School of Pharmacy

Rural Pharmacy Services in Western Australia: A Time-series Comparative Study

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Declaration

I certify that this thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

To the best of my knowledge and belief, this thesis contains no material previously published by any other person except where due acknowledgement has been made.

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Abstract

Objectives: to evaluate rural pharmacy practice in Western Australia (WA) ("2006 data"), and to perform a time-series comparison with the previous data ("2002 data") that were sourced from the National Pharmacy Database Project in 2002.

Methods: a questionnaire used in the 2006 survey was developed based on that used in the 2002 national survey. In the 2002 survey, questionnaires were mailed to 1391 representative participant pharmacies (82 participants from rural WA), of which 1131 were returned (66 respondents from rural WA). The response rate for rural WA was 80.5%. In the 2006 survey, questionnaires were mailed to all 103 sample pharmacies of rural WA, of which 51 were returned. This gave a response rate of 49.5%. Chi-square tests were used to test individual associations between year of survey against pharmacist or pharmacy characteristics, or provision of services. Where significant associations were reported between year of survey and provision of particular services, logistic regressions controlling for gender, age, PhARIA location, and inclusion of a forward pharmacy area, were performed.

Results: pharmacist characteristics were not significantly different across the two surveys with regard to age, gender, year of registration, qualification, Continuing Professional Education (CPE) involvement, and position. Similar pharmacy characteristics were reported in relation to PhARIA, setting, group membership, inclusion of counselling areas, method of operation, trading hours and annual turnover. Only Quality Care Pharmacy Program (QCPP) accredited-pharmacies significantly increased. In both surveys, WA rural pharmacies offered a range of services, including prescription-related activities, medication reviews, preventive services, primary health care, harm minimisation services, and Enhanced Pharmacy Services (EPS). A significantly higher percentage of pharmacies provided clinical testing for monitoring, Domiciliary Medication Management Reviews (DMMRs), and printed information for non-prescribed medicines. There were marked increases in weight testing and weight management services. Smoking cessation was offered by over 50% of pharmacies, and tended to increase. However, other EPS (asthma, diabetes, hypertension, hyperlipidaemia), which correspond to the National Health Priorities Areas (NHPAs) and rural needs, were reported by less than 50% of pharmacies in both surveys. A shortage of pharmacy workforce still remained a problem, as evidenced by similar numbers of full-time equivalent (FTE) pharmacists per pharmacy. This study also highlights several issues, including less CPE involvement, low uptake of forward pharmacy, and low participation in the S100 scheme.

Conclusions: This study found a remarkable consistency of WA rural pharmacy practice across the two surveys. However, significant increases were reported in some important services such as weight management. This findings may indicate that support for important services is required if they are to be taken up by the profession. The government and pharmacy bodies need to address the workforce barriers to improve access to pharmacy services for rural communities.

Table of Contents

List of Tables

List of Abbreviations

AACP	Australian Association of Consultant Pharmacy
AHS	Aboriginal Health Service
AIHW	Australian Institute of Health and Welfare
ARIA	Accessibility/Remoteness Index of Australia
ASGC	Australian Standard Geographical Classification
CMI	Consumer Medicine Information
CPE	Continuing Professional Education
CPI	Consumer Price Index
DAA	Dose Administration Aid
DMMR	Domiciliary Medication Management Review
EPC	Enhanced Primary Care
EPS	Enhanced Pharmacy Services
FTE	Full-time Equivalent
GP	General Practitioners
HMR	Home Medicines Review
HREC	Human Research Ethics Committee
MAS	Medication Assistance Service
N/A	Not Applicable
NATSIHS	National Aboriginal and Torres Strait Islander Health Survey
NDSHS	National Drug Strategy Household Survey
NHMRC	National Health and Medical Research Council
NHPA	National Health Priorities Area
NPS	Needle and Syringe Program
NSW	New South Wales
OTC	Over-the-counter
PCWA	Pharmaceutical Council of Western Australia
PhARIA	Pharmacy Access/Remoteness Index of Australia
PSA	Pharmaceutical Society of Australia
QCPP	Quality Care Pharmacy Program
QUM	Quality Use of Medicines

RACGP	Royal Australian College of General Practitioners
RRMA	Rural, Remote and Metropolitan Areas
RRPWDP	Rural and Remote Pharmacy Workforce Development Plan
SEIFA	Social and Economic Index for Australia
WA	Western Australia

Chapter 1: INTRODUCTION

1.1. Background

Australia is very much an urban society where only approximately 30% of the population lives in rural and remote areas.[1,2] According to the Australian Institute of Health and Welfare (AIHW) 2006[3], the health status of rural populations in Australia is commonly perceived as being poorer than those living in urban areas. This is likely to be the result of factors such as higher levels of socio-economic disadvantage (lower incomes and lower levels of education), poorer access to health services, higher levels of personal health risk factors such as obesity and smoking, and environmental issues related with road travel and occupation. The substantial proportion of Indigenous people in rural and remote areas, coupled with their poor overall health, also influences the higher mortality rates in these areas.[3]

Pharmacy is a crucial part of any health care system and plays an important role in maintaining the health of all Australians.[4] A national survey (2002)[5] demonstrated that apart of their dispensing role, Australia's community pharmacies performed a range of other services involving medicines and health, such as harm minimisation services, medication reviews, and health promotion. The model of pharmacy practice in rural settings, however, could be quite different to urban practice. Such major cities are provided with high levels of support, and access to a range of health care providers.[6] Several authors have reported that rural pharmacies provide a greater diversity of health care services than their metropolitan counterparts.[7-9] These services include early intervention and health promotion programs such as cholesterol, blood glucose and blood pressure screening, infant health clinics and smoking cessation programs.[8, 10] Furthermore, pharmacies were highly valued amongst rural populations. A survey of rural communities in Western Australia (WA) demonstrated that pharmacies were highly utilised for a wide range of health-based requirements such as emergency treatment, over-the-counter (OTC) and prescription medications.[11] When small rural communities were asked about health care needs in order to keep them healthy, pharmacy services were rank third, only after doctors and hospitals.[12]

However, many issues may hamper the provision of pharmacy services in rural areas. Financial issues are identified as one of the major barriers. Business overheads may be higher as the result of the isolated nature of rural practice. If the higher costs are shifted to consumers and can not be afforded, businesses may be under financial pressure and pharmacies could be forced to close. This may affect the accessibility to pharmacy services, particularly since many rural towns have only a single pharmacy.[13] The other important issue is the shortage of pharmacists in rural areas.[8, 9, 14, 15] Emerson[14] has discussed the ramifications of this workforce shortage, including closure of pharmacies due to lack of staff and the ageing workforce, a reduced ability to provide additional professional services, reduction in the quality of locum staff, reduced access to Continuing Professional Education (CPE), and doubts about the financial viability of rural pharmacies. All of these constraints may result in compromising the health of rural Australia.

In addressing these issues, in 2001, the Australian Government introduced a range of incentive and support programs designed to prevent rural pharmacy closures and increase the number of pharmacies operating in rural areas. Specifically, $60.4 million was allocated to provide assistance to rural pharmacies over a four-year period, under the programs of the Rural Pharmacy Maintenance Allowance, Start Up Allowance, Succession Allowance and Allowance for Pharmacist Support Services to Remote Area Aboriginal Health Services.[4] Moreover, the government has provided programs to improve recruitment and retention rates of rural and remote pharmacists. For example, the Rural and Remote Pharmacy Workforce Development Plan (RRPWDP) established in 1999 includes an attempt to develop a rural pharmacy curriculum and makes funds available for undergraduate scholarships for students with rural backgrounds, internship and professional development allowances.[14, 16] Clearly, these efforts were put forward in recognition of the important role of pharmacies in the health care system, particularly in rural areas.

Given the significant role of pharmacies in rural health and the poorer health status of rural populations, a better understanding of rural pharmacy practice is of importance. The national survey (2002)[5] constructed the first database of pharmacy practice in Australia and, hence, data on rural pharmacy practice could be generated from this database. However, more up-to-date data are needed to enable a time-series

comparison that provides information on the changes in rural pharmacy practice over time. This will assist the government and pharmacy bodies in designing policies and programs aimed at improving access to pharmacy services and, therefore, reducing rural health inequalities.

1.2. Objectives

1. To provide more recent data in rural pharmacy practice in Western Australia (WA) with regard to pharmacist demographics, pharmacy characteristics, provision of services, and barriers of providing services; and
2. To evaluate the changes in WA rural pharmacy practice over a period of four years since the previous study in 2002 (the National Pharmacy Database Project 2002, which included data on WA rural pharmacies).

1.3. Significance

This study was undertaken to identify if rural pharmacy practice in WA had changed over a four-year period since 2002 in relation to pharmacist demographics, pharmacy characteristics, provision of services, and barriers for providing services. Hence, the findings of this study would provide direction for policies and programs to be developed to improve the delivery of particular services, particularly those that correspond to rural needs.

1.4. Definition of Terms

Comprehensive medication review is defined as a systematic evaluation of a resident's or patient's complete medication treatment regimen in the context of other clinical information and the resident's or patient's health status.[17] Home Medicines Reviews (HMRs) or Domiciliary Medication Management Reviews (DMMRs) refer to medication reviews in domiciliary settings.[17]

Consumer Medicine Information (CMI) is brand-specific, manufacturer-produced written information about drug products that conforms to special provisions set out in the Therapeutic Goods Regulations. [17]

Dose Administration Aids (DAAs) are devices or packaging systems designed to improve compliance by clearly setting out the medicine doses according to the time of administration.[18]

Enhanced Pharmacy Services (EPS) refer to those offered in community pharmacies requiring additional or special skills, knowledge and/or facilities and are provided to sub-groups with special needs. They exclude prescription-related and over-the-counter (OTC) medicines-related activities. [5, 17]

Forward pharmacy is a private unenclosed front-of counter seated area in the pharmacy with a dispensary computer for prescription receipt, and counselling for medicines or health.[19]

PhARIA (Pharmacy Access/Remoteness Index of Australia) is a classification system designed to provide measurement of the physical and professional remoteness of pharmacies within Australia, for use in determining additional remuneration of rural and remote pharmacies based on their remoteness.[20]

Quality Use of Medicines (QUM) constitutes three main activities: (i) selecting treatment options wisely (use of medicines only when necessary with non-medicinal alternatives considered); (ii) choosing appropriate medicines if a medicine is considered necessary (taking into account medical conditions, risks and benefits, dosage and length of treatment, duration and costs); and (iii) using medicines safely and effectively to achieve the best possible outcomes.[21]

Rural in this study is used when referring to areas outside metropolitan zones.

Rural pharmacies are defined here as community pharmacies with non-metropolitan postcodes.

Section 100 (S100) involves a community pharmacy that supplies medicines to a remote area Aboriginal Health Service (AHS) through arrangements made under section 100 of the National Health Act. They may also provide assistance in the implementation of procedures and protocols, including development of a medicine store, assisting AHS staff with stock control and medication management procedures, providing continuing education, and assisting clinical staff in AHS with clinical enquiries, and other medicine issues.[22, 23]

Chapter 2: LITERATURE REVIEW

Rural Society, Health and Health Services

Rural Society

People who live outside major cities live in a range of settings that could broadly be categorised as rural, regional, and remote areas. The generic term 'rural', however, is often used when referring to these areas generally.[24] Several systems have been developed to classify areas according to their rurality. Three major rurality classifications are currently used: (i) RRMA (Rural, Remote and Metropolitan Areas) classification; (ii) ARIA (Accessibility/Remoteness Index of Australia) classification; and (iii) ASGC (Australian Standard Geographical Classification) Remoteness Areas.[25]

In 2001, it was reported that 34% of the Australian population lived in rural and remote areas.[1] Rural population growth varied across areas and was strongly concentrated in areas relatively close to the edges of major urban centres, suggesting that what is actually occurring is a new form of quasi-urbanisation. It is noted that small rural communities in the wheat and sheep belt have been steadily losing population due to the departure of young adults. This gradual decline is associated with the loss of many commercial and public services, which makes small towns even less attractive.[26]

While some parts of the rural areas are indeed in demographic decline, others are growing rapidly, and hence there is considerable diversity. The key factors that influence demographic diversity include: (i) fertility – the extent to which women living in the area have children; (ii) mortality – the pattern of death in the sector; and (iii) in and out migration – the extent to which people move into or out of the area. All of these factors vary in different parts of the rural areas.[6, 26]

Throughout the 1990s, rural organisations began to respond to the rural decline and they developed significant political influence. Rural issues have been prominent in political life and there has been a significant political response. The Australian

Government has invested millions of dollars into rural developments in many forms. Hence, it is important to acknowledge that the broad diversity across rural Australia translates into a diversity of needs. The policy relevant to a small rural community that serves wheat-farming areas that are in decline will differ markedly to those relevant to a prosperous wine-growing area that is booming.[26] The lack of understanding of the issues from a rural perspective may lead to inappropriate responses in addressing rural inequalities.

2.1.2. Rural Health

The health of rural populations in Australia is commonly perceived as being poorer than those living in urban areas. It was reported that rural populations have higher mortality and hospitalisation rates for some diseases.[2, 3, 6] Many factors may contribute to the rural health disadvantage, which include: (i) poorer access to health care; (ii) higher levels of socio-economic disadvantage; (iii) higher levels of health risk factors, (iv) greater exposure to injury; and (v) Indigenous health needs.[2, 3]

Rural populations tend to have less access to health care. This is indicated by the lower levels of health care personnel and health services available in rural areas. Medicare data also have shown that people living in rural areas are using less services than those living in urban areas.[2] Despite health access issues, rural residents have been reported as experiencing higher levels of socio-economic disadvantage than their metropolitan counterparts, as evidenced by the SEIFA (Social and Economic Index for Australia) score.[2] SEIFA is a set of indexes calculated to provide information on the level of socio-economic well-being on a geographic basis. The three indicators calculated from the 1991 Census were 'Economic resources', 'Education and occupation', and 'Disadvantage'. All showed a pattern of increasing disadvantage with increasing distance from major urban centres.[2, 6]

The 2001 National Health Survey revealed that health risk factors tend to be worse in rural areas compared to metropolitan areas. For example, males in regional areas were 1.33 times as likely to engage in risky alcohol consumption as those in major cities. Also, people in regional areas were 1.11 times as likely to smoke as people in major cities, and were less likely to walk for exercise. Moreover, males and females

in regional areas were, respectively, 1.05 and 1.10 times as likely to be overweight or obese as their major cities counterparts.[1] These factors are likely to increase the risk of cardiovascular and respiratory diseases, cancers, and diabetes.[1, 6]

The large contribution of farming and mining to rural life is associated with a greater incidence of injuries.[6] An estimated 20 to 60 presentations to the rural emergency department occur per 100 farms per year.[27] Rural residents are also more likely to be exposed to high-speed, long-distance motor travel and unsealed roads, all of which are related with the higher risk of injury. It was reported that the incidence of road crashes in rural areas is estimated to be almost twice that in urban areas.[28]

In 2001, Indigenous Australians made up 2.4% of the national population, and an estimated 70% of them live in rural and remote areas.[1] It was reported that Indigenous people suffer a mortality rate two to three times higher than other Australians, with a life expectancy twenty or more years shorter.[3, 26] High levels of socio-economic disadvantage (lower incomes, higher rates of unemployment, and poorer education achievements), high exposure to violence, and high levels of health risk behaviour such as smoking and obesity, all drive these extraordinary differentials. [3, 26] Hence, the substantial Indigenous population in rural and remote areas, coupled with their inferior health status, significantly affects rural health in general.

2.1.3. Rural Health Services

The most defining features of rural health services is reduced access compared with the cities.[2] Since many small, isolated communities lack sufficient population to sustain a local service, residents may have a limited choice of health services in their areas, and may be required to seek care from large centres.[6] It was acknowledged that rural people recognise the need to travel further for access to services, especially for specialist consultations.[2, 6] Hence, the great distance to services, coupled with a limited choice of services, tends to make access to health care more difficult, expensive and time consuming for rural people.[29]

Access is even more problematic due to workforce shortages resulting in fewer health professionals per population.[6, 30] There are significantly more residents per full-time equivalent (FTE) general practitioners (GPs) in metropolitan zones (985 to 1085 people per GP) than non-metropolitan areas (1206 to 2524 people per GP). However, it was reported that rural people have fewer visits to GPs.[6, 31] Travelling long distances to reach a GP is likely to be one factor explaining the lower use of GPs in rural areas. Another potentially significant factor is cost, as rates of bulk-billing are lower in the country.[6, 32] Similar inequalities occur in terms of access to pharmacies, hospitals, and specialists.[26]

It is acknowledged that access to, and use of, health services are significant factors contributing to optimising the health status of rural Australians. Hence, it is important to develop alternative models for delivering more effectively an appropriate level and mix of health services.[6] There is a range of alternative models of care, including Multipurpose Centres and Multipurpose Services, mobile services, visiting services, and telemedicine.[33-35] The rationale of Multipurpose Centres and Multipurpose Services is to maximise the range of local health services in a cost-effective way through better coordination across health services and the sharing of limited resources.[36] Mobile services and visiting services are taking services to patients and, therefore, overcome the issue of patient transport. Telemedicine uses an interactive audiovisual system that enables diagnosis, treatment, and many other care activities across vast distances. This provides a cost-effective way of delivering health care without the need for rural people to travel. Given that alternative models of service delivery have their own advantages and disadvantages, it is important that their adoption takes into account the specific circumstances and health needs of the community.[6]

2.2. Pharmacy Services

Traditionally, community pharmacies have been the main suppliers of medicines for the Australian population. However, this role has evolved, with a proliferation of professional services.[37] The development of professional services is believed to be important for pharmacy to survive as a profession, and to maximise its contribution

to community health care. It has been indicated that there are less expensive and probably more efficient ways of supplying medications than by almost exclusively using pharmacists.[38, 39] Hence, pharmacists are expected to provide their customers with value-added services rather than just supply medicines. Shepperd[40] suggested that '…. *in the future, more people and organisations will choose a pharmacy not so much on product price, but on the package of values that accompanies the product'*.

