduates in terms of
215 clinical and therapeutic decisions was raised by several participants. Timely communication of
216 medication information can also be lacking between healthcare providers who may be overloaded
217 with patients' healthcare demands.

218

219 **Role extension:** While participant K5 pointed out that about three-quarters of the public hospitals in
220 rural Queensland did not employ a pharmacist, and registered nurses on site were up-skilled to

221 undertake pharmacy-based functions in these non-pharmacist hospitals. While some of the
222 participants acknowledged the skills of other healthcare providers in the field of medications,
223 concerns were raised about overlapping roles and up-skilling, particularly relating to nursing staff
224 undertaking pharmacy-based functions without professional support from a pharmacist. The requisite
225 training, level of pharmacotherapy knowledge required, increased workload, patient prioritisation and
226 deviation from true core role(s) were some of the key issues raised.

227

228 Numerous participants commented that inappropriate allocation of funding for role extension to
229 provide pharmacy services, instead of supporting outreach pharmacists to provide such services,
230 contributed to the incomprehensive medication services in rural areas:

231

232 *“Right now, we’re spending an awful lot of time developing training programs, to train Indigenous*
233 *health workers and nurses to actually undertake a role that (pharmacists) are actually trained for ...*
234 *the only reason (pharmacists) are not doing it is because there’s no remuneration package to allow*
235 *pharmacists to perform that role.” (K12)*

236

237 **Under-utilisation of pharmacists:** Some participants commented that rural hospitals that did employ
238 pharmacists did not utilise a pharmacist’s expertise appropriately, as they are expected to fulfil basic
239 dispensing tasks. The majority of participants expressed their concern about the shortage of clinical
240 pharmacy services (e.g. medication reconciliation, medication review services and therapeutic
241 recommendations), and the potential for higher rates of medication-related events as a result. This was
242 particularly an issue in facilities without pharmacists or where pharmacists are being burdened with
243 dispensing tasks:

244

245 *“If you take it back to basics, the first thing the hospital wants a pharmacist to do is supply. That’s the*
246 *legal requirement, that’s what we need for the patient. ... the clinical pharmacy is the nice bit that we*
247 *can drop if we’re short of funding there’s no one we can recruit, et cetera ...” (K4)*

248

249 Pharmacists were also under-utilised in healthcare programs, which may enhance health services in a
250 rural setting. Participant K5 cited the example of the federally-funded ‘Transition Care Program’,
251 which identifies patients’ needs in transition from a hospital to a non-hospital environment, and
252 pointed out the potential of pharmacist involvement to facilitate medication information transfer and
253 to provide post-discharge medication reviews. It is, however, currently restricted by workforce issues
254 and lack of remuneration.

255

256 Participant K12 also commented on the limitations of the PBS Section 100 scheme in Australia,
257 which involves the bulk delivery of PBS medications, with no dispensing or labelling, to a remote or

258 isolated Aboriginal Health Services. The participant reflected on the inappropriate role structures
259 involved:

260

261 *“[Pharmacists] really have a house-keeping role – they turn up, they drop off the drugs, they remove*
262 *the old drugs, do appliance clean-up at the clinic’s room and leave again. Then you have an*
263 *[Indigenous] health worker who unpacks it, puts it away and then supplies it to a patient based on*
264 *[the order that] is sent to them by the doctor or the nurse. So the true person [i.e. the pharmacist]*
265 *with the expertise in providing medication and providing counselling is not interfacing with the*
266 *patient, no interaction like what would normally happen in a community pharmacy. That’s just really*
267 *disjointed and a poor use of the ability of a pharmacist.” (K12)*

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269 **Existing Facilitators for Medication Supply and Management**

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271 Table 1 provides a summary of identified existing facilitators.