According to Engle[41], professional services will enhance the community pharmacy practice base, improve therapeutic outcomes for patients, increase pharmacists' job satisfaction, and provide new sources of revenue. Moreover, the development of a service orientation is important for ensuring the quality use of medicines (QUM).[37] QUM constitutes three main platforms: (i) selecting treatment options wisely (use of medicines only when necessary with non-medicinal alternatives considered); (ii) choosing appropriate medicines if a medicine is considered necessary (taking into account medical conditions, risks and benefits, dosage and length of treatment, duration and costs); and (iii) using medicines safely and effectively to achieve the best possible outcomes.[21]

Through both the traditional role of supplying medicines and an evolving role in the provision of professional services, community pharmacy makes a significant contribution to the care of patients, the health of individuals who directly come to pharmacists to ask for advice, and prevention public health more broadly. A systematic review of the literature published since 1990 on pharmacist professional services has demonstrated that there is considerable high-quality evidence to support the value of professional services in the community setting.[42]

Several studies have been carried out with regard to the provision of services in Australia's community pharmacies. A review of national and jurisdictional surveys of community pharmacies conducted in Australia since 1970, by government agencies, national and state pharmacy bodies, and university researchers summarised the activities of community pharmacists into two categories: (i) prescription-related activities; and (ii) other health-related services, including primary health care, self care and health promotion.[43]

In 1992, a survey of community pharmacies within Western Australia was conducted to document the scope and nature of pharmaceutical services offered for the elderly.[38] Investigators found a range of services with high levels of first-aid assistance, health information provision and incontinence counselling; but low levels of monitoring (such as blood glucose levels), and advice (such as therapeutic drug levels or blood cholesterol levels). Few respondent pharmacists reported having evaluated the effectiveness (9%) or the efficiency (4%) of services provided.[38, 44] The results of this study provided insight into the range of activities performed in community pharmacies.

The National Pharmacy Database Project, which was conducted in 2002, provided the first national database of Australia's community pharmacies with regard to pharmacy characteristics, and the provision of services. It was reported that Australia's community pharmacies performed a wide range of services, including prescription-related activities, primary health care (including OTC medications), medication reviews, preventive services, harm minimisation, complementary therapies and Enhanced Pharmacy Services (EPS).[5]

Prescription-related Activities

Prescription-related activities are referred to those associated with dispensing of prescribed medicines, which include: (i) assessment of the medicine prescribed (taking into account patients' other medication and their medical condition); (ii) supplying of the correct medicine; (iii) appropriate labeling and recording; and (iv) patient counselling on their medication.[17] Aside from verbal counselling, pharmacists provide written counselling, including Consumer Medicine Information (CMI), as a supplement. CMI is brand-specific, manufacturer-produced written information about drug products that conforms to special provisions set out in the Therapeutic Goods Regulations. All prescription and "pharmacist-only" medicines required CMI to be provided by 2004.[17] Some patients may require Dose Administration Aids (DAAs) in addition to counselling.[17] DAAs are devices or packaging systems designed to improve the compliance of consumers by clearly setting out the medicine doses according to the time of administration. The use of DAAs in medication

management is supported by literature and survey evidence collated by Australian researchers.[18]

Medication Reviews

In Australia, a simple medication review is carried out at the time a medicine is dispensed without the benefit of specific clinical information. Comprehensive medication review refers to a systematic evaluation of a resident's or patient's complete medication treatment regimen in the context of other clinical information and the resident's or patient's health status. This process involved pharmacists with special skills and knowledge, to support and assist other health professionals to ensure the QUM.[17] Pharmacies have been able, from 1997, to engage and be remunerated for pharmacists accredited by the Australian Association of Consultant Pharmacy (AACP) or the Society of Hospital Pharmacists of Australia to perform comprehensive medication reviews in residential aged care facilities, and since 1 October 2001 to perform medication reviews in domiciliary settings (Home Medicines Reviews or HMRs – also known as Domiciliary Medication Management Reviews or DMMRs).[45] The 2002 national survey reported that 24.5% and 19.7% of pharmacies respectively provided DMMRs and medication management reviews in aged care facilities.[5]

Primary Health Care

Primary health care is provided by health workers, including GPs and pharmacists, who form the first level of contact with health systems. It was documented that community pharmacy has been an active primary health care provider in Australia since the 19th century.[46] Australia has standards and guidelines for pharmacists in assisting self-medication by consumers, providing CMI, GPs' and pharmacists' interprofessional communication, and the provision of "pharmacy" (Schedule 2 − S2) and "pharmacist-only" (Schedule 3 − S3) medicines in community pharmacy.[17]

Preventive Services

Community pharmacies are highly suited to health promotion as a high volume of people use their services.[47] Australia has standards and guidelines for pharmacists to assist self-medication by consumers, to provide CMI, to provide "pharmacy" (S2)

and "pharmacist-only" (S3) medicines, and to perform clinical testing (such as blood glucose and blood pressure measurements) for screening and monitoring purposes.[17] Moreover, the Royal Australian College of General Practitioners (RACGP) guidelines, which identify the level and strength of evidence of the preventive activities recommended for general medical practice in Australia,[48] are generally applicable to preventive activities in Australia's community pharmacies. The 2002 national survey demonstrated that pharmacists were undertaking a large variety of preventive activities, including initiating OTC agents for preventive purposes, and performing screening tests. More than 50% of pharmacies performed blood pressure measurements, and a lower percentage provided blood glucose, blood cholesterol, or weight testing at least one test per month.[49]

Harm Minimisation Services

In the 1980s, harm minimisation referred mainly to methadone and needle or syringe programs, but then the term "harm reduction" has broadened to efforts that reduced the adverse health effects and socio-economic consequences of illicit drugs without necessarily reducing their consumption.[50] Community pharmacies have many attributes that make them important in minimising harm associated with drug misuse. For example, the geographical distribution of and opening hours of pharmacies make them more accessible to the public, and the daily dispensing and supervision of methadone enables them not only to manage opioid dependence, but also prevent the diversion of methadone.[49] In Australia, the standards for pharmacists in management of licit opioids use are set down in state and national regulations and guidelines.[17, 51] Surveys of methadone programs involving Australia's community pharmacies were first performed in 1996 by Victoria's Turning Point group.[52] In 1999 and 2000, Curtin University pharmacy researchers managed a series of studies in five of Australia's jurisdictions, which reported high patient acceptability of pharmacies in community methadone programs, the characteristics of participating pharmacists and pharmacies, the retention of clients in methadone programs, costs in public and private clinics, and factors affecting the prevention and treatment of drug misuse.[53] The national survey in 2002 found that more than 40% of Australia's community pharmacies were active in each of methadone or buprenorphine dosing, or needle exchange.[5]

Enhanced Pharmacy Services (EPS)

EPS refer to health-related services other than supplying medicines that require additional or particular skills, knowledge and/or facilities and are provided to sub-groups with special needs.[5, 17] In Australia, many of these services such as wound management and smoking cessation, are recognised, defined, and described for implementation in community pharmacies.[17] The 2002 national survey reported that over 40% of Australia's community pharmacies offered EPS in each of the areas of asthma, diabetes, harm reduction with methadone, herbal medicines counselling, hypertension, and wound care. Other services that offered by 20% to 40% of pharmacies included community education, geriatric care, naturopathy, pain management osteoporosis, skin care, and weight reduction management. This study also highlighted the barriers of providing EPS, including lack of time, a shortage of pharmacists, no extra remuneration, or the inability to find locums.[5, 54]

2.3. Rural Pharmacy

2.3.1. Rural Pharmacy as Health Care Provider

The PhARIA (Pharmacy Access/Remoteness Index of Australia) system has been developed to provide a comprehensive, standardised measurement of remoteness of pharmacies throughout Australia. This system incorporates measurements of the physical remoteness (as represented by road distance to reach a range of services), and professional isolation (as represented by the road distance to the five closest pharmacies). There are six categories within this classification, which include: (i) highly accessible, (ii) accessible (Group A); (iii) accessible (Group B); (iv) moderately accessible; (v) remote; and (vi) very remote.[20]

Pharmacy plays an important role in maintaining the health of rural populations as access to other health care in these areas is often limited.[55] In small towns, the presence of pharmacies allowed that population to have easy access to a wider range of pharmacy services. Pharmacies also enjoyed a higher level of community support than the local medical services. This was evidenced by pharmacies being highly utilised for OTC, emergency, and prescription medications.[11] When small rural communities were asked about health care needs in order to keep them healthy,

pharmacy services were ranked third, only after doctors and hospitals.[12 1] A recent study has shown that these preferences have not changed substantially after almost a decade.[56]

The pharmacy is often the first point of contact for the rural population, perhaps due to its ease of access and non-threatening image.[8, 10] People can come to a pharmacy without an appointment, can expect to receive professional help almost immediately, and retain a high level of control over the extent of their engagement with the pharmacist.[37]

Further, pharmacists have been the most frequently contacted of Australia's community health workers.[43] A quantitative study showed that the overall rate of people receiving services in Australia's community pharmacies was approximately 4.8 million per fortnight, comprising of 3.2 million prescription-related contacts and 1.6 million other health related contacts.[43] People perceive pharmacists as highly reliable advisers on many personal health matters, trustworthy independent purveyors of health care products, and steadfast partners of the medical profession. This has been clearly demonstrated in national and international literature on consumers' views and experiences of community pharmacy services.[57]

2.3.2. Rural Pharmacy Practice

Some authors have reported that rural pharmacists provide a greater diversity of health care compared to their urban counterparts. These services included early intervention and health promotion programs and services such as cholesterol, blood glucose and blood pressure screening, infant health clinics and smoking cessation programs.[8, 10] Another study showed that rural pharmacists were more involved in providing professional services such as intensive education of diabetic patients with regard to the proper use of home serum glucose monitors, and of asthmatic patients with regard to proper inhaler use.[58] When rural and remote pharmacists in New South Wales (NSW) were asked about the perceived differences between rural and urban pharmacy practice, they believed that they were involved in a lot more diagnosing and extended services than their urban colleagues. They also believed that rural pharmacists develop stronger relationships with their patients and with

other health care professionals, which provide benefits to the overall health of the patients.[59]

It could be argued that, because of the relatively poor levels of health and health services experienced by rural populations, it is more important for rural pharmacists to offer this wider range of health services than their urban counterparts. Researchers believe that rural pharmacies should work closely with local doctors and other health professionals in order to provide a comprehensive health care.[60-62] Hence, multidisciplinary team is the preferred model of care in rural areas as it improves health outcomes through better coordination of health professionals and the sharing of limited resources.[6, 29] Such multidisciplinary teams have been utilised in the provision of Multipurpose Services, Coordinated Care Services and Aboriginal health, which collectively aim to improve overall community health by specifically targeting medication and disease management while maintaining continuity of care for patients.[63]

Despite the greater diversity of services provided, pharmacists in rural areas carry a heavier workload with lower economic rewards than experienced by their urban colleagues.[64] A study conducted in Nebraska found that 33.0% of rural pharmacists worked more than 50 hours per week compared to 23.8% of urban pharmacists.[65] This is in line with the findings of Australia's Pharmacy Labour Force Survey (2001)[66]. The fact that many rural pharmacies are staffed by a single pharmacist may contribute to this situation as these pharmacists have to work longer hours to complete the maximum recommended daily workload by themselves.[14] This situation is even worse due to difficulties in finding relief coverage and sufficient professional staff in rural areas.[13, 67]

2.3.3. Issues Related with Rural Pharmacy Practice

While pharmacy plays an important role in improving rural health, there are many issues that may hamper the provision of pharmacy services.

Geographical Issues

Research by Kaiser[68] demonstrated that the location of pharmacies in Western Australia was less than optimal, in terms of accessibility for the entire population. It was estimated that Western Australians had to travel an average distance of 5.7 kilometers to the nearest pharmacy; however, rural residents must travel longer distances to reach a pharmacy. Clearly, this finding indicates that rural residents have not received the same level of access to pharmacy services.

A survey comparing pharmacy services in single and no pharmacy towns showed that participants in no pharmacy towns were more likely to be dissatisfied with the level of health and pharmacy services access they were receiving. The most salient features of this dissatisfaction were having to travel to access medications and not being able to immediately access medications from the doctor's dispensary. More non-pharmacy town participants thought they were receiving inadequate advice on medicines.[69]

Geographic access to health services, however, was considered as a less serious problem, suggesting that distance has been accepted as part of rural living. Rural consumers perceived the cost of health services and higher prices than in urban areas was the major issue.[70] A study on access to pharmacy services in three rural states in the United States indicated that financial access to pharmacy services for rural consumers was a serious concern, especially for the elderly who lack prescription drug coverage.[67]

Economic/Financial Issues

Financial issues are identified as one of the major barriers for the provision of pharmacy services in rural areas. The cost of doing business and overheads may be higher because of the isolated nature of rural pharmacies, increased competition from mail-order companies, and discriminatory pricing on the part of drug manufacturers. This may produce further problems if the higher costs are shifted to consumers, since the rural population tends to have lower incomes than urban residents. If these higher prices can not be afforded, businesses may be under pressure and pharmacies may be

forced to close. This may affect the accessibility to health services, since many rural towns have only a single pharmacy.[13]

Workforce Issues

It is well documented that there is an under-supply of pharmacists in Australia, and this is more pronounced in rural areas of Australia than in metropolitan areas.[8, 9, 14, 15] For the year 2000, there were 359 pharmacies in metropolitan WA (each servicing 3923 people), and 110 pharmacies in rural WA (each servicing 4572 people).[71] This indicates that pharmacists in rural WA served more people than their urban counterparts.

In a qualitative study, Emerson[14] identified several major causes for this maldistribution of pharmacists in rural areas. The widespread shortage of FTE pharmacy staff available was cited as the major cause. The second perceived cause was the notion that there is a general refusal of pharmacists to move to rural settings. Several reasons were cited for this attitude. The first was the increasing number of females in the pharmacy workforce. It is believed that female pharmacists are more likely to work part-time and are less likely to own pharmacies. Female pharmacists also tend to work where their spouse is working, which is often in metropolitan areas. It is also believed that the high percentage of recent graduates from non-English speaking backgrounds can influence the rural workforce as their family and social ties are mostly metropolitan based, making them less inclined to move away.[14]

Emerson[14] has discussed the ramifications of this misdistribution, including closure of pharmacies due to lack of staff and the ageing workforce, a reduced ability to provide additional professional services, reduction in the quality of locum staff, reduced access to Continuing Professional Education (CPE), and doubts about the financial viability of regional pharmacies. These constraints can make access to pharmacy services even more complicated, and may result in compromising the health of rural Australia.

In addressing the rural health issues, in 2001, the government introduced a range of incentive and support programs designed to prevent rural pharmacy closures and increase the number of pharmacies operating in rural areas. Specifically, $60.4 million was allocated to provide assistance to rural pharmacies over a four-year period, under the programs of the Rural Pharmacy Maintenance Allowance, Start Up Allowance, Succession Allowance, and Allowance for Pharmacist Support Services to Remote Area Aboriginal Health Services.[4]

Moreover, the government has provided programs to improve recruitment and retention rates of rural and remote pharmacists. For example, the Rural and Remote Pharmacy Workforce Development Plan (RRPWDP) established in 1999 includes an attempt to develop a rural pharmacy curriculum and make funds available for undergraduate scholarships for students with rural backgrounds, internship and professional development allowances.[14, 16] It is believed that a rural background and positive rural experiences, such as undergraduate rural placements, internship years, and other rural educational experiences, seem to influence the decision of pharmacists to practice and to remain working in rural areas.[14, 16, 59] The RRPWDP has also partially addressed the emergency relief coverage by implementing an "Emergency Locum Service" to find and cover the travel costs for locums in emergency situations.[72] As many rural pharmacies are staffed by a single pharmacist, in emergency situations such as illness or bereavement, pharmacies often have been forced to close temporarily, compromising the health of rural people.[72] Clearly, these efforts were put forward in recognition of the important role of pharmacies in the health care system, particularly in rural areas.

Given the poorer health status of rural populations and the significant role of pharmacies in improving rural health, a better understanding of the rural pharmacy practice is very important. The national survey (2002)[5] constructed the first database of pharmacy practice in Australia and, thus, data on rural pharmacy practice could be generated from this database. However, more up-to-date data are needed to enable a time-series comparison that provides information on the changes in rural pharmacy practice over time. This will assist the government and pharmacy bodies in designing policies and programs aimed at improving access to pharmacy services and, hence, reducing rural health inequalities.

Chapter 3: METHODS

3.1. Study Design

A cross-sectional mail survey was designed to provide recent data ("2006 data") in rural pharmacy practice in WA, and to enable a time-series comparison with the previous data ("2002 data"). The source of the previous data was Australia's National Pharmacy Database Project[5], which was a national survey of community pharmacies performed in 2002.

3.2. Ethics

This study was approved by the Human Research Ethics Committee (HREC) of Curtin University of Technology on 19th October 2006 [Appendix 1]. All sample pharmacies were informed about the study, and the respondent pharmacies were requested to provide written informed consent.

All of the data collected was de-identified, processed and analysed in groups, and held confidentially according to National Health and Medical Research Council (NHMRC) requirements. On the completion of the study, the data will be stored in a secure place at the School of Pharmacy for a period of seven years.

3.3. Questionnaire

The questionnaire, which was used in the 2006 survey, consisted of 9 pages, 4 sections (A to D), and 32 questions [Appendix 2]. The questionnaire was designed based on that used in the Australia's National Pharmacy Database Project (2002) [5], so that comparisons could be made over time. There were, however, some questions that were modified from the 2002 questionnaire to suit rural situations [Table 3.1]. These questions were not used in the time-series comparison.

Table 3.1. The questions comprising the 2006 questionnaire and the matched questions from the 2002 questionnaire

Sections and Questions	Question no. (2006)	Question no. (2002)
A : Respondent pharmacy details		
Age	1	1
Gender	2	2
Year of registration	3	3
Rural background	4	N/A
Highest qualification	5a	5a
Continuing Professional Education (CPE)	5b, 5c	5b, 5c
Position in pharmacy	6	6
B : Pharmacy services		
Prescription-related activities		
Number of prescriptions	7a	10a
Category of order	7b	N/A
Delivery method	7c	N/A
Dose Administration Aids (DAAs)	8	11a
Supervised dosing	9	11c
Declined prescription	10	12
Counselling	11	13a
Monitoring	12, 13	13b, 13c
Impact of Silver Chain or Nursing Post	14	N/A
Medication Review Processes		
Supply medicines to aged care facilities	15a, 15b	14a, 14b
HIC registration	15c	14c
Medication review processes	15d	14d
Australian Association of Consultant Pharmacy (AACP)-accredited pharmacists	15e, 15f	14e, 14f
Preventive services		
Preventive activities with non-prescribed medicines	16	17
Screening tests	17	18
Primary health Care (S2 and S3)	18	15a
Harm minimisation services	19	19a
Complementary therapies	20	20
Enhanced Pharmacy Services (EPS)	21	7
C : Barriers and facilitators		
Barriers to EPS	22	8
Facilitators for EPS	23	9
D : Pharmacy characteristics		
Postcode (PhARIA)	24a	25a
Setting	24b	N/A
Hours and days open per week	25	25c
Structure of premises	26	26
Group membership	27	27
Quality Care Pharmacy Program (QCPP) status	28	28
Method of operation	29a, 29b	29a, 29b
Pharmacy staff – working hours per week	30	32
Number of customer per week	31	N/A
Total turnover	32a	33a

3.4. Sample

The national survey (2002)[5] involved a population of all pharmacies registered in Australian jurisdictions for the 12 months to December 2001 (4824 pharmacies). Stratification with the PhARIA system was used to minimise sampling bias arising from location. Due to 81% of the total pharmacies being in PhARIA 1, a 20% random sample of total PhARIA 1 pharmacies was drawn. Due to the small number of pharmacies in PhARIA 2 to 6, the entire population was used. Overall, this gave a total sample of 1641 pharmacies [Table 3.2]. Of the sample of 1641 pharmacies, 1391 agreed to participate, 141 refused, and 109 were not contactable due to duplications or pharmacy closure. Questionnaires were mailed to the 1391 participants [Table 3.2], of which 82 were participant pharmacies from rural WA [Table 3.3]. Only data from WA rural pharmacies were included in the time-series comparison.

Table 3.2. Sample and participant pharmacies across Australia by PhARIA (2002)

PhARIA	Number of Australia's pharmacies	Sample	Participants
1	3927	744	611
2	321	321	278
3	313	313	276
4	123	123	110
5 and 6	140	140	116
Total	4824	1641	1391

Table 3.3. Participant pharmacies from rural WA by PhARIA (2002)

PhARIA	Participants (rural WA)
1	4
2	17
3	17
4	14
5	16
6	14
Total	82

In the 2006 survey, the population was all pharmacies in rural WA (103 pharmacies) as listed by the Pharmaceutical Council of Western Australia (PCWA) in September 2006 [Appendix 3]. Due to the small number of rural pharmacies in WA, the whole

population was used. The sample pharmacies were then classified, using the PhARIA system, into six categories [Table 3.4].

Table 3.4. Sample pharmacies from rural WA by PhARIA (2006)

PhARIA	Number of WA rural pharmacies	Sample
1	18	18
2	16	16
3	17	17
4	14	14
5	18	18
6	20	20
Total	103	103

3.5. Procedure

Three consecutive mailings of the questionnaire were implemented in the 2002 national survey. The 1391 participant pharmacies, including 82 rural WA participants, were first mailed the questionnaire on 12th of July 2002, with two subsequent mail outs at approximately 20 day intervals to non-respondents in July and August to increase the response rate.[5]

A similar procedure was applied in the 2006 survey. The questionnaires were first mailed to the 103 sample pharmacies (rural WA) on the 19th of October 2006. Two subsequent mailings were sent on 10th and 24th of November for non-respondents. A cover letter (introducing the study and requesting participation from the pharmacies) [Appendix 4], a consent form, and a stamped-addressed envelope, were included in each mailing. The cut off date for questionnaires to be returned was 17th of December 2006.

3.6. Data Analysis

Statistical analysis of data was performed using the SPSS statistical software package for Windows (Version 14.0). Frequencies and percentages of responses were generated for each question from the 2006 questionnaire, and for matched questions from the 2002 questionnaire. If responses were continuous and numerical,

descriptive statistics were generated (mean, standard deviation, median, minimum and maximum score).

Cross tabulations by year of survey (2002 and 2006) were conducted for questions of "pharmacist characteristic" (section A), "pharmacy characteristic" (section D), and "service" (section B). The data from "service" questions were first combined (within questions) to create an overall binary variable ("Not providing the service" versus "Providing the service").

To test individual associations between year of survey against pharmacist or pharmacy characteristics, or provision of services, Pearson chi-square tests were conducted (where expected cases were less than five, Fisher's exact test were calculated). Where significant associations were reported from the chi-square tests between year of survey and provision of particular services, logistic regressions were performed. Due to the limited sample size, only a few factors were included in the logistic regression to control for any effects between year of survey and frequency of service provision. Four "characteristic" variables (gender, age, PhARIA location, and inclusion of a forward pharmacy area) were selected as analysis from 2002 indicated that those variables may influence service provision.[5, 54, 73]

Chapter 4: RESULTS

4.1. Response Rate

Response rate refers to the number of pharmacies that returned their questionnaire ("respondent") as a proportion of those that were sent the questionnaires ("participant" in the 2002 survey, or "sample" in the 2006 survey).

In the National Pharmacy Database Project (2002)[5], of the total sample of 1641 pharmacies (a census sample of PhARIA 2 to 6 and a 20% random sample of PhARIA 1 pharmacies), 1391 agreed to participate, 141 refused, and 109 were not contactable due to duplications or pharmacy closure. Questionnaires were mailed to 1391 participant pharmacies (including 82 participants from rural WA), of which 1131 were returned (including 66 respondents from rural WA). The overall response rate for rural WA in the 2002 survey was 80.5% (66/82).

In the 2006 survey, questionnaires were mailed to all 103 sample pharmacies (a census sample of all rural pharmacies in WA, including a small number of PhARIA 1 rurally located pharmacies), of which 51 were completed and returned. The overall response rate of this study was therefore 49.5% (51/103). The comparisons of response rates for rural WA by PhARIA and by year of survey are detailed [Table 4.1].

Table 4.1. Response rates for rural WA by PhARIA and by year of survey

PhARIA	Rural WA (2002)			Rural WA (2006)		
	Participants	Respondents	Response rates	Sample	Respondents	Response rates
	N	N	%		N	%
1	4	3	75.0	18	6	33.3
2	17	14	82.3	16	12	75.0
3	17	16	94.1	17	7	41.1
4	14	13	92.8	14	6	42.8
5	16	11	68.7	18	10	55.5
6	14	9	64.3	20	10	50.0
Total	76	66	80.5	103	51	49.5

4.2. Respondent Pharmacist Details

Of 66 respondent pharmacies from rural WA in the 2002 survey, the proportion of males was larger than females (66.7% versus 33.3%, respectively). This figure had changed in the 2006 survey where almost the same proportion of males and females were reported among a total of 51 respondents (51.0% and 49.0%, respectively) [Table 4.2]. The Pearson chi-square test, however, showed that there was no association between year of survey and gender (χ^2 (1) = 2.945, P = 0.086).

Table 4.2. Characteristics of WA rural respondent pharmacists by year of survey

Characteristics	Respondents (2002) N (%)	Respondents (2006) N (%)	P-value[a]
Gender			0.086
Male	44 (66.7)	26 (51.0)	
Female	22 (33.3)	25 (49.0)	
Age			0.598
≤ 50 years	49 (74.2)	40 (78.4)	
51+ years	17 (25.8)	11 (21.6)	
Year of registration			0.278
Pre-1970	14 (21.5)	7 (13.7)	
1970 and afterward	51 (78.5)	44 (86.3)	
Highest qualification			0.556
Diploma	14 (21.2)	7 (13.7)	
B Pharm	47 (71.2)	39 (76.5)	
Other	5 (7.6)	5 (9.8)	
Continuing Pharmacy Education (CPE)			0.626
≤ 10 hours/month	56 (84.8)	44 (88.0)	
> 10 hours/month	10 (15.2)	6 (12.0)	
Position in the pharmacy			0.745
Sole proprietor	34 (53.1)	24 (47.1)	
Partner proprietor	16 (25.0)	12 (23.5)	
Manager	9 (14.1)	8 (15.7)	
Other pharmacist staff	5 (7.9)	7 (13.8)	

[a] P-value from Pearson chi-square tests

Similar figures were reported for age, degree and year of registration between 2002 and 2006 respondents [Table 4.2]. Of respondents in the 2002 survey, 74.2% were less than 50 years of age, and 71.2% held a university bachelor degree reflecting graduates mainly since 1970. While in 2006, 78.4% of respondents were less than 50 years of age, 76.5% had a bachelor degree, and 86.3% registered as a pharmacist in

1970 and afterward. Additionally, more than 70% of the respondents in both surveys were the pharmacy's proprietors. Over 80% of the respondents in the 2002 and 2006 surveys spent less than 10 hours per month on Continuing Pharmacy Education (CPE), with less than 10% not taking part in any CPE in the past year (9.1% and 6.0%, respectively).

4.3. Pharmacy Characteristics

Of a total 66 WA rural pharmacies in the 2002 survey, 50% of pharmacies were from "smaller towns" (PhARIA 4 to 6), and 50% were from "larger towns" (PhARIA 1 to 3). A similar trend was reported in 2006 where about the same percentage of a total 51 pharmacies were from "smaller towns" or "larger towns" (49.0% versus 51.0%, respectively) [Table 4.3]. The majority of pharmacies in 2006 were located in stand alone or strip shopping centres (54.9%), and had between 501 and 1500 customers per week (52.9%). These figures, however, were not directly comparable to 2002 figures, since different categories were applied for these particular questions.

In the 2002 and 2006 surveys, more than half of the pharmacies were owner operated (58.5% and 64.7%, respectively), and had group memberships (60.0% and 51.0%, respectively) [Table 4.3]. The percentage of pharmacies with Quality Care Pharmacy Program (QCPP) accreditation more than doubled from 2002 to 2006 (41.5% versus 86.3%, respectively). The Pearson chi-square test showed that there was a significant association between year of survey and whether or not pharmacies were QCPP accredited (χ^2 (1) = 24.087, P < 0.001).

More pharmacies in 2006 grossed over $2 million compared to those in 2002 (45.0% versus 29.2%, respectively) [Table 4.3]. The estimate means of the turnovers for 2002 and 2006 were: $1.71 million (SD = 1.18) and 1.93 million (SD = 1.31), respectively. However, in order to make a more accurate comparison, the 2002 figure should be adjusted for inflation rates. Based on the Consumer Price Index (CPI) 2006[74], the inflation rates in Australia were as follows: 3.0% (period 2002-03); 1.9% (period 2003-04); 2.0% (period 2004-05); and 3.3% (period 2005-06). Thus, the adjusted estimate mean of the 2002 turnover was $1.89 million.

It was reported that only a small percentage of pharmacies in 2002 and 2006 had a forward pharmacy (15.6% and 12.2%, respectively; P = 0.610) or a closed counselling/dosing area (31.3% and 36.7%, respectively; P = 0.541) [Table 4.3]. Forward pharmacy referred to a private unenclosed front-of counter seated area in the pharmacy with a dispensary computer for prescription receipt, and counselling for medicines or health.

Table 4.3. Characteristics of WA rural pharmacies by year of survey

Characteristics	WA rural pharmacies (2002) N (%)	WA rural pharmacies (2006) N (%)	P-value[a]
PhARIA			0.355
1	3 (4.5)	6 (11.8)	
2	14 (21.2)	12 (23.5)	
3	16 (24.2)	7 (13.7)	
4	13 (19.7)	6 (11.8)	
5	11 (16.7)	10 (19.6)	
6	9 (13.6)	10 (19.6)	
Setting of pharmacy	N/A		N/A
Stand alone or strip shopping centre		28 (54.9)	
Shopping mall complex		17 (33.3)	
Medical centre		6 (11.8)	
Hospital		0 (0.0)	
Pharmacy areas			
Forward area			0.610
Yes	10 (15.6)	6 (12.2)	
No	54 (84.4)	43 (87.8)	
Unenclosed counselling/dosing area			0.701
Yes	49 (76.6)	39 (79.6)	
No	15 (23.4)	10 (20.4)	
Closed counselling/dosing area			0.541
Yes	20 (31.3)	18 (36.7)	
No	44 (68.8)	31 (63.3)	
Group			0.331
No group	26 (40.0)	25 (49.0)	
In a group	39 (60.0)	26 (51.0)	
QCPP status			<0.001
Not QCPP accredited	38 (58.5)	7 (13.7)	
Partially completed	27 (41.5)	44 (86.3)	

Method of operation			0.642[b]
Owner operated	38 (58.5)	33 (64.7)	
Partner operated	15 (23.1)	7 (13.7)	
Manager operated	10 (15.4)	9 (17.6)	
Other	2 (3.1)	2 (3.9)	
Non-pharmacist retail manager			0.209
Yes	18 (28.1)	20 (39.2)	
No	46 (71.9)	31 (60.8)	
Customer weekly	N/A		N/A
< 500		11 (21.6)	
501-1000		15 (29.4)	
1000-1500		12 (23.5)	
1501-2000		8 (15.7)	
2001-3000		3 (5.9)	
3001+		2 (3.9)	
Annual turnover			N/A[c]
< $1 m	18 (27.7)	14 (27.5)	
$ 1 – 1.5	11 (16.9)	9 (17.6)	
$ 1.5 – 2	17 (26.2)	5 (9.8)	
$ 2 – 3	13 (20.0)	15 (29.4)	
$ 3 – 4	4 (6.2)	4 (7.8)	
$ 4 – 6	1 (1.5)	4 (7.8)	
$ 6 – 8	1 (1.5)	0 (0.0)	
$ 8+	0 (0.0)	0 (0.0)	

[a] P-value from Pearson chi-square test
[b] P-value from Fisher's exact test
[c] Estimate means were used for comparison to enable adjustment for inflation rate

Pharmacies in both surveys opened six days per week (median) for approximately 50 hours (median) [Table 4.4]. The median was used because data were not normally distributed as confirmed by the Shapiro-Wilk test ($P < 0.05$).

Table 4.4. WA rural pharmacies' opening hours and days per week by year of survey

	WA rural pharmacies (2002)		**WA rural pharmacies (2006)**	
Total days per week	N = 61		N = 50	
	Mean	6.2	Mean	6.2
	SD	0.41	SD	0.51
	Median	6.0	Median	6.0
Total hours per week	N = 62		N = 50	
	Mean	52.6	Mean	53.2
	SD	11.71	SD	10.26
	Median	50.0	Median	51.0

4.4. Pharmacy Services

4.4.1. Prescription-related Activities

The majority of WA rural pharmacies in 2002 and 2006 dispensed less than 800 prescriptions in a week (58.4% and 58.8%, respectively) [Table 4.5].