272

273 **Regulatory aspects:** Participant K2 explained that extending the roles of rural healthcare providers
274 aims to promote continuity of therapy in rural communities where healthcare services are scarce. This
275 was supported by a number of participants:

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277 *“Patients don’t care if their care is delivered by a nurse practitioner, a senior registrar, a physician*
278 *assistant or general practitioner. What the patient wants is quality care in a timely manner, delivered*
279 *in a caring manner. [But] there’s a balance between increasing access and ... unsafe practice.” (K6)*

280

281 However, participants K7 and K12 pointed out the divergence between Federal and State/Territory
282 protocols, contributing to confusion and inefficiency in legislative compliance. Several participants
283 also commented that current legislation does not allow the flexibility needed in a rural environment.
284 Quite often the roles of healthcare providers are ‘stretched’ to meet healthcare demands, and there is a
285 perceived tension between following legislative boundaries and providing patient care:

286

287 *“There’re a lot of pharmacists in the country who would like to [provide off-site pharmacy services],*
288 *but they’re constrained by the requirement to be in the pharmacy while the pharmacy is open. We*
289 *lock people into the pharmacy.” (K8)*

290

291 **Support:** Queensland Health’s corporate directorate responsible for QUM, MSQ, has been actively
292 involved in providing training and clinical support to healthcare providers in rural communities,
293 particularly sole practitioners or those undertaking non-traditional medication roles. The concepts

294 were supported by participants, but they acknowledged that funding shortages and workforce issues
295 were hindering the ideal implementation and uptake of these support mechanisms.

296

297 **Electronic development:** Participants K4, K9 and K10 also commented on the benefits of software
298 packages developed for state-wide use in Queensland Health public hospital facilities to facilitate
299 medication processes such as ordering or issuing of drugs (iPharmacy[®]) and transfer of medication-
300 related information to healthcare providers within a facility, between facilities and in the general
301 community (eLMS). As these support systems are generally utilised by pharmacists rather than
302 nurses, training and assessment modules have been developed to familiarise nursing staff in non-
303 pharmacist hospitals with medication supply and reconciliation processes as well as the use of the
304 software. The participants expressed difficulties such as infrequent on-site training and high turnover
305 of staff in these sites, resulting in poor sharing of expertise and succession training amongst nursing
306 staff.

307

308 **Potential Facilitators for Medication Supply and Management**

309

310 Key informants believed that some healthcare providers have demonstrated competency in practice
311 when undertaking extended roles in rural communities, for example, nurses adopting medication
312 *supply* roles to enhance consumers' access to medications. However, pharmacy support to achieve
313 quality medication services, including medication *management*, in rural areas was perceived as the
314 next target to support the provision of healthcare and to enhance QUM in rural communities.

315

316 **Non-medical prescribers:** Some participants proposed arguments for increased use of non-medical
317 prescribers, including pharmacists, to provide greater workforce capacity in a rural setting. This
318 should free up medical doctors somewhat to focus on more complex medical conditions. Some of the
319 examples of roles for pharmacists in 'prescribing' were:

320

321 • Participant K1 suggested the potential of pharmacist-initiated therapy according to a "rural
322 schedule" or protocol for medications with immediate need, such as for urinary tract infection or
323 "cold and flu" with antibiotics, and eye drops for eye infection. Despite this, the participant
324 believed that training, competency measures and defined protocols were needed for
325 implementation, as this role requires more specialised skills compared to supplying a pharmacist-
326 only product in a pharmacy.

327

328 • Participants K1 and K3 commented that pharmacists could have a role in chronic disease
329 medication management to ensure continuity of therapy and to ease access issues in rural
330 communities. This was clarified as not initiating therapy, but rather the pharmacist writing a

331 prescription for a continuing therapy in cases where the patient's condition is stable and/or the
332 patient is unable to see a doctor for a new prescription, a form of 'supplementary prescribing'.
333

334 **Alternative delivery models by pharmacists:** Participant K12 stated that a model should be
335 formulated to support pharmacists to provide medication services to rural and isolated areas. This
336 would improve QUM in those communities, and provide a significant support system to rural
337 healthcare providers. While a majority of the participants acknowledged the limitations to providing
338 pharmacists' services full-time to rural areas, some of them have suggested alternative ways to
339 improve the situation:

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341 *"Other professionals are actually recognising now that pharmacists do have a major role to play ...*
342 *[pharmacists] do key things like admission history and reconciliation on admission, ... review, ...*
343 *reconciliation on discharge, counselling and communicate all the information; all that will reduce*
344 *readmission rates. ... [The doctors] want the service but we can't get people out there, so we're*
345 *looking at other options as [there are many] hospitals that are not serviced by a pharmacist on-site."*

346 (K4)

347

348 Video technology: Acknowledging logistical and funding issues, some participants commented that
349 tele-pharmacy, utilising video technology, is a good compromise for physical services, improving
350 access to pharmacists and clinical pharmacy services in rural areas. Participant K4 listed the benefits
351 with the use of video technology to provide access to an off-site or remote pharmacist: assistance with
352 patient consultation, medication consultation via case-conferencing, assistance with inventory
353 management, support for rural pharmacists and medication education to rural healthcare providers.