Table 4.5. Prescriptions dispensed in WA rural pharmacies by year of survey

Prescriptions weekly	WA rural pharmacies (2002)	WA rural pharmacies (2006)
	N (%)	N (%)
0 to 300	9 (13.8)	13 (25.5)
301 to 800	29 (44.6)	17 (33.3)
801 to 1,200	17 (26.2)	10 (19.6)
1,201 to 2,000	9 (13.8)	11 (21.6)
2,001 to 3,000	1 (1.5)	0 (0.0)
3,001 or more	0 (0.0)	0 (0.0)

Many rural pharmacies in 2002 and 2006 provided DAAs to a number of facilities [Table 4.6]. In both surveys, it was reported that more than 75% of pharmacies provided DAAs in community settings, and lower percentages of pharmacies provided DAAs to nursing homes or hostels. The proportion of pharmacies supplying DAAs for remote clinics had more than doubled from 2002 to 2006. However, only 23 pharmacies responded to the "remote clinics" question in the 2006 survey, and this resulted in a much higher percentage for the 2006 figure, which was 34.8% (8/23).

Table 4.6. WA rural pharmacies by various facilities where DAAs being issued and by year of survey

Aged or community setting	Active pharmacies (2002)		Active pharmacies (2006)	
	N	(%)	N	(%)
Nursing home	21	(35.0)	21	(45.7)
Hostel	32	(52.5)	20	(46.5)
Community	50	(78.1)	46	(90.2)
Remote clinics	6	(13.0)	8	(34.8)

It appears that 41 pharmacies (63.1%) in the 2002 survey and 29 pharmacies (59.2%) in the 2006 survey performed supervised dosing of at least one of the five drugs included in the surveys [Table 4.7]. Methadone was reported as the most common drug being supervised by pharmacies in the 2002 and 2006 surveys (54.0% and

45.8%, respectively). This was followed by buprenorphine (30.2%) and benzodiazepines (28.0%) in the 2006 survey; and benzodiazepines (30.9%) and analgesics (26.8%) in the 2002 survey.

Table 4.7. WA rural pharmacies by a range of drugs being supervised and by year of survey

Drugs	Active pharmacies (2002)		Active pharmacies (2006)	
	N	(%)	N	(%)
Analgesics	15	(26.8)	7	(15.9)
Benzodiazepines	17	(30.9)	12	(28.0)
Buprenorphine	10	(18.5)	13	(30.2)
Methadone	34	(54.0)	22	(45.8)
Other psychotropics	9	(17.6)	5	(12.5)
Other agents	4	(10.0)	3	(13.0)

CMI was provided in a computerised form by more than 90% of pharmacies in both surveys. Over 70% of pharmacies in 2002 and 2006 provided written information produced by computer programs other than CMI (76.3% and 82.0%, respectively), or other written or printed information (81.7% and 74.5%, respectively). About 68% of pharmacies provided counselling to non- or poor-English speaking patients in both surveys [Table 4.8].

More than 75% of pharmacies counselled patients in an unenclosed area in 2002 and 2006 (77.4% and 90.2% respectively). Over 30% of pharmacies provided counselling in a closed counselling area, and less than 20% counselled in a forward pharmacy in both surveys [Table 4.8].

Table 4.8. WA rural pharmacies by counselling categories and by year of survey

Counselling type	Active pharmacies (2002)		Active pharmacies (2006)	
	N	(%)	N	(%)
Poor English	44	(68.7)	35	(68.6)
CMI computerised information	57	(91.9)	50	(98.0)
Other computer information	45	(76.3)	41	(82.0)
Written of printed information	49	(81.7)	38	(74.5)
Closed area	22	(35.5)	23	(46.0)
Unenclosed area	48	(77.4)	46	(90.2)
Forward pharmacy	12	(20.0)	7	(14.0)
MAS (health insurance)	5	(8.2)	5	(10.0)
Other	1	(14.3)	4	(57.1)

More than 90% pharmacies in 2002 and 2006 reported monitor compliance with verbal questioning (98.0% and 92.2%, respectively) or repeat prescriptions (98.0% and 93.8%, respectively). DAAs have emerged as devices for enhancing compliance with about 80% of pharmacies reporting use of DAAs for monitoring compliance in both surveys [Table 4.9].

Most pharmacies monitored patient responses to therapy by questioning patients or their carers. The use of methods other than verbal assessment to monitor the effects of prescribed therapy [Table 4.10] showed over 80% of pharmacies in both surveys using records of adverse effects in patients' files. Clinical testing devices (such as weight scales, blood pressure and glucose meters) were used by more pharmacies in 2006 than those in 2002 (78.4% and 59.4%, respectively; χ^2 (1) = 4.723, P = 0.030). Logistic regression controlling for gender, age, PhARIA location, and the inclusion of a forward pharmacy, showed that pharmacies in 2006 were 1.30 times (95%CI = 1.038 – 1.636) as likely to use clinical testing devices as those in 2002. Less than 20% of pharmacies in both surveys reported using laboratory results for monitoring the effects of drugs.

Table 4.9. WA rural pharmacies by methods of monitoring compliance and by year of survey

Method of monitoring compliance	Active pharmacies (2002)		Active pharmacies (2006)	
	N	(%)	N	(%)
Questions	59	(92.2)	49	(98.0)
Repeats	61	(93.8)	48	(98.0)
DAAs	50	(82.0)	44	(88.0)
Other	3	(30.0)	1	(33.3)

Table 4.10. WA rural pharmacies by methods for assessing drug effects and by year of survey

Method of monitoring drug effects	Active pharmacies (2002)		Active pharmacies (2006)	
	N	(%)	N	(%)
Clinical testing[a]	38	(59.4)	40	(78.4)
Laboratory results	5	(7.9)	8	(16.0)
Adverse effects recorded in patient files	53	(82.8)	46	(90.2)
Other	2	(25.0)	0	(0.0)

[a] Using chi-square tests, P < 0.05

4.4.2. Medication Review Processes

A total of 43 pharmacies (66.2%) and 26 pharmacies (51.0%) respectively reported supplying medicines to aged care facilities or private hospitals in 2002 and 2006 [Table 4.11]. The proportion of pharmacies approved for DMMRs doubled from those approved in 2002 (30.0% in 2002 versus 64.0% in 2006; χ^2 (2) = 13.407, P = 0.001) [Table 4.12].

DMMRs activity showed progress, with 29.8% to 56.3% of pharmacies being involved respectively in 2002 and 2006 (χ^2 (1) = 7.474, P = 0.006) [Table 4.13]. Logistic regression controlling for gender, age, location PhARIA, and inclusion of a forward pharmacy, showed that pharmacies in 2006 were 1.36 times (95%CI = 0.730 – 1.573) as likely to perform DMMRs as pharmacies in 2002. Less than 25% of pharmacies in both surveys provided medication reviews in aged care facilities or Enhanced Primary Care (EPC) multidisciplinary care plans.

Table 4.11. WA rural pharmacies by status of supplying medicines to aged care facilities or private hospitals and by year of survey

Status	WA rural pharmacies (2002)		WA rural pharmacies (2006)	
	N	(%)	N	(%)
Yes	43	(66.2)	26	(51.0)
No	22	(33.8)	25	(49.0)
Total	64	(100.0)	51	(100.0)

Table 4.12. Pharmacies by HIC approval for DMMRs and by year of survey

Approved[a]	WA rural pharmacies (2002)		WA rural pharmacies (2006)	
	N	(%)	N	(%)
Yes	18	(30.0)	32	(64.0)
No	40	(66.7)	16	(32.0)
Don't know	2	(3.3)	2	(4.0)
Total	60	(100.0)	50	(100.0)

[a] using chi-square tests, P < 0.05

Table 4.13. WA rural pharmacies by medication review processes and by year of survey

Review Process	Pharmacies involved (2002)		Pharmacies involved (2006)	
	N	(%)	N	(%)
DMRs or DMMRs[a]	17	(29.8)	27	(56.3)
Medication management reviews in aged care facilities	12	(21.1)	10	(20.0)
Enhanced primary care (EPC) multidisciplinary care plan	9	(16.7)	7	(15.6)
Enhanced primary care (EPC) case conference	3	(5.6)	4	(8.9)
Enhanced primary care (EPC) case health assessment	1	(1.9)	2	(4.4)
S100 for Aborigines	4	(7.3)	6	(13.6)
Other medication reviews	1	(5.0)	1	(14.3)

[a] Using chi-square tests, $P < 0.05$

Pharmacies reported having access to an AACP-accredited pharmacist increased from 45.2% of pharmacies in 2002 to 70.6% of pharmacies in 2006 (χ^2 (2) = 11.224, P = 0.004) [Table 4.14]. The reported position of the AACP-accredited pharmacist in pharmacies is recorded in Table 4.15.

Table 4.14. WA rural pharmacies by access to AACP-accredited pharmacists and by year of survey

Access to AACP pharmacists[a]	WA rural pharmacies (2002)		WA rural pharmacies (2006)	
	N	(%)	N	(%)
Yes	28	(45.2)	36	(70.6)
No	28	(45.2)	8	(15.7)
Don't know	6	(9.7)	7	(13.7)
Total	62	100.0	51	100.0

[a] Using chi-square tests, $P < 0.05$

Table 4.15. Position held with AACP-accredited pharmacist in WA rural pharmacies with access by year of survey

Position in pharmacy	WA rural pharmacies (2002)		WA rural pharmacies (2006)	
	N	(%)	N	(%)
Proprietor	13	(46.4)	10	(27.8)
Manager	0	(0.0)	2	(5.6)
Employee full-time	2	(7.1)	1	(2.8)
Employee part-time	1	(3.6)	3	(8.3)
Consulted of contracted	11	(39.3)	19	(52.8)
Other	1	(3.6)	1	(2.8)
Total	28	(100.0)	36	(100.0)

4.4.3. Preventive Services

The percentage of WA rural pharmacies that reported providing OTC agents for primary preventive purposes is presented in Table 4.16. More than 90% of pharmacies in the 2002 and 2006 surveys provided nicotine replacement, folic acid for pregnancy, calcium, or daily multivitamins for undiagnosed patients.

Table 4.16. WA rural pharmacies by OTC medicines provided for primary prevention and by year of survey

Preventive OTC	Pharmacies involved (2002)	Pharmacies involved (2006)
	N (%)	N (%)
Nicotine replacement	63 (98.4)	47 (94.0)
Aspirin (≥ 100mg daily)	44 (69.8)	32 (64.0)
Iron supplementation	55 (85.9)	40 (78.4)
Folic acid in pregnancy	63 (96.9)	49 (96.1)
Calcium	62 (95.4)	46 (90.2)
Daily multivitamins	61 (95.3)	50 (98.0)
Other	4 (80.0)	4 (80.0)

Data on screening tests performed in WA rural pharmacies in both surveys showed that more than 50% of pharmacies performed blood pressure measurements [Table 4.17]. A lower percentage of pharmacies in both 2002 and 2006 surveys offered glucose tests (20.3% and 18.0%, respectively), and cholesterol tests (9.5 and 4.0%, respectively). Fewer pharmacies in 2006 provided bone testing than those in 2002 (15.9% vs. 0.0%, respectively). Interestingly, the prevalence of pharmacies providing weight testing increased from 3.2% in 2002 to 44.9% in 2006. The Pearson chi-square tests showed that there was a significant association between year of survey and whether or not pharmacies provided weight testing (χ^2 (1) = 28.498, P < 0.001). After controlling for gender, age, PhARIA location, and inclusion of a forward pharmacy, pharmacies in 2006 were 2.24 times (95%CI = 1.526 – 3.283) as likely to provide weight testing as those in 2002.

Table 4.17. WA rural pharmacies by screening tests provided and by year of survey

Screening test	Pharmacies involved (2002)	Pharmacies involved (2006)
	N (%)	N (%)
Anthropometric (weight, etc)[a]	2 (3.2)	22 (44.9)
Cholesterol	6 (9.5)	2 (4.0)
Blood pressure	38 (58.5)	34 (66.7)
Glucose	13 (20.3)	9 (18.0)
Bone density[b]	10 (15.9)	0 (0.0)
Pregnancy	5 (7.9)	2 (4.0)
Other	1 (20.0)	0 (0.0)

[a] Using Pearson chi-square test, P < 0.05
[b] Using Fisher's Exact test, P < 0.05

4.4.4. Primary Health Care

All pharmacies in the 2002 and 2006 surveys were actively involved in self-medication, and assisting patients with their symptoms or health problems [Table 4.18]. Printed information, including computerised CMI and Self Care cards, for non-prescribed medicines was used by more pharmacies in 2006 compared to those in 2002 (92.2% versus 76.6%, respectively). After controlling for gender, age, PhARIA location, and inclusion of a forward pharmacy, pharmacies in 2006 were 1.49 times (95%CI = 1.069 – 2.074) as likely to provide printed information as those in 2002. In both surveys, more than 80% of pharmacies reported having patients referred to doctors with ailments, and about 50% of pharmacies made referrals to other health care workers [Table 4.18].

Table 4.18. WA rural pharmacies by primary health care and self-medication activities and by year of survey

Health care actions	Pharmacies involved (2002)		Pharmacies involved (2006)	
	N	(%)	N	(%)
Self-medication (named S2 or S3)	63	(100.0)	50	(100.0)
Primary care (received assistant)	63	(100.0)	50	(100.0)
Printed information including computerised CMI and Self Care[a]	49	(76.6)	47	(92.2)
Referred to GPs	54	(84.4)	42	(82.3)
Referred to other health workers	32	(51.6)	26	(52.0)
Other	2	(40.0)	2	(100.0)

[a] Using Pearson chi-square tests, $P < 0.05$

4.4.5. Harm Minimisation Services

Needle supplies were provided by more than 60% of the WA rural pharmacies in both surveys. A similar prevalence was evident in the 2002 and 2006 surveys for pharmacies involved in methadone dosing (56.9% and 45.1%, respectively), and buprenorphine dosing (15.6% and 25.5%, respectively). Benzodiazepine contracts or arrangements with prescribers for other drugs of dependence were practised in 42.2% and 36.7% of WA rural pharmacies in 2002 and 2006, respectively [Table 4.19].

Table 4.19. WA rural pharmacies by harm reduction activities and by year of survey

Activity	Pharmacies involved (2002)		Pharmacies involved (2006)	
	N	(%)	N	(%)
Methadone dosing	37	(56.9)	23	(45.1)
Buprenorphine dosing	10	(15.6)	13	(25.5)
Naltrexone dispensing	5	(8.1)	1	(2.0)
Needle supply or exchange	49	(77.8)	30	(62.0)
Benzodiazepine or other prescriber contracts	27	(42.2)	18	(36.7)
Other	5	(31.2)	4	(44.4)

4.4.6. Enhanced Pharmacy Services (EPS)

The Enhanced Pharmacy Services (EPS) that were offered by WA rural pharmacies in the 2002 and 2006 surveys are listed in Table 4.20, along with trained staff, fees charged and if services were planned in 12 months. More than 20% of pharmacies in the 2002 and 2006 surveys offered EPS for asthma (31.3% and 23.5%, respectively), diabetes (25.0% and 25.5%, respectively), harm reduction with methadone (54.7% and 45.1%, respectively), geriatric care (23.4% and 5.9%, respectively), herbal medicines/nutritional supplement counselling (59.4% and 47.1%, respectively), hypertension (45.3% and 49%, respectively), smoking cessation (51.6% and 62.7%, respectively), weight reduction (34.4% and 58.8%, respectively), and wound care (49.1% and 45.1%, respectively)

The provision of weight reduction services showed an increase from 22 pharmacies (34.4%) in 2002 to 30 pharmacies (58.8%) in 2006. The Pearson chi-square test showed that there was a significant association between year of survey and whether or not pharmacies provided weight reduction services (χ^2 (1) = 6.849, P = 0.009). After controlling for gender, age, PhARIA location, and inclusion of a forward pharmacy, pharmacies in 2006 were 1.37 times (95%CI = 1.109 – 1.695) as likely to provide weight reduction services as those in 2002. Among pharmacies offering weight management, it was reported that a higher percentage of pharmacies received payment (28.3% versus 18.2%, respectively), and had trained or accredited staff (36.7% versus 22.7%, respectively) in 2006 compared to 2002.

On the other hand, geriatric care was provided by a lower percentage of pharmacies in 2006 than in 2002 (χ^2 (1) = 6.625, P = 0.010). After controlling for gender, age, PhARIA location, and inclusion of a forward pharmacy, pharmacies in 2006 were less likely to provide geriatric care than those in 2002 (odds ratio = 0.690; 95%CI = 0.493 – 0.966). Of pharmacies offering this particular service in 2002, a similar percentage (33.3 %) either received payment or had trained staff, while in 2006, none of the pharmacies either received payment or had trained staff for geriatric care.

Structured community education was provided by 16 pharmacies (25.0%) in 2002, but this decreased to 4 pharmacies (7.8%) in 2006 (χ^2 (1) = 5.815, P = 0.016). After controlling for gender, age, PhARIA location, and inclusion of a forward pharmacy, pharmacies in 2006 were less likely to provide structured community education than those in 2002 (odds ratio = 0.677; 95%CI = 0.493 – 0.932). None of these pharmacies received a fee for this particular service. Among pharmacies providing this service, a higher percentage of pharmacies had trained staff in 2006 compared to that in 2002 (75.0% versus 37.5%, respectively).

For most of the services (asthma, community education, community clinic with nurses, diabetes, herbal medicines, naturopathy, hypertension, weight reduction, smoking cessation, and wound care), the percentages of pharmacies that had trained staff were higher than those that received payment. However, of 35 pharmacies (54.7%) and 23 pharmacies (45.1%) respectively providing harm reduction in 2002 and 2006, the majority received payment (80.0%; and 86.9%, respectively), and smaller percentages had trained staff (34.3% and 21.7%, respectively) [Table 4.20].

The following EPS were planned to be introduced by at least 4% of pharmacies in the months of July-September 2003: diabetes (15.6%); naturopathy (12.5%); asthma, or community education, or community clinic with nurses or herbal medicines, or hyperlipidaemia, or hypertension, or smoking cessation (4.7%). In the 2006 survey, diabetes or weight reduction or geriatric care was the prominent EPS planned to be offered (11.8%); followed by asthma (7.8%), smoking cessation (6.2.%); community education, or community clinic services, or herbal medicines, or hyperlipidaemia, or naturopathy, or wound care (5.9%) [Table 4.20].

Table 4.20. WA rural pharmacies that offered Enhanced Pharmacy Services (EPS) by trained staff, fees charged and planning in 12 months, and by year of survey

Enhanced pharmacy service	WA rural pharmacies (2002)				WA rural pharmacies (2006)			
	Offer	Receive payment	Trained staff	Plan in 12 months	Offer	Receive payment	Trained staff	Plan in 12 months
	N (%)	N (%)[b]	N (%)[b]	N (%)	N (%)	N (%)[b]	N (%)[b]	N (%)
Aboriginal health services	8 (12.5)	6 (75.0)	0 (0.0)	2 (3.1)	7 (13.7)	3 (42.8)	2 (28.6)	0 (0.0)
Anticoagulation	1 (1.6)	0 (0.0)	0 (0.0)	0 (0.0)	1 (2.0)	1 (100.0)	1 (100.0)	1 (2.0)
Asthma	20 (31.3)	0 (0.0)	8 (40.0)	3 (4.7)	12 (23.5)	0 (0.0)	6 (50.9)	4 (7.8)
Community education, structured[a]	16 (25.0)	0 (0.0)	6 (37.5)	3 (4.7)	4 (7.8)	0 (0.0)	3 (75.0)	3 (5.9)
Community clinic services with nurse	7 (10.9)	1 (14.3)	2 (28.6)	3 (4.7)	6 (11.8)	0 (0.0)	3 (50.0)	3 (5.9)
Diabetes	16 (25.0)	0 (0.0)	5 (31.2)	10 (15.6)	13 (25.5)	0 (0.0)	5 (38.0)	6 (11.8)
Drug level monitoring/ kinetic dosing	1 (1.6)	0 (0.0)	1 (100.0)	1 (1.6)	1 (2.0)	0 (0.0)	0 (0.0)	0 (0.0)
Harm reduction including methadone	35 (54.7)	28 (80.0)	12 (34.3)	1 (1.6)	23 (45.1)	20 (89.9)	5 (21.7)	1 (2.0)
Geriatric care[a]	15 (23.4)	5 (33.3)	5 (33.3)	2 (3.1)	3 (5.9)	0 (0.0)	0 (0.0)	6 (11.8)
Herbal medicines/ nutritional supplement counselling	38 (59.4)	2 (5.3)	13 (34.2)	3 (4.7)	24 (47.1)	2 (3.9)	10 (41.7)	3 (5.9)
Hyperlipidaemia	10 (15.6)	3 (30.0)	0 (0.0)	3 (4.7)	5 (9.8)	0 (0.0)	1 (20.0)	3 (5.9)
Hypertension	29 (45.3)	6 (20.7)	7 (24.1)	3 (4.7)	25 (49.0)	4 (16.0)	6 (24.0)	2 (3.4)
Naturopathy	9 (14.1)	1 (11.1)	3 (33.3)	8 (12.5)	8 (15.7)	1 (12.5)	3 (37.5)	3 (5.9)
Smoking cessation	33 (51.6)	1 (3.0)	12 (36.4)	3 (4.7)	32 (62.7)	1 (3.1)	10 (31.2)	4 (6.2)
Weight reduction[a]	22 (34.4)	4 (18.2)	5 (22.7)	0 (0.0)	30 (58.8)	7 (23.3)	11 (36.7)	6 (11.8)
Wound care	25 (49.1)	1 (4.0)	5 (20.0)	2 (3.1)	23 (45.1)	1 (4.3)	9 (39.1)	3 (5.9)

[a] Using Pearson chi-square tests, $P < 0.05$
[b] Percentage from number of pharmacies offered the particular service

In both surveys, the barriers of providing EPS, in order, were lack of time, a shortage of pharmacists, no extra remuneration, and the inability to get locum cover for emergencies. The barriers most strongly rejected for EPS were "not felt to be part of their job" and "it may impair their relations with GPs" [Table 4.21].

Table 4.21. Barriers to EPS reported by WA rural pharmacies by year of survey

Barriers	WA rural pharmacies (2002)			WA rural pharmacies (2006)		
	Strongly disagree – Disagree	Unsure	Strongly agree- Agree	Strongly disagree - Disagree	Unsure	Strongly agree - Agree
Shortage of time for pharmacist	6.2%	3.1%	90.8%	10.0%	4.0%	86.0%
Shortage of pharmacists	4.7%	7.8%	87.5%	16.0%	12.0%	72.0%
Customer's won't pay	15.4%	30.8%	53.8%	14.0%	30.0%	56.0%
Unable to get locum cover for emergencies	21.9%	10.9%	67.2%	22.0%	16.0%	62.0%
Lack of appropriate knowledge/skills by pharmacists	45.3%	10.9%	43.8%	50.0%	14.0%	36.0%
Lack of confidence by pharmacy staff	48.4%	14.1%	37.5%	48.0%	10.0%	42.0%
It is not felt by pharmacists to be part of their job	78.1%	12.5%	9.4%	74.0%	10.0%	16.0%
There is no extra remuneration for it	20.3%	10.9%	68.8%	16.0%	14.0%	70.0%
Would impair working relationships with local GPs	55.4%	30.8%	13.8%	58.0%	24.0%	18.0%
Lack of opportunity to meet with local GPs or other health workers	47.7%	13.8%	38.5%	44.0%	16.0%	40.0%
GPs do not recognise pharmacists' skills in enhanced pharmacy services	35.4%	24.6%	40.6%	34.0%	28.0%	38.0%

In the 2002 survey, the facilitators most strongly supported for EPS were "accreditation", "dedicated study time", "clinical testing area" and "closed counselling area". A similar figure was reported for the 2006 survey except for "clinical testing area" [Table 4.22].

Table 4.22. Facilitators for EPS reported by WA rural pharmacies by year of survey

Facilitators	WA rural pharmacies (2002)			WA rural pharmacies (2006)		
	Strongly disagree - Disagree	Unsure	Strongly agree - Agree	Strongly disagree - Disagree	Unsure	Strongly agree - Agree
Access to detailed patient notes	11.1%	17.5%	71.4%	12.0%	20.0%	68.0%
Designated closed counselling area	17.2%	7.8%	75.0%	16.0%	14.0%	70.0%
Designated clinical testing area	14.1%	7.8%	78.1%	16.3%	26.5%	57.1%
Appointment system	16.1%	19.4%	64.5%	18.4%	22.4%	59.2%
Accreditation for specific activity	10.9%	10.9%	78.1%	8.2%	10.2%	81.6%
Dedicated study time for pharmacist	4.7%	12.5%	82.8%	8.0%	16.0%	76.0%

Chapter 5: DISCUSSION

5.1. Response Rate

The response rates for the 2006 survey were lower than those for the 2002 survey, particularly for PhARIA 3 and PhARIA 4 pharmacies. Both the 2002 and 2006 surveys used three consecutive mailings to enhance response rate. However, the 2002 national survey applied other techniques, including wide publicity of the survey (newsletter, journal, and website) and offering incentives (accreditation points and a cash payment)[5], which were not applied in the 2006 survey. This may reflect the effectiveness of the publicity and the incentives in achieving the higher response rate.

5.2. Respondent Pharmacist Details

The 2002 survey respondents from rural WA were mainly owner or partner pharmacists who were males, with one-quarter aged 50 years of age or more. However, there was a trend of an increasing proportion of females in rural WA over time. This may relate to the fact that most new pharmacy workforce entrants are females. The Pharmacy Labour Force Survey in 1999 reported that the proportion of females in the pharmacist labour workforce had risen, from 43.5% to 46.9% in 1999.[66] This finding may also reflect that more female pharmacists are now willing to work in rural areas.

The feminisation of pharmacy is believed to be a significant and positive dynamic as women in general provide a better patient-focused service than men.[15] In addition, female pharmacists are generally younger than males. Both the 2002 and 2006 surveys reported that none of the female pharmacists was more than 51 years of age compared to 40% of males. This finding is in line with the national survey in 1999[66] where female pharmacists (mean 41.7 years) were substantially younger than male pharmacists (mean 50.0 years).[66] Thus, with more and younger female pharmacists working in rural areas, the issue of the ageing pharmacist workforce in these areas may no longer be a concern. However, it is believed that female pharmacists tend to not work full-time due to family commitments.[14, 15, 59, 66] This problem is more

prominent in rural areas where a general shortage of pharmacists living in these areas results in a minimal chance of having two or more female pharmacists living in a particular area who are prepared to share one full-time position.[59] Female pharmacists are also reported to be less likely to purchase pharmacies, and this may raise the issue of the sustainability of local pharmacies.[14, 59]

About 10% of WA rural pharmacists in the 2002 survey did not take part in any CPE over the past year, and this had improved slightly in 2006. These rural figures, however, were lower than the national survey (2002)[5], where only 3.1% of Australia's community pharmacies (urban and rural) were not involved in any CPE during the past year. Access to CPE could be a problem in rural areas due to the remoteness of the practice, and also the difficulty in finding a relief pharmacist, for attending CPE usually requires taking time off work. On the other hand, rural pharmacists may be required to provide a wide range of services,[7-9] and CPE could be seen as a critical tool for acquiring the skills to deliver these services. Research based on the National Pharmacy Database Project (2002)[5] demonstrated that pharmacies with higher CPE involvement were more likely to be offering EPS, particularly diabetes and hyperlipidaemia services. Thus, Australia's national bodies should further develop electronic, more accessible, practical and efficient forms of CPE for pharmacists residing in rural and remote areas.[5] The forms developed, however, should not neglect the importance of pharmacists interacting with their peers.

5.3. Pharmacy Characteristics

There was an even distribution of rural pharmacies located in "smaller towns" (PhARIA 4 to 6), and "larger towns" (PhARIA 1 to 3) in both surveys. The 2006 survey also reported that the majority of pharmacies were located as stand alone or as part of strip shopping centres.

The estimated mean of the turnovers of WA rural pharmacies in 2002 (after being adjusted) was comparable to the 2006 figure. However, the 2002 figure ($1.71 million – without adjustment) was lower than the national figure (2002)[5], which

showed an estimate turnover of $1.84 million. This may relate to fewer prescriptions being dispensed in WA rural pharmacies compared to the national figure (2002)[73]. The percentages of WA rural pharmacies that dispensed more than 800 prescriptions per week in 2002 and 2006 surveys were 41.6% and 41.2%, respectively. In comparison, the national figure (2002)[73] showed 53.5% of Australia's pharmacies (rural and urban) dispensed more than 800 prescriptions weekly, and it was noted that more than 60% of pharmacy income was generated from dispensing prescriptions.

About one-quarter of WA rural pharmacies had customer numbers of more than 1500 per week in 2006. This is not directly comparable to the 2002 figure, since different categories were included in the question. It was reported that 31.7% of WA rural pharmacies in 2002 had customer numbers of more than 1400 per week, which was comparable to the national figure (2002)[73] of 35.1% of Australia's pharmacies. Similar days and hours of opening were reported for WA rural pharmacies in 2002 and 2006. These were comparable to the national figure (2002)[5], where Australia's pharmacies (urban and rural) opened 52 hours (median) per week. Considering the shortage of pharmacists in rural areas, this may be an indication that rural pharmacists worked longer hours than their urban counterparts.

Less than half of the pharmacies in 2002 were QCPP-accredited, but this had doubled in 2006. This is a positive finding since accreditation requires compliance with minimum standards of pharmacy facilities and staff training.[75] Thus, membership of the national QCPP could be seen as an indicator of the quality of pharmacies in Australia.

A large percentage of WA rural pharmacies in both surveys had an unenclosed counselling area, and a much lower percentage reported having a closed counselling area or a forward pharmacy. Less than 16% of WA rural pharmacies from both surveys had a forward pharmacy area. These figures were lower than the national figure (2002)[73], where 27.3% of Australia's pharmacies (rural and remote) reported having a forward pharmacy area. Forward pharmacy was first introduced in Australia in 1992 as one arm of the Pharmacy Extension Program (PEP), aiming to develop the counselling role of community pharmacists.[76] Practising forward pharmacy requires

redesigning the area in front of the dispensary to allow a pharmacist to sit at a desk with a patient while he or she enters the prescription data into a dispensing computer, and reviews the patient's prescribed or other medicines and other health-related matters. Consumers' experiences of this model had been evaluated, and significant improvements were evident for frequency of counselling scores for a range of types of information received.[19] Moreover, a study based on the national survey (2002)[5] reported that the inclusion of a forward pharmacy area was a significant predictor of an increased proportion of time being spent on patient consultation.[73] Thus, the low uptake of forward pharmacy in WA rural pharmacy practice warrants closer consideration.

More than half of WA rural pharmacies in 2002 belonged to banner groups, and this was not significantly different after four years. This is in line with the report in 2000 that about half of the pharmacies in Australia had group membership.[77] Banner groups offer support on administration and marketing issues that can relieve administrative tasks from pharmacists, allowing them to concentrate more on their professional role.[77] A study from the National Pharmacy Database Project (2002)[5] reported that pharmacies that belonged to groups were much more likely to have higher sales figures, and also to provide greater consultation services to their consumers.[58] In rural areas where financial and workforce problems are more pronounced, banner memberships may provide great benefits in terms of helping pharmacists to elevate their profile cost-effectively and save administrative time to enable more clinical activities.

5.4. Pharmacy Services

5.4.1. Prescription-related Activities

Less than 50% of WA rural pharmacies reported they dispensed more than 800 prescriptions per week in the 2002 and 2006 surveys. These were lower than the 2002 national figure[73], where 53.5% of Australia's pharmacies (rural and urban) dispensed more than 800 prescriptions weekly. This may provide an indication that WA rural pharmacies dispensed fewer prescriptions than their urban counterparts. This is despite the fact that they served a larger population per pharmacy.[71]

The proportions of WA rural pharmacies that issued DAAs in aged care facilities (nursing homes and hostels) and in community settings, had not changed significantly over four years. However, the high percentage of pharmacies reported using DAAs for monitoring compliance in the 2002 and 2006 surveys, may indicate that DAAs have emerged as devices for enhancing compliance. These figures were only slightly lower than the percentage of pharmacies using verbal questioning or repeated prescriptions for monitoring compliance in both surveys. The use of DAAs in medication management has been supported by literature and survey evidence collated by Australian researchers.[18]

Most pharmacies monitor patient responses to therapy by questioning patients or their carers. The use of methods other than verbal assessment to monitor the effects of prescribed therapy showed that the majority of WA rural pharmacies in both surveys used records of adverse effects in patients' files. Monitoring adverse effects is important to anticipate or detect adverse reactions to drugs before they become inevitable or irreversible. Moreover, the use of clinical testing devices (such as weight scales, blood pressure and glucose meters) for monitoring had increased significantly from about 50% in 2002 to almost 80% in 2006. The use of clinical testing devices according to Australian standards[78] may help to overcome the barrier to de-scheduling of prescribed medicines to "pharmacist-only" (S3) or "pharmacy" (S2) status. Hence, if clinical testing for monitoring purposes becomes widely and frequently performed in community pharmacies, then the case for widening the range of S3 and S2 products available in pharmacies would be strengthened.[5]

About 60% of WA rural pharmacies performed supervised dosing for at least one of a range of drugs listed in the 2002 and 2006 surveys (methadone, buprenorphine, analgesics, benzodiazepines, and other psychotropics). Methadone was the most common drug being supervised by pharmacies in both surveys, with about half of the pharmacies providing this service. It was reported that 1,557 or 31% of Australia's pharmacies in May 2000 were approved to participate in methadone maintenance programs involving the supervised dosing of methadone liquid.[49] This implies a marked increase in participation rates by pharmacies in methadone maintenance programs since May 2000. Since October 2000, buprenorphine has been available as an alternative treatment for opioid dependence.[79] This study showed that WA rural

pharmacies' involvement in supervised dosing of buprenorphine tended to increase over time. The supervised dosing of methadone and/or buprenorphine is considered of importance in enhancing the effectiveness of opioid dependence treatment by increasing compliance and significantly improving retention, while lowering the risk of diversion.[49]

Various written counselling aids were provided by WA rural pharmacies, and the figures had not significantly changed over time. More than 90% of pharmacies provided CMI for prescribed medications in the 2002 and 2006 surveys, and lower percentages were reported for written information produced by computer programs other than CMI, or other written or printed information. CMI and other written counselling, when available, should be seen as a supplement to verbal counselling.[17] Face-to-face counselling with the patient is the most acceptable way to legally clarify patients' concerns and to avoid dispensing errors.[17, 80] In the case of verbal counselling, both surveys reported that the majority of WA rural pharmacies provided counselling in an unenclosed counselling area. Less than half of the pharmacies used a closed counselling area, and a much lower percentage reported counselling patients in a forward pharmacy area. These corresponded with the findings that over 70% of WA rural pharmacies had an unenclosed area, and lower proportions of pharmacies had a closed counselling area or a forward pharmacy.