354

355 Pharmacist outreach services: Hospital-based pharmacists from larger hospitals could undertake a role
356 in providing district outreach support to nearby non-pharmacist hospitals. Apart from auditing
357 inventory management and medication *supply* practices, an outreach pharmacist's role may also
358 include providing on-site training and education to medical and nursing staff, covering topics from
359 medication-related provisions to pharmacotherapeutics:

360

361 *"When I was working in [a rural town] and had to do fly-ins, the hospital staff [were] always happy*
362 *to see you ... The nursing staff always [asked] you a thousand questions. I helped them out because*
363 *they just didn't have a pharmacist at all."* (K12)

364

365 Participants identified barriers, such as remuneration and staffing problems to these initiatives.
366 However, the initiatives were considered important, and the participants perceived significant value
367 from a pharmacist being physically present in a rural facility, compared to remote-services models:

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“[This] would enhance the face-to-face pharmacy service ... until you actually go out to one of those places ... you don’t have an understanding of what [isolation] is actually like and what actually happens, knowing how the hospital physically looks, and the staff ...” (K9)

Sessional pharmacist services: Several participants also identified a potential shared-employment model with an on-site community pharmacist providing part-time or casual pharmacy services to non-pharmacist hospitals in the same rural community. This is a value-added service to the community in supporting doctors in terms of therapeutic recommendations, assisting the nurses in terms of medication supply and management processes, and providing medication consultation to patients.

Reiterating current funding and staffing issues, participant K12 added that this model may increase the workload on the local community pharmacist, particularly in single-pharmacist rural towns, and rational compensation models were required:

“... you leave your pharmacy, race down to the hospital to do two hours of running around like a maniac, and then you race back to your pharmacy where you’ve left your staff keeping everything at bay. They could do basic things, but while you’re not there, they can’t do S3’s, S4’s and S8’s. It’s actually quite hard work on the pharmacist ...” (K12)

Extended roles for pharmacy support staff: Rural pharmacists practising as sole practitioners are often burdened with dispensing tasks, impeding them from undertaking additional medication management roles such as medication reviews. Several participants highlighted the benefits of expanding the roles of pharmacy support staff, thereby releasing pharmacists to focus on more advanced roles.

Pharmacy support staff, such as a pharmacy assistants or technicians, could potentially support medication supply processes in non-pharmacist sites, under the supervision of another healthcare professional, e.g. a registered nurse or director of nursing, to provide more effective basic pharmacy services:

“I think [pharmacy assistants’] knowledge of [legislation requirements] is probably more than the nursing staff have been trained to do. It’s not because the nursing staff is incompetent, it’s because they haven’t been exposed to that area ... [a pharmacy assistant] knows the ordering processes ... the only thing is, we lose the pharmacist function of looking at therapeutic appropriateness of the prescription ... but with nurses, we’re not going to get that either ...” (K10)

405 Participants K10 and K11 also mentioned some of the potentially more clinically-focused roles that a
406 pharmacy assistant or technician could undertake in the future, such as medication reconciliation or
407 checking patients' medication charts for dose and dosage form availability and potential duplication
408 of medications.