5.4.2. Medication Review Processes

Pharmacies have been able from 1997 to engage and be remunerated for pharmacists accredited by the AACP or the Society of Hospital Pharmacists of Australia to perform comprehensive medication reviews in residential aged care facilities, and since 1 October 2001 to perform HMRs or DMMRs.[45] A small percentage of WA rural pharmacies in 2002 performed medication reviews in residential aged care facilities, and this had not changed over four years. On the other hand, the percentage of pharmacies providing DMMRs had increased significantly from less than 30% in 2002 to almost 60% in 2006. This was in line with the increasing proportion of pharmacies being registered as approved DMMRs providers, and having access to an AACP-accredited pharmacist. Registration to conduct medication reviews entitles such accredited pharmacists with special skills and knowledge to assist other health care professionals and to contribute to the care of residents or patients by ensuring

QUM.[17] A survey of domiciliary medication reviews in Australia reported that in most cases, the rural GPs encouraged pharmacists to get involved in this process as the benefits for the patient have been established.[81]

A low percentage of WA rural pharmacies in both surveys were involved in the Section 100 (S100) program. The S100 scheme was introduced in Australia in February 1999 in order to improve access to medicine for Indigenous people in designated remote areas. Under the scheme, Aboriginal Health Services (AHSs) in remote areas can order bulk supplies of Pharmaceutical Benefits Scheme (PBS) medications through a selected pharmacy, and distribute them directly, as needed, to patients.[22] Thus, pharmacies are not involved in individual dispensing processes. Instead, pharmacists are intended to be involved at a systems level to support safe and legal medications management at the S100 sites.[22] A survey of AHSs and pharmacies which participated in the S100 program indicated that, although community pharmacy have provided a good supply mechanism for medications in bulk to AHSs, there is a need in the AHS sector for training by pharmacists on medicines issues.[23] An allowance has been provided for pharmacies providing support services to the S100 program, however, it has been suggested that this allowance is inadequate, and the uptake has been extremely low.[23, 82] This may be compounded by a scarcity of pharmacists in rural and remote areas leading to issues of overwork.[83] Hence, these issues need to be addressed to improve pharmacists' involvement in ensuring QUM.

5.4.3. Preventive Services

The rates of OTC agents issued and screening tests performed reflect the extent and level of prevention (mainly primary preventive) activities offered by WA rural pharmacies [Table 4.16 and Table 4.17]. Since rural populations have poorer health outcomes than urban populations and have less access to health services, preventive services are of great importance. In the 2002 and 2006 surveys, it was reported that more than 90% of WA rural pharmacies provided nicotine replacement, folic acid for pregnancy, calcium, or daily multivitamins for undiagnosed patients. Nicotine replacement has been recommended in the Royal Australian College of General Practitioners (RACGP) guidelines (2005)[48] as an effective treatment for smoking

cessation. Tobacco smoking is one of the behavioural determinants of health that accounts for the greatest burden of disease in Australia. Estimates from the 2004 National Drug Strategy Household Survey (NDSHS)[3] indicated that around 2.9 million Australians (17.4% of people aged 14 years and over) smoked tobacco daily, while people living in rural and remote areas were reported to be more likely to be smokers than those living in major cities[1]. Supplementation of 0.5 mg folic acid daily is suggested in all women planning to become pregnant to prevent neural tube defects in offspring.[48] A diet high in calcium (1000-1500 mg/day) is indicated for preventing osteoporosis in women 45 years of age and men 50 years of age.[48] However, the preventive effects of OTC agents, especially vitamins, need to be carefully considered by pharmacy bodies in Australia. For instance, a randomised, double-blind, placebo-controlled trial found that a combined treatment of folic acid and B vitamins (B_6 and B_{12}) taken daily by persons with high cardiovascular risk did not lower mortality or incidence of vascular diseases and, therefore, should not be recommended.[84]

The most common screening performed in WA rural pharmacies was blood pressure measurements, with more than 50% of pharmacies offering this service. The AusDiab Study found that in 1999-2000 the prevalence of high blood pressure in Australia was 28.6 per 100 people with 15.2 per 100 untreated and possibly undiagnosed.[85] A high burden of cardiovascular disease and cardiovascular risk was found in those with untreated hypertension.[86] Thus, early detection and appropriate treatment of hypertension are of importance in reducing cardiovascular disease rates in Australia. Less than 25% of WA rural pharmacies offered glucose tests in both surveys. The recent national guidelines (updated in 2005) have recommended the use of fasting plasma glucose testing, performed in a laboratory, for diabetes screening.[87] However, people living in rural areas may be a significant distance from a laboratory, and point-of-care glucose testing may have a useful role in screening for diabetes risk, yet the diagnosis of diabetes should still rely on confirmatory tests of plasma glucose in the laboratory.[88]

Blood cholesterol tests were reported in less than 10% of WA rural pharmacies in both surveys. The lower rates of cholesterol screening in pharmacies may be due to legal or practical barriers to skin penetration, ignorance or resistance by clients or

their carers, or may be related to time or capital expense issues. The lower percentages of pharmacies providing bone density testing may be due to the fact that such testing is offered and promoted through community pharmacies across Australia at specific times. This service is organised by the Australian Bone Density Testing Centre and, hence, this test is provided by external staff.[89]

Interestingly, the prevalence of WA rural pharmacies that provided weight testing had increased from less than 10% to almost 50%. This is in line with the finding that more pharmacies offered weight management services over four years. This may be due to the increase of the awareness, knowledge and/or skills of weight screenings in rural pharmacies, which is related to the introduction of a national program "Lifeweight" in March 2004. This coincided in Australia with the change in classification of orlistat, an effective weight management agent, from a medically prescribed (S4) to a "pharmacist-only" (S3) product in May 2004. National pharmacy bodies and the pharmaceutical manufacturer of orlistat have cooperated to promote a weight management program in a kit form for pharmacies. It includes a "Weight Category" package with electronic weight scales, anthropometric measurement tape, client record forms, an educational CDROM and support materials for clients and pharmacy assistants.[90]

5.4.4. Primary Health Care

WA rural pharmacies provided a range of primary health care, as evidenced by all pharmacies in the 2002 and 2006 surveys were involved in self-medication, and assisting patients with their symptoms or health problems. More pharmacies in 2006 issued printed information, including computerised CMI and Self Care cards, for non-prescribed medicines to their clients. This may be related to the increasing availability of CMI by this time, as the Pharmaceutical Society of Australia (PSA) recommended CMI to be provided for all prescribed and "pharmacist-only" medicines by 2004.[17] A range of training programs and incentives that has been provided to promote and improve the effective use of CMI in pharmacy practice[91], may also influence this positive finding. Moreover, the recent PSA guidelines have recommend that pharmacies should provide CMI leaflets to their customers since CMI is an official document prepared by the sponsor conveying brand-specific

medicine information. Other forms of written medicines information such as Self Care cards, however, could be provided only as a supplement to CMI in assisting consumers' understanding of their condition or medication issues.[92]

5.4.5. Harm Minimisation Services

Community pharmacies have an important role in minimising infections and other harm related events with drug misuse. The main harm reduction interventions have been the provision of methadone treatment and needle or syringe programs.[49, 50] It was reported that more than 60% of the WA rural pharmacies in both surveys provided needle supply or exchange. This is in line with the finding that 50% of pharmacies in Australia offer sterile injecting equipment either by sale or through an exchange program to the estimated 100,000-175,000 regular or occasional injecting drug users.[49] A comparison study of rural and metropolitan drug users in NSW demonstrated that rural pharmacies were being accessed more than their urban counterparts for obtaining clean injecting equipment. The researchers, however, noted that pharmacies typically can not provide the information, education and support that fixed site Needle and Syringe Programs (NSPs) offer.[93]

Over 45% of the WA rural pharmacies provided methadone dosing, and this was not statistically significantly different over four years. These figures were similar to those reported for the provision of supervised dosing for methadone. It is known that the ability of pharmacists to dispense and supervise the consumption of methadone not only improves the flexibility and convenience of dosing, but also increases the treatment retention and prevents the diversion of methadone.[49] Nevertheless, it was reported that in both surveys, small percentages of pharmacies had trained staff despite most of them receiving payments for harm minimisation services, including methadone. This may warrant further development of training programs in order to improve the pharmacy's role in providing harm minimisation services for rural communities.

5.4.6. Enhanced Pharmacy Services (EPS)

WA rural pharmacies reported providing a range of EPS in 2002 and 2006 [Table 4.22]. This was an addition to the extensive medication-related services recorded by pharmacies in both surveys.

There were some inconsistencies between the high prevalence of certain risk factors and disorders in rural Australia and the rates of provision of corresponding EPS by rural pharmacies in WA. The National Health Priorities Areas (NHPAs) include asthma, mental health, cardiovascular health, cancer control, diabetes, injury prevention and control, arthritis and other musculoskeletal conditions.[94] It is documented that the prevalence of cardiovascular diseases, diabetes, respiratory diseases, and other chronic conditions are higher in rural areas. This is related to the higher levels of health risk factors among rural populations such as smoking, obesity and physical inactivity.[1-3,6] The 2002 survey, however, showed that less than 50% of WA rural pharmacies were offering some of the EPS that correspond to NHPAs and rural health issues (asthma, weight reduction, diabetes, hypertension, hyperlipidaemia). Only smoking cessation had a service percentage higher than 50%, and tended to increase over time.

The provision of asthma, diabetes, hypertension, and hyperlipidaemia did not show significant changes over four years. However, the proportion of pharmacies, which provided weight management service, had increased from about 30% to almost 60%. Weight management was also ranked first as the service planned within a 12-month period, together with diabetes and geriatric care. The increasing uptake of weight management services in rural pharmacy practice is a positive finding, since about 60% of Australian adults were either overweight or obese in 2004[95], and it is well documented that people living in rural areas are more likely to be overweight or obese[1]. This may relate to the substantial proportion of Indigenous populations living in these areas. Self-reported results from the 2004-05 National Aboriginal and Torres Strait Islander Health Survey (NATSIHS) indicated that, in each age group, Indigenous males and females tended to be obese compared to other Australians.[96] Despite the higher acceptance of weight management services in rural pharmacy practice, more pharmacies in 2006 reported having trained staff for the service. The

increase in pharmacies with staff trained and offering weight management in rural WA may be related to the introduction of a national program "Lifeweight" in March 2004, which coincided with the change in classification of orlistat from a medically prescribed to a "pharmacist only" (S3) product in May 2004.[90]

Given the low rates of some EPS relative to the rural health issues in both surveys, it is important to analyse what prevented and facilitated the involvement of rural pharmacies in EPS. In 2002, there was an even spread of factors considered as important facilitators in providing EPS such as allocation of study time, accreditation, clinical testing, and counselling area. The most common reported barriers to undertaking EPS involved either time constraints, a shortage of pharmacists, no extra remuneration, or the inability to find locums. After four years, the facilitators and barriers reported by WA rural pharmacies remained the same.

Given the lack of time and a shortage of pharmacists as the major barriers in both surveys, comparisons were made for number of FTE pharmacists per WA rural pharmacy (PhARIA 2-6) in 2002 and 2006**.** This was calculated with an assumption that 1 FTE pharmacist worked for 51 hours per week, which was the median of opening hours per week in 2006. It was found that number of FTE pharmacists per WA rural pharmacy only increased slightly from 1.49 in 2002 to 1.66 in 2006. This indicates that the workforce issues still remained a problem in WA rural pharmacy practice and, hence, corresponds to the barriers reported in both survey. The similar number of FTE pharmacists in both surveys may be related to the trend of an increasing proportion of female pharmacists in 2006. While it is believed that female pharmacists tend to not work full-time,[14, 15, 59, 66] the FTE pharmacists may not improve significantly with the increasing number of female pharmacists taken up rural practice. However, this may need a closer investigation in order to provide clear directions for the government and pharmacy bodies in addressing the shortage of pharmacists in rural areas.

Research based on the National Pharmacy Database Project (2002)[5] found that significant barriers to EPS were a perceived lack of confidence and the EPS not being seen as pharmacy practice. It was also noted that pharmacy and pharmacists' characteristics such as the inclusion of closed counselling area and higher CPE, were

significant predictors for offering EPS.[54] These findings may assist in designing programs aimed to improve the provision of EPS in rural areas.

Moreover, promotion campaigns may play an important role in increasing the uptake of important services. For example, the introduction of the "Lifeweight" program[90] has been evident in increasing pharmacies' involvement in weight testing and weight management services. Even wound care, which was a condition of low frequency, was reported in more than 40% of pharmacies in both the 2002 and 2006 surveys. Its high acceptance has demonstrated the success of the organised promotion and traditional nature of a service.[97] Clearly, these findings show that a marked increase in the uptake of services can occur if support is provided.

5.5. Study limitations

This study has several limitations that are important to acknowledge. First, WA rural pharmacies involved in the 2002 survey were not exactly the same with those involved in the 2006 survey. In repeat cross-sectional studies, the initial and subsequent studies do not necessarily recruit the same individuals, since community and not individual changes are of interest. A series of cross-sectional studies have been used to investigate changes in practice over time.[98] Second, the 2002 data of WA rural pharmacies were sourced from the national survey (2002)[5], which was a census of PhARIA 2 to 6 and a 20% random sample of PhARIA 1 pharmacies. The 20% random sample was based on the high number of PhARIA 1 pharmacies. The 2006 survey was a census sample of all WA rural pharmacies, including a small number of PhARIA 1 rurally located pharmacies. There was, therefore, a comparatively small under-representation of PhARIA 1 rurally located pharmacies in the 2002 survey. This, however, was not considered as a major issue in this study, since the chi-square test of the percentage of WA rural pharmacies across PhARIA (PhARIA 1 to 6) against year of study (2002 and 2006) showed no significant difference.

Third, this study was based on self-reported data that may be subjected to bias as a result of responders knowingly misinterpreting activities, or as a result of unwittingly

poor memory or misconceptions regarding the actual state of affairs.[98] However, several methods have been applied to ensure the validity of data collected: (i) pharmacists were assured about the confidentiality, and informed that the study was conducted for the benefit of rural pharmacy practice, all of which may encourage pharmacists in providing valid responses; (ii) questionnaires should be completed by pharmacists, who have an adequate knowledge of the pharmacy; and (iii) the questionnaire was carefully constructed and designed. The questionnaire used in 2006 survey was designed based on that used in the Australia's National Pharmacy Database Project (2002)[5]. The 2002 questionnaire was constructed in consultation with a wide range of specialist pharmacists, and was examined and tested by academic, administrative, specialist and practicing pharmacists throughout the country (PhARIA 1 to 6). A focus group of pharmacists was conducted to gain practical feedback on the questionnaire. Fourth, changes in the wording of some questions within the 2006 questionnaire from those within the national survey (2002)[5] questionnaire may have limited the scope of the comparisons between 2002 data and 2006 data. However, these changes were made to suit the specific rural situations. Lastly, this study provides broader information on the proportions of pharmacies performing a range of services, without taking into account detailed data on frequency and quality of services. Thus, further research focused on gaining detailed data of particular services is noteworthy.

6. CONCLUSIONS

This study provides information on the changes in WA rural pharmacy practice between 2002 and 2006. The pharmacist characteristics were not significantly different after four years with regard to age, gender, year of registration, highest qualification, CPE, and their position in the pharmacy. However, there was a trend of an increasing female proportion of the pharmacy workforce that may influence rural pharmacy practice.

Similar figures of pharmacy characteristics in 2002 and 2006 were reported in relation to PhARIA location, setting of pharmacy, group membership, the inclusion of counselling areas, method of operation, trading hours and annual turnover. Only QCPP accredited-pharmacies had increased significantly, which may imply the improved quality of WA rural pharmacies over time.