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410 Participant K10 commented that having a pharmacy staff member in a medical facility would ease the
411 burden on nursing staff in managing the pharmacy store:

412

413 *"It definitely takes pressure off nursing staff when it comes to supply, because they don't have to deal*
414 *with supply processes and what to do when a brand is short, there's another brand; ... worrying*
415 *about the Controlled Drugs. [The nurses] can focus on their aspects of care."* (K10)

416

417 **DISCUSSION**

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419 The interviews with key informants identified a range of issues relating to the workforce, professional
420 support and communication, role structures and funding opportunities, which hindered the provision
421 of optimal medication supply and management services in rural areas. Existing legislative and
422 electronic developments and support mechanisms aim to promote continuity of therapy, provide
423 medication training and support to rural healthcare providers and facilitate medication processes in
424 rural areas. Pharmacists and pharmacy support staff could potentially play a major role in medication
425 processes, and hence, expanding pharmacy-mediated services in rural areas should be the next key
426 target to support provision of healthcare and to enhance QUM in rural communities. Potential
427 facilitators highlighted by the key informants included:

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- 429 • Increased scope for pharmacists in medication initiation (a 'rural schedule') or supplementary
430 prescribing,
- 431 • Alternative pharmacist-mediated service delivery models via use of video technology (tele-
432 pharmacy), outreach services or sessional employment, and
- 433 • Enhancing the role of pharmacy support staff in the medication supply process.

434

435 The strength of our study lies in the exploratory approach that included a range of representatives,
436 adding breadth and depth to the limited published data on this topic. A number of the key informants
437 who provided their perspectives from their governance viewpoint also drew upon personal rural
438 practice experience during their interviews, which added richness to the data presented and was
439 valuable in contextualising the issues and identifying potential solutions.

440

441 **Key Issues**

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443 Workforce shortages, lack of professional support and communication or interaction between rural
444 healthcare providers were the dominant issues raised by the majority of the key informants, consistent
445 with several Australian healthcare workforce studies.^{3,7,10,12} The interviews conducted further explored
446 perceptions of the impact of these reported challenges on rural healthcare providers providing
447 medication services. A significant concern that could contribute to poor medication management in
448 rural communities was the lack of pharmacy services in addition to basic dispensing services,
449 pharmacist consultation services and pharmacist-mediated support, worsened by the perceived
450 pharmacy workforce shortage.^{3,6,13} Key informants also reported the under-utilisation of rural
451 pharmacists' expertise resulting from the need to prioritise dispensing (medication supply) tasks. The
452 need for enhanced pharmacist roles and improved pharmacy services in rural areas was highlighted by
453 the majority of the participants as a measure to optimise QUM in rural areas.

454

455 **Role or Practice Development**

456

457 The participants, on the whole, supported role extension of rural healthcare providers in medication
458 initiation, supply and administration to improve access to medications.^{8,17-19} This role extension is in
459 line with the proposed 'generalist' career pathway to ensure access to healthcare in all rural
460 communities.⁷ However, similar developments specific to pharmacists' roles are lacking. On the other
461 hand, challenges have been cited, aligned with published reports, that rural healthcare providers with
462 extended medication roles were unable to provide optimal medication services due to lack of
463 familiarity and knowledge to perform such roles.^{3,20-22} Pharmacy-based electronic facilitators, such as
464 iPharmacy[®] and eLMS, developed to enhance medication processes, were also reportedly under-
465 utilised. Key informants commented that training packages were inadequate to support these
466 healthcare providers. There is a need for continuous pharmacy-based medication support amidst
467 limited professional peer support, although research into methods to provide such support is lacking.

468

469 Extending prescribing roles to include non-medical prescribers has been long debated in Australia as a
470 measure to improve continuity of care and medication therapy, particularly in rural areas challenged
471 by workforce shortages.^{7,23} Suggestions by key informants for pharmacist-mediated medication
472 initiation or supplementary prescribing would require legislative amendments, training and
473 endorsements and development of a defined framework.²³ The support for a pharmacist prescribing
474 model is also in line with the APC report *Remote Rural Pharmacists Project*, recommending that
475 remote pharmacists be authorised to prescribe by protocol.³ The *5th Community Pharmacy Agreement*
476 between the Department of Health and Ageing and the Pharmacy Guild of Australia included a
477 recommended model for pharmacists to be able to supply, in the absence of a prescription, a one-

478 month or single-pack of medication, instead of the current short period of three days' supply (based
479 on the Queensland's Health Drugs and Poisons Regulation).^{8,24} This "medication continuance
480 protocol" is under development, and would require jurisdictional drugs and poisons legislation to be
481 amended. It is anticipated to ease access to medications in rural areas where prescribers are
482 unavailable or patients are in short supply, and also increase pharmacists' involvement particularly in
483 management of chronic medication therapy. With the establishment of models for pharmacists'
484 prescribing internationally, developments in this field in Australia are being explored.^{3,23-25}