In both surveys, WA rural pharmacies were reported as providing a wide range of services, including prescription-related activities (DAAs, monitoring, supervised dosing, and counselling activities), medication review processes, preventive services, primary health care, harm minimisation services (particularly methadone and/or buprenorphine dosing, and needle supply or exchange), and EPS. However, several significant differences were reported across the two surveys. More pharmacies provided clinical testing for monitoring, and printed information for non-prescribed medicines. A higher percentage of pharmacies performed DMMRs, which was in line with the increasing proportion of pharmacies being registered as approved DMMRs, and having access to an AACP-accredited pharmacist. There were rapid increases in weight testing and weight management services. Smoking cessation was offered by more than 50% the pharmacies, and had tended to increase. Disappointingly, other EPS (asthma, diabetes, hypertension, hyperlipidaemia), which correspond with Australia's health priorities and rural needs, were reported by low percentage of pharmacies in both surveys. A shortage of pharmacy workforce had remained a problem, as evidenced by the similar figures of FTE pharmacists per WA rural pharmacy across the two surveys. Thus, government and pharmacy bodies

should take these issues into consideration when designing new programs aimed to increase access to pharmacy practice. Moreover, support for the important services is clear if they are to be taken up by the profession.

This study also highlights several issues that may warrant closer consideration, including CPE involvement, low uptake of forward pharmacy, and low participation in the S100 scheme. In improving rural pharmacists' involvement in CPE, the government and pharmacy bodies should further develop more accessible, practical and efficient forms of CPE, which also consider the need of pharmacists to interact with their peers. The low uptake of forward pharmacy in rural pharmacy practice may require further research on the facilitators and barriers of applying this model in rural pharmacy practice and, thus, provide assistance for future interventions. The government and pharmacy bodies should also address the issue of the low participation in the S100 scheme by dealing with barriers such as the inability to access locum pharmacists, and the lack of time to provide support services. Pharmacists' involvement in providing support and advice on medication management in AHS sites is important in ensuring the quality use of medicines.

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Appendix 1: Ethical Approval

minute

To	**Ms Yosi Irawati WIBOWO**
From	**Mrs Jennifer Ramsay - Ethics Committee Secretary**
Subject	**Protocol Approval PH-11-2006**
Date	**09 October 2006**
Copy	**Professor V.B. Sunderland**

Curtin University of Technology

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Thank you for your "Form C Application for Approval of Research with Minimal Risk (Ethical Requirements)" for the project titled **"RURAL PHARMACY SERVICES IN WESTERN AUSTRALIA"**. On behalf of the Human Research Ethics Committee I am authorised to inform you that the project is approved.

Approval of this project is for a period of twelve months from **27 September, 2006** to **30 September, 2007**.

If at any time during the twelve months changes/amendments occur, or if a serious or unexpected adverse event occurs, please advise me immediately. The approval number for your project is **PH-11-2006**. *Please quote this number in any future correspondence.*

Mrs Jennifer H. Ramsay
Committee Secretary
Human Research Ethics Committee

Please Note: The following standard statement must be included in the information sheet to participants: *This study has been approved by the Curtin University Human Research Ethics Committee. If needed, verification of approval can be obtained either by writing to the Curtin University Human Research Ethics Committee, c/- Office of Research and Development, Curtin University of Technology, GPO Box U1987, Perth, 6845 or by telephoning 9266 2784.*

Appendix 2: Questionnaire – Rural Pharmacy Services (2006)

Survey of Rural Pharmacy Services in Western Australia

Curtin University of Technology

This survey is being conducted by Curtin University's School of Pharmacy. **The main purpose** of the survey is to gain a better understanding of the scope of services currently provided by rural pharmacies so our state and national bodies can be assisted in designing appropriate programs and policies to improve the plight of both pharmacists and people from rural and remote areas. Clearly, if rural pharmacies become uneconomic, the consequent loss of services can be defined from these data.

The respondent pharmacist manager or owner may need to consult with other pharmacists or non-pharmacist staff who work at other times or in different areas in the pharmacy. Please find an enclosed tea bag for refreshment while you are completing the questionnaire.

Any queries may be directed to either of us:

Prof. Bruce Sunderland
Project Supervisor
Phone: 9266 7377
B.Sunderland@curtin.edu.au

Yosi Wibowo
Primary Researcher
Phone: 041 0314506
yosi.wibowo@postgrad.curtin.edu.au

Thank you for participating in this study.

Informed Consent

I consent to the collection and the use of the data in the enclosed form on the understanding that it will be de-identified, processed and analysed in groups, and held confidentially according to National Health and Medical Research Council requirements. I further understand that the project has been approved by the Human Research Ethics Committee of the Curtin University of Technology.

Signed: _____ Pharmacy (print): _____

Name (print): _____ Date: _____/_____/_____ (DD/MM/YY)

This study has been approved by the Curtin University Human Research Ethics Committee. If needed, verification of approval can be obtained either by writing to the Curtin University Human Research Ethics Committee, c/- Office of Research and Development, Curtin University of Technology, GPO Box U1987, Perth, 6845 or by telephoning 9266 2784.

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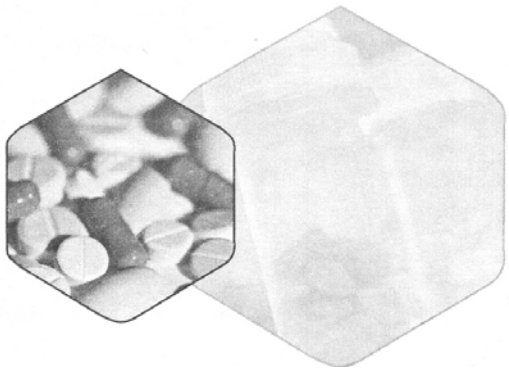
47710-10-06



SECTION A: Respondent pharmacist details

1. **Gender.** Please tick (√)

Male	
Female	

2. **Age.** Please tick (√)

21 - 30	
31 - 40	
41 - 50	
51 - 60	
61+	

3. In which year did you **first** obtain **Australian registration** as a pharmacist (any category) in any State or Territory?

4. **a)** Please tick (√) where your **secondary schooling** was done.

Rural	
Metropolitan	

b) Please tick (√) where you **resided** when you studied at secondary school.

Rural	
Metropolitan	

5. **a)** Please tick (√) your **highest qualification** in pharmacy.

Diploma	
B Pharm	
M Pharm	
PhD	
Other (specify) _____	

b) Please tick (√) the average **number of hours** you spent each **month** on Continuing Pharmacy Education activities in the last 12 months.

None	
1 to 5 hours	
6 to 10 hours	
11 to 20 hours	
More than 20 hours	

c) Please tick (√) the percentage of your involvement in the following **Continuing Pharmacy Education (CPE)**

% CPE time involvement	**0 – 20 %**	**21 – 40 %**	**41 – 60 %**	**61 – 80%**	**81 – 100 %**
Conferences					
Course/lectures (seminars)					
Journals/ personal reading					
Online					
Questionnaires in professional journals					
Other (specify) _____					

6. Please tick (√) which one of the following best describes your **position in this pharmacy**.

Sole proprietor	
Partner proprietor	
Salaried manager	
Pharmacist in charge	
Locum pharmacist	
Consultant pharmacist	
Employee pharmacist	

SECTION B: Pharmacy Services

Prescription related activities

7. **a)** Please tick (√) the average **number of prescription items dispensed** in this pharmacy in a typical period of **seven days (one week)**.

Prescriptions per week	0 to 300	301 to 800	801 to 1,200	1,201 to 2,000	2,001 to 3,000	3,001 or more
Total						

b) Please tick (√) the average **number of patients** in the following categories who **order** prescribed drugs in a typical period of seven days in this pharmacy.

Category of order	None at all	Less than 1 per week	1 to 5 per week	6 to 10 per week	11 to 20 per week	21 or more per week
Mail (post)						
Facsimile						
Telephone						
Other (specify) _____						

c) Please tick (√) the average **number of patients** in the following categories who were **delivered** prescribed drugs in a typical period of seven days in this pharmacy.

Category of delivery	None at all	Less than 1 per week	1 to 5 per week	6 to 10 per week	11 to 20 per week	21 or more per week
Mail						
Courier						
Depot						
Other (specify) _____						

8. Please tick (√ **)** the average **number of patients** in a typical period of seven days in the following settings who received from this pharmacy prescription items packaged in **dose administration aids or DAAs** (eg. Webster-type, Dosette-type)

Aged care or community setting	None at all	Less than 1 per week	1 to 20 per week	21 to 50 per week	51 to 100 per week	101 to 250 per week	251 or more per week
Nursing home							
Hostel							
Community based patients							
Remote health clinics (specify) _____							

9. Please tick (√) the **number of individual (different) patients** who received the following drugs by **supervised dosing** in this pharmacy during a typical period of seven days.

Drug groups dosed in pharmacies	None per week	Less than 1 per week	1 to 5 per week	6 to 10 per week	11 to 20 per week	21 or more per week
Analgesics (specify) _____						
Benzodiazepines (specify) _____						
Buprenorphine						
Methadone						
Other psychotropic agents (specify) _____						
Other agents (specify) _____						

10. Please tick (√) the **number of patients in the past seven days** who were declined prescription drugs for the following reasons.

Reason for declining prescribed drugs	None at all	Less than 1 per week	1 to 2 per week	3 to 5 per week	6 to 10 per week	11 or more per week
Inappropriate drug or dose, suspected interaction, or contraindication						
Suspected **adverse effect**						
Duplication, **prescription defects**						

11. Please tick (√ **)** the estimated **number of patients** with prescription medications who fall into of the following **counselling** categories in this pharmacy during a typical working day. Forward pharmacy refers to a seated counselling area with dispensary computer.

Verbal or written counselling	None at all	Less than 1 per day	1 to 5 per day	6 to 10 per day	11 to 20 per day	21 or more per day
Non-or-poor-English speaking patients						
CMI computerised						
Other computer produced information						
Other written or printed drug information						
Counselled or administered medicines in closed counselling area						
Counselled or administered medicines in private un-enclosed area						
Counselled or administered medicines in a forward pharmacy area						
Medication Assistance Service (MAS) or activity paid by health insurance						
Other (specify) _____						

12. Please tick (√) the estimated **number of patients** who received the following **monitoring activities for compliance** with their prescribed medications in this pharmacy during a typical period of seven days.

Monitoring compliance	None at all	Less than 1 per week	1 to 10 per week	11 to 40 per week	41 to 80 per week	81 or more per week
Monitor compliance by appropriate questions						
Monitor compliance by frequency of repeats						
Monitor with DAAs (eg. Webster-type, Dosette-type)						
Other (specify) _____						

13. Please tick (√) the estimated number of patients who received the following **monitoring activities for therapeutic and adverse effects** of their prescribed medications in this pharmacy during a typical period of seven days.

Monitoring therapeutic and adverse effects	None at all	Less than 1 per week	1 to 5 per week	6 to 10 per week	11 or more per week
Clinical testing in pharmacy with devices such as weight scales, glucose meters, blood pressure meters, peak flow meters					
Laboratory test results to monitor medication effects					
Adverse reactions recorded in patient file (eg. drug allergies)					
Other (specify) _____					

14. Please tick (√) if there is a **Silver Chain or Community Nursing post** in your town.

Yes	
No	

If **YES**:

a) Please tick (√) how often the pharmacy provides medications to the Silver Chain or Community Nursing post.

None at all	Less than 1 per week	1 to 2 per week	3 to 5 per week	6 to 10 per week	11 or more per week

b) Please tick (√) if the Silver Chain or Community Nursing post impact on the pharmacy's service provision.

Yes	
No	

➡ Please specify: _____

Medication review process

15. **a)** Please tick (√) if the pharmacy **supplies medicines** to patients in **residential aged care facilities** (eg. nursing homes, hostels) or **private hospitals**.

Yes	
No	

b) Please record the **number of beds** in the following locations supplied with medicines by this pharmacy.

Type of external facility	Beds supplied
Nursing homes	
Hostels	
Private hospitals	
Other (specify) _____	

c) Please tick (√) if this pharmacy is **registered with the HIC** as an approved Home Medicine Reviews (HMRs) or DMMRs Service Provider. DMMR refers to Domiciliary Medication Management Review, a term interchanged with HMR.

Yes	
No	
Don't know	

d) Please tick (√) the **number of patients** in a typical month in 2006 involved in the following medication review processes in which this pharmacy participated.

Medication review processes reimbused	None at all	Less than 1 per month	1 to 10 per month	11 to 50 per month	51 to 100 per month	101 to 200 per month	201 or more per month
Home Medicine Review (HMRs) or DMMRs							
Medication Management Review in residential aged care facilities							
Enhanced Primary Care (EPC) Multidisciplinary Care Plan							
Enhanced Primary Care (EPC) Case Conference							
Enhanced Primary Care (EPC) Case Health Assessment							
Section 100 medicine access scheme for aborigines							
Other form of medication review (specify) _____							

e) Please tick (( ) if this pharmacy has access to an Australian Association of Consultant Pharmacy (AACP) accredited pharmacists.

Yes	
No	
Don't know	

f) Please tick (( ) which of the following positions the AACP accredited pharmacist occupies in this pharmacy.

Proprietor	
manager	
Employee pharmacist full-time	
Employee pharmacist part-time	
Consultant or contracted pharmacist	
Other (specify) _____	

Health promotion

16. Please tick (( ) the estimated number of clients in the last seven days who received one of the following agents initiated in this pharmacy by a pharmacist and not prescribed by a doctor.

Preventive activities with non-prescribed medicines	None at all	Less than 1 per week	1 to 2 per week	3 to 5 per week	6 to 10 per week	11 to 20 per week	Over 20 per week
Nicotine replacement therapies							
Aspirin (100 mg or less per day) for the primary or secondary prevention of coronary heart disease							
Iron supplementation to prevent anaemias in females							
Folic acid in early pregnancy to prevent neural-tube defects in offspring							
Calcium products to prevent osteoporosis							
Daily multivitamins to prevent suspected nutritional deficiency							
Other (specify) _____ _____							

17. Please tick (( ) the estimated average number of each of the following tests performed to screen undiagnosed patients during a typical period of 30 days in this pharmacy

Clinical testing to screen undiagnosed patients	**None at all**	**Less than 1 per month**	**1 to 2 per month**	**3 to 10 per month**	**11 to 20 per month**	**21 or more per month**
Anthropometric tests (eg. body weight, height, and waist circumference)						
Blood cholesterol testing						
Blood pressure testing						
Blood glucose testing						
Bone density testing						
Pregnancy testing						
Other (specify) _____ _____						

Primary health care including pharmacy (S2) and pharmacist-only (S3) medicines

18. Please tick (√) the average number of clients who received the following services in a typical working day in this pharmacy.

Primary health care activities in this pharmacy (excludes prescription medicines)	**Less than 1 per day**	**1 to 5 per day**	**5 to 10 per day**	**11 to 20 per day**	**21 or more per day**
Total who **asked for** S2 and S3s by name (i.e. self medication)					
Total who **received assistance** with symptoms, health problems, or questions					
Clients issued computerised CMIs, printed information (e.g. Self Care card)					
Clients **referred to GP** with ailments					
Clients **referred to other health practitioners**					
Other (specify) _____					

Harm minimisation or harm reduction activities

19. Please tick (√) the estimated average **number of clients** provided with each of the following harm minimisation or harm reduction activities during a typical working day.

Harm minimisation or reduction activity	**None at all**	**Less than 1 per day**	**1 to 5 per day**	**6 to 10 per day**	**11 to 20 per day**	**21 or more per day**
Methadone dosing						
Buprenorphine dosing						
Naltrexone dispensed						
Needle exchange or supply						
Benzodiazepine contracts or prescriber arrangements to prevent diversion and misuse of drugs of dependence						
Other harm minimisation activity (specify) _____ _____						

Complementary therapies

20. Please tick (√) the estimated average **number of clients** referred to a practitioner or provided with the following complementary therapies by this pharmacy in a typical period of 30 days

Complementary therapies referred or provided	**None at all**	**Less than 1 per month**	**1 to 5 per month**	**6 to 10 per month**	**11 to 30 per month**	**31 or more per month**
Acupuncture						
Aromatherapy						
Chiropractic						
Homeopathy						
Hypnosis						
Iridology						
Meditation						
Naturopathy						
Reflexology						
Massage						
Spiritual healing						
Other (specify) _____ _____						

Enhanced pharmacy services

21. Please tick (√) the following categories of enhanced pharmacy services **over and above routine practice** that this pharmacy offers or plans to offer.

Category of enhanced pharmacy service	Does not offer	Specially trained or accredited pharmacist or non-pharmacist	Offers now		Plan to offer in 12 months
			Offers at no charge	Receives payment for	
Aboriginal health services					
Anticoagulation					
Asthma					
Community education, structured					
Community clinic services with nurse					
Diabetes					
Drug level monitoring/ kinetic dosing					
Harm reduction including methadone					
Geriatric care					
Herbal medicines/nutritional supplement counselling					
Hyperlipidaemia					
Hypertension					
Naturopathy					
Smoking cessation					
Weight reduction					
Wound care					
Other (specify) _____ _____					

SECTION C: Barriers and Facilitators

22. Please tick (√) the extent to which you agree or disagree that the following are **barriers** to **this pharmacy** implementing enhanced pharmacy services listed in question 21.