485
486 The key informants proposed a range of other roles for pharmacists, including a greater focus on
487 clinical pharmacy services, provision of medication information and support to healthcare providers,
488 and expansion of medication review services in primary health care. While the key informants
489 commented on the potential advantages of increasing pharmacists' scope of practice and the ideal
490 provision of medication support by pharmacists to rural healthcare providers, they also highlighted the
491 well-reported shortage of pharmacists and associated services in rural areas.^{3,9,10,13,26} Other studies
492 have explored enhanced roles for pharmacists, however, formal establishment of such roles in rural
493 areas is lacking due to remuneration issues and limited pharmacy workforce capacity.^{3,6,13,27-29}

494 495 **Capacity-building Initiatives**

496
497 One approach to address workforce issues in rural areas is to effectively 'expand' the workforce via
498 alternative service delivery models, namely through the utilisation of video-technology (tele-
499 pharmacy) to address the rural geographical barrier, provision of outreach support by visiting
500 pharmacists and provision of shared-care via sessional employment of the local pharmacist. These
501 approaches were viewed as appropriate by the majority of the key informants, particularly for non-
502 pharmacist hospitals, thereby improving access to medication consultations and promoting QUM.
503 Some of the key informants were able to share their experiences with similar delivery models. All
504 three delivery models have been suggested or identified in a range of studies, although application
505 models in rural areas have not been explored.^{6,9,10,20,26,28,30-33} With the lack of professional support in
506 rural areas, these models were also deemed suitable for providing medication information and clinical
507 support to rural healthcare providers, including sole rural pharmacists.^{13,18,20} However, barriers to the
508 development of these models were cited, including lack of legislative support to provide services
509 outside pharmacy, existing pharmacy practice models that tend to prioritise dispensing, workforce
510 issues to support those delivery models, as well as lack of career or remuneration pathways. Further
511 research into developing these models of delivery is warranted.

512
513 The key informants also supported expanded roles for pharmacy support staff (pharmacy assistants or
514 technicians) to provide enhanced support in terms of medication supply and at the patient-care level,

515 given their training in medications.^{26,34-37} This would also enable pharmacists to focus on medication-
516 related patient care in both hospital and community settings. This is in line with career pathway
517 developments for pharmacy support staff in New Zealand, Canada, the United Kingdom and the
518 United States of America.³⁷ Such initiatives would require further exploration of formalised training,
519 remuneration models, legislation amendment and supervision requirements.^{36,37}

520

521 **Limitations**

522

523 Limitations of our study included lack of input of representatives from Indigenous-based
524 organisations. While the Indigenous community is acknowledged to form a significant population in
525 rural Australia, Indigenous issues require separate investigation due to specific Indigenous policy and
526 practice in Australia.^{3,18,38}

527

528 We also acknowledge potential bias from pharmacy-based key informants. However, key informants
529 were able to report on both positive and negative aspects of rural pharmacy practice and healthcare
530 issues. Another limitation is that the key informants were Queensland-based, and hence, some of the
531 responses may not apply to other Australian jurisdictions to the same extent as there are jurisdictional
532 differences. It should be noted, however, that the concept of facilitators discussed in this paper should
533 be applicable to general rural settings, at least for exploratory purposes.

534

535 The limited geographical focus reported is due to the scope of the study exploring medication supply
536 and management issues within a *specific* rural study community in Queensland. While the purposive
537 sample is statistically non-representative of all policymakers and practitioners in Queensland, the
538 participants represented the majority of relevant organisations and groups with interest in medication
539 services provision in rural Queensland.¹⁵ The range of responses generated was considered valuable in
540 providing an exploratory overview, from a governance perspective, of medication-related issues in
541 rural areas, which can then inform data collection in the specific community.

542

543 **CONCLUSION**

544

545 Optimising healthcare in rural Australia imposes challenges that are different from those in
546 metropolitan areas. Research into roles, practices and legislative developments based on metropolitan
547 areas are often unsuitable to be applied to rural areas. This study presented the insights of key
548 informants with policy development, regulatory or administrative experiences relevant to rural
549 healthcare, particularly medication supply and management services. Practice experiences shared by
550 several key informants further strengthened the quality of the findings.