Barriers to enhanced pharmacy services in this pharmacy	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
Shortage of time for pharmacist					
Shortage of pharmacists					
Customer's won't pay					
Unable to get locum cover for emergencies					
Lack of appropriate knowledge/skills by pharmacists					
Lack of confidence by pharmacy staff					
It is not felt by pharmacists to be part of their job					
There is no extra remuneration for it					
Would impair working relationships with local general medical practitioners (GP's)					
Lack of opportunity to meet with local GP's or other health workers					
GP's do not recognise pharmacists' skills in enhanced pharmacy services					
Poor retention rates of employees					
Other (specify) _____					

23. Please tick (√) the extent to which you disagree or agree that the following will **facilitate this pharmacy** implementing the enhanced pharmacy services listed in Question 21.

Facilitators of enhanced pharmacy services in this pharmacy	Strongly disagree	Disagree	Unsure	Agree	Strongly agree
Access to detailed patient notes					
Designated closed counselling area					
Designated clinical resting area					
Appointment system					
Accreditation for specific activity					
Dedicated study time for pharmacist					
Other (specify) _____					

SECTION D: Pharmacy Characteristics

24. **a)** Location of this pharmacy by **postcode**.

b) Please tick (√) which one of the following best describes the **setting of this pharmacy**.

Stand alone or strip shopping centre	
Shopping mall complex	
Medical centre	
Hospital	
Other (specify) _____	

25. Please record the **total hours in each day** this pharmacy is open.

	Monday	**Tuesday**	**Wednesday**	**Thursday**	**Friday**	**Saturday**	**Sunday**
Hours							

26. Please record or estimate as accurately as possible the **area of each of the following sections** in this pharmacy. If a certain area is not applicable then please enter a value of zero (0).

Dispensary area	m^2
Schedule area (for S2s and S3s)	m^2
Forward pharmacy area (seated counselling area with dispensary computer)	m^2
Private un-enclosed counselling/dosing area	m^2
Closed counselling/dosing area	m^2
Retail area	m^2
Storeroom, office, etc	m^2
Other (specify) _____	m^2
Total area of premises	**m^2**

27. Please tick (√) which one of the following describes this pharmacy's **group membership**.

Not in a group	
Amcal	
Chem Mart	
Friendly Societies	
Guardian	
Soul Pattison	
Other group (specify) _____	

28. Please tick (√) the **QCPP status** of this pharmacy. QCPP refers to Quality Care Pharmacy Program.

Not yet registered for QCPP	
Partially completed QCPP accreditation	
Completed but not yet accredited	
QCPP accredited	
Re-accredited	
Other (specify) _____	

29. **a)** Please tick the **method of operation** in this pharmacy.

Owner operated	
Partner operated	
Manager operated	
Other (specify) _____	

b) Please tick (√) if this pharmacy has a **non-pharmacist retail manager**.

Yes	
No	

30. Please record the **number of current staff or contractors** (including yourself) working in this pharmacy and their **hours worked** in a typical period of seven days. Please include zero (0) where there is **no** time spent on certain activity

Pharmacy staff	**Full time (number)**	**Part time and casuals (number)**	**Total hours per week**	**% of time spent in**		
				Dispensary (no patient contact)	**Clinical, patient care or counselling**	**Administration work**
Proprietor/s						
Pharmacist manager						
Consultant pharmacist						
Other pharmacist staff						
Non-pharmacist manager (retail)						
Dispensary assistant / Pharmacy technician						
Non-pharmacist clerical or administration						
Other non-pharmacist staff						
Complementary or other health practitioners (Please specify) _____						
Total						

31. Please tick (√) the average **total number of customers per week**. Please include patients in hospitals and aged care facilities serviced by this pharmacy.

0 – 500	**501 – 1,000**	**1,001 – 1,500**	**1,501 – 2,000**	**2,001 – 3,000**	**3,001 or more**

32. **a)** Please tick (√) the estimated **annual turnover** of this pharmacy.

Total turnover (total pharmacy and other income)	**<$1m**	**$1-1.5m**	**$1.5-2m**	**$2-3m**	**$3-4m**	**$4-6m**	**$6-8m**	**>8m**

b) Please complete details of the **sales/ turnover per year** for each of the following categories. If not known for any category, then please estimate.

Total prescription sales (incl. Safety Net and private prescriptions)	_____ % turnover
S2 and S3 medicines	_____ % turnover
Herbal products and vitamins sales	_____ % turnover
Medical aids and medical appliances / equipment (home health care)	_____ % turnover

THE END ~ THANK YOU

Appendix 3: List of WA Rural Pharmacies (2006)

Premises Name	Shop Number	Shopping Centre	Street Number	Street Name	treet Suf	Suburb	Postcode	State	Phone	Fax
Waroona Pharmacy			74	South West	Hwy	WAROONA	6215	WA	9733 1315	9733 1315
Harvey Pharmacy			91	Uduc	Rd	HARVEY	6220	WA	9729 1422	9729 2059
Collie Chemmart Pharmacy	Shops 8 & 9	Collie Central S/Centre		Forrest	St	COLLIE	6225	WA	9734 3700	9734 3041
Australind Village Pharmacy	Shops 12 & 14	Australind Shopping Centre		Old Coast	Rd	AUSTRALIND	6230	WA	9797 1303	9725 9648
Bunbury Drive-in Chemist		Forrest Ave &		Blair	St	BUNBURY	6230	WA	9791 2447	9721 9955
Bunbury Forum Pharmacy	Shop 22/30	Bunbury Forum S/C		Sandridge	Rd	BUNBURY	6230	WA	9721 6731	9721 1440
Centrepoint Amcal Chemist	Shop 4	Bunbury Centrepoint Shopping Centre	1	Blair	St	BUNBURY	6230	WA	9721 5166	9721 5192
Crosslands Pharmacy	Shop 7	Parks Centre	Cnr	Brittain	Rd	BUNBURY	6230	WA	9721 5909	9721 7829
Minninup Forum Pharmacy	Shop 3	Minninup Forum		Minninup	Rd	BUNBURY	6230	WA	9795 7702	9795 7727
Pharmacy Plus - Bunbury			Unit 1/122	Spencer	St	BUNBURY	6230	WA	9721 6555	9791 1068
South City Chemmart			182	Spencer	St	BUNBURY	6230	WA	9721 2341	9721 2829
Thomas & Co Chemists			110	Victoria	St	BUNBURY	6230	WA	9721 2071	9721 3279
Usher Pharmacy			36	Cranbrook	Way	BUNBURY	6230	WA	9795 7631	9795 5560
Pharmacy 555	Shop 6	Bunbury City Plaza		Spencer	St	BUNBURY	6230	WA	9721 2159	9791 7118
Dalyellup Pharmacy / News	Unit 6	Dalyellup Local Centre (Lot 703)	135	Norton	Prom	DALYELLUP	6230	WA	9795 4622	9795 4677
Eaton Pharmacy	Shop 15	Eaton Fair Shopping Centre		Eaton	Dve	EATON	6232	WA	9725 2635	9725 2652
Donnybrook Pharmacy			78	South West	Hwy	DONNYBROOK	6239	WA	9731 1016	9731 1317
Boyup Brook Pharmacy			83	Abel	St	BOYUP BROOK	6244	WA	9765 1066	9765 1066
Bridgetown Pharmacy			127	Hampton	St	BRIDGETOWN	6255	WA	9761 1004	9761 1004
Ambassadors Pharmacy			32A	Rose	St	MANJIMUP	6258	WA	9771 1373	9771 8140
Bonadeo's Pharmacy			27	Giblett	St	MANJIMUP	6258	WA	9771 1357	9777 1437
Pemberton Pharmacy			Lot 2	Brockman	St	PEMBERTON	6260	WA	9776 1054	9776 0737
Capel Pharmacy			19	Properjohn	Rd	CAPEL	6271	WA	9727 3300	9727 3033
Amcal Chemist Busselton	Shop 2	Boulevard Shopping Centre		Prince	St	BUSSELTON	6280	WA	9752 4200	9752 4148
Busselton Healthsense Pharmacy	Shops 3 & 4	Busselton City S/C	61	Kent	St	BUSSELTON	6280	WA	9752 1879	9754 7393
Chemmart Central Pharmacy Busselton	Shops 5, 15 & 16	Busselton Central S/C	Cnr West &	Prince	Sts	BUSSELTON	6280	WA	9752 1276	9754 4275
Broadwater Pharmacy	Shop 14	Broadwater Shopping Village		Bussell	Hwy	BUSSELTON	6280	WA	9754 2626	9754 2421
West Busselton Pharmacy	Shop 5	West Busselton S/C	170	Bussell	Hwy	BUSSELTON	6280	WA	9754 2922	9754 2766
Dunsborough Pharmacy	Shops 16 & 17	Dunsborough Centre Point S/C		Dunn Bay	Rd	DUNSBOROUGH	6281	WA	9755 3272	9759 1470
Margaret River Pharmacy			146	Bussell	Hwy	RIVER	6285	WA	9757 2224	9757 3351
Augusta Pharmacy			81	Blackwood	Ave	AUGUSTA	6290	WA	9758 1516	9758 1400
York Pharmacy			108	Avon	Tce	YORK	6302	WA	9641 1044	9641 1446
Beverley Pharmacy			112	Vincent	St	BEVERLEY	6304	WA	9646 1134	9646 0581
Pingelly Pharmacy			16	Parade	St	PINGELLY	6308	WA	9887 1075	9887 1075
Twaddles Amcal Chemist			8-12	Fortune	St	NARROGIN	6312	WA	9881 1963	9881 1466
Maxwell's Pharmacy			74	Federal	St	NARROGIN	6312	WA	9881 1006	9881 2116
Wagin Pharmacy			52	Tudhoe	St	WAGIN	6315	WA	9861 1245	9861 2419
Katanning Pharmacy			92	Clive	St	KATANNING	6317	WA	9821 1677	9821 7009
Mt Barker Country Chemist			23	Lowood	Rd	MOUNT BARKER	6324	WA	9851 1010	9851 1010
Albany Amcal Chemist			262-264	York	St	ALBANY	6330	WA	9842 2036	9841 1332
Hacienda Pharmacy			30	Albany	Hwy	ALBANY	6330	WA	9841 2393	9841 2393

North Road Pharmacy	Shop 9A	North Road Shopping Centre	210	North	Rd	ALBANY	6330	WA	9841 1532	9842 5172
Albany Dog Rock Chemist	Shops 5-9	Dog Rock Place		Middleton	Rd	ALBANY	6330	WA	9841 1115	9841 1115
Spencer Park Pharmacy	Shop 6	Spencer Park S/Centre		Hardie	Rd	ALBANY	6330	WA	9841 1100	9841 8191
Farm Fresh Market Pharmacy		Farm Fresh Food Market	160	Chester Pass	Rd	ALBANY	6330	WA	9841 3841	9842 3767
Denmark Pharmacy			19	South Coast	Hwy	DENMARK	6333	WA	9848 3635	9848 1711
Gnowangerup Pharmacy			34	Yougenup	Rd	GNOWANGERUP	6335	WA	9827 1046	9827 1971
Narembeen Pharmacy	Unit 1		19	Churchill	St	NAREMBEEN	6369	WA	9064 7373	9064 7300
Corrigin Pharmacy & Health Food Centre			4	Campbell	St	CORRIGIN	6375	WA	9063 2094	9063 2708
Quairading Pharmacy	Shop 29		Lot 16	Heal	St	QUAIRADING	6383	WA	9645 1061	9645 1061
Kojonup Pharmacy			114	Albany	Hwy	KOJONUP	6395	WA	9831 1035	9831 0154
Walpole Pharmacy	Shop 2		Lot 21	Nockolds	St	WALPOLE	6398	WA	9840 1127	9840 1127
Northam Pharmacy	Shop 17	Northam Boulevard Shopping Centre		Fitzgerald	St	NORTHAM	6401	WA	9622 1521	9622 3137
Stewarts Pharmacy			124	Fitzgerald	St	NORTHAM	6401	WA	9622 1644	9622 2544
Kellerberrin Pharmacy			92-94	Massingham	St	KELLERBERRIN	6410	WA	9045 4306	9045 4376
Savings Plus Chemist			102	Barrack	St	MERREDIN	6415	WA	9041 1311	9041 1023
Bruce Rock Pharmacy			46	Johnson	St	BRUCE ROCK	6418	WA	9061 1025	9061 1610
Southern Cross Pharmacy			11A	Antares	St	CROSS	6426	WA	9049 1056	9049 1056
Amcal Chemist Kalgoorlie			205	Hannan	St	KALGOORLIE	6430	WA	9021 2200	9021 8780
Bill Hicks Pharmacy			132	Hannan	St	KALGOORLIE	6430	WA	9021 2453	9021 8508
Friendlies Chemist Kalgoorlie		G6 McKenzie Building	140-142	Hannan	St	KALGOORLIE	6430	WA	9091 2221	9091 7155
Savingsplus Chemist Kalgoorlie	Shop 15	Hannan's Boulevard Shopping Centre		Graeme	St	KALGOORLIE	6430	WA	9022 2200	9022 2290
Paul Robson Guardian Pharmacy			102	Brookman	St	KALGOORLIE	6430	WA	9021 5503	9021 0236
The Boulder Pharmacy			46-48	Burt	St	BOULDER	6432	WA	9093 1150	9093 1150
Kambalda West Pharmacy			28	Salmon Gums	Rd	KAMBALDA	6444	WA	9027 1570	9027 1514
Bradshaws Pharmacy			94e	Dempster	St	ESPERANCE	6450	WA	9071 3539	9071 6836
Esperance Pharmacy	Shop 11	Boulevard Shopping Centre		Forrest	St	ESPERANCE	6450	WA	9071 2125	9071 7855
Castletown Chemist	Shops 9 & 10	Castletown Shopping Centre	67	Goldfields	Rd	ESPERANCE	6450	WA	9071 4480	9071 4942
Goomalling Pharmacy			37	Railway	Tce	GOOMALLING	6460	WA	9629 1088	9629 1088
Bindoon Pharmacy		Shop 2	11	Binda	Plce	BINDOON	6502	WA	9576 1666	9576 1777
Gingin Pharmacy			8	Brockman	St	GINGIN	6503	WA	9575 2331	9575 2331
Moora Pharmacy			7	Dandaragan	St	MOORA	6510	WA	9651 1252	9651 1998
Jurien Pharmacy	Shops 2, 3 & 4	Jurien Bay Shopping Centre	24	Bashford	St	JURIEN BAY	6516	WA	9652 1333	9652 1572
Dongara Pharmacy	Shop 9		33	Moreton	Tce	DONGARA	6525	WA	9927 1132	9927 2550
Pharmacy 149			149	Durlacher	St	GERALDTON	6530	WA	9921 6138	9965 5331
Bluff Point Pharmacy			437	Chapman	Rd	GERALDTON	6530	WA	9923 1584	9923 1147
Geraldton Amcal Pharmacy	Shop 16	Stirlings S/C	54	Sanford	St	GERALDTON	6530	WA	9921 1965	9964 3965
Fountains Chemmart Pharmacy			113	Marine	Tce	GERALDTON	6530	WA	9921 1755	9921 7080
Guardian Pharmacy Sunset Beach		Shop 5, Sunset Shopping Plaza		Chapman Valley	Road	GERALDTON	6530	WA	9938 3274	9938 3791
Jim Berry Pharmacy			130	Marine	Tce	GERALDTON	6530	WA	9921 2156	9964 7774
Fullife Northgate Neighbourhood Chemist	Shop 2	Northgate Shopping Centre		Chapman	Rd	GERALDTON	6530	WA	9921 6455	9964 5295
Rangeway Pharmacy	Shop 6	Rangeway S/C	Cnr	Utakarra	Rds	GERALDTON	6530	WA	9921 8111	9921 1044
Williams Shenton Street Pharmacy			105	Shenton	St	GERALDTON	6530	WA	9921 4151	9964 4428
Northampton Pharmacy			Lot 20	Hampton	Rd	NORTHAMPTON	6535	WA	9934 1007	9934 2222

Kalbarri Pharmacy	Shop 1	Kalbarri Lane	Lot 37	Grey	St	KALBARRI	6536	WA	9937 1026	9937 2050
Newsagency			51	Knight	Tce	DENHAM	6537	WA	9948 1220	9948 1017
Plaza Pharmacy Albany	Shops 14, 15 & 16	Albany Plaza S/C	38	Albany	Hwy	ALBANY	6558	WA	9841 5855	9842 1081
Toodyay Pharmacy			110	Stirling	Tce	TOODYAY	6566	WA	9574 2393	9574 2393
Wongan Hills Pharmacy		Shop