551

552 The interviews identified a range of issues and challenges relating to medication supply and
553 management processes in rural areas, with the focus on role or practice development and legislative
554 development relevant to medication supply and management. It was found that while some existing
555 medication initiatives, including endorsements involving medication roles and additional training
556 education, were perceived to be beneficial, our data highlighted the role for pharmacy to optimise
557 medication management and support medication services in rural areas.

558

559 The purpose of this exploratory project approach was to inform policy and role development for
560 Queensland, and potentially for other regions with similar recognised limitations in medication
561 services in rural areas. The outcomes from this study also informed interview topics for exploratory
562 research with healthcare providers and consumers in a specific study community.

563

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570

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660

661

662 **TABLES AND FIGURES**

663

664 Table 1: Interview guide

665 Table 2: Existing facilitators for medication supply and management

Table 1: Interview guide

- 1) What do you think are the major issues in rural health care and provision of medication services?
Prompts: Workforce, support (between healthcare providers, government, technology), societal changes (population)
- 2) Which rural healthcare providers are involved in provision of medication supply and management services?
Prompts: Who can prescribe or initiate medication? Who can supply medication? Who helps patients manage their medication?
When a patient is in need of prescription(s) and/or medication(s) after hours, what do they do?
Are there any healthcare providers undertaking extended medication roles? What do you think are the challenges involved?
- 3) What potential models might improve access to medications in rural areas?
What potential models might improve medication management in rural areas?
Prompts: Roles/scope of practice, service delivery models, challenges (support, training, legal implications)
- 4) (If answering from a theoretical perspective) Can you tell us about your experience in terms of rural initiatives and pilot projects, particularly relating to quality supply and use of medications?

Theme	Sub-theme	Notes
Regulatory aspects	Medication roles	Drugs and Poisons Regulation (Qld) ⁸ : <ul style="list-style-type: none"> • Endorsing rural healthcare providers, such as paramedics and registered nurses, to supply medications in non-pharmacist hospitals, • Exploring the role of nurse practitioners and physician’s assistants to prescribe in situations where there is no medical practitioner, and • Endorsing certain licensed businesses to supply Schedule 2 (Pharmacy) Medicines in towns isolated from pharmaceutical services.
	Public Hospital Pharmaceutical Reforms	Changes in PBS requirements allow hospital doctors to prescribe PBS medications for discharge and outpatients, to be dispensed either at the hospital pharmacy or a community pharmacy. The latter is encouraged in non-pharmacist hospitals, as “this allows the patients to gain adequate counselling by a [community] pharmacist, and the nurses [in non-pharmacist sites] don’t get tied down with dispensing.” (K4)
Support	Training	Resource packages, informal training and assessment modules and credentialing processes to equip nurses with information on legislative requirements for medication supply and knowledge to provide basic pharmacy services such as medication reconciliation.
	Professional support	Clinical educators (senior pharmacists) to train junior pharmacists via site visits and video-conferencing; a “buddy-system” and education support to inexperienced pharmacists who are sole practitioners, with the aim of equipping them mainly in management and clinical skills.
	Medication education	Pharmacists travelling to rural areas to provide academic detailing to nurses, doctors and pharmacists in the community (primary health care) and at the local hospital.
Electronic development	iPharmacy	iPharmacy [®] is a dispensing and inventory management software system that is linked state-wide. ⁹ This electronic bridging allows larger hospitals to access and monitor ordering processes conducted by satellite (smaller) hospitals. This is particularly important for district pharmacists to monitor ordering processes in non-pharmacist sites, although the frequency of such monitoring is unknown.
	eLMS	The electronic Liaison Medication System (eLMS) is a web-based software program developed to produce a discharge medication record (DMR) that contains medication information for patients being discharged. ⁹ Some of the information on a DMR includes new, current and ceased medications as well as directions on how to take the medications. The DMR is provided to the discharged patient or carer as well as electronically transferred to the patient’s elected community health practitioners (e.g. GPs, community pharmacists) to enhance the process of medication reconciliation and to facilitate exchange of medication information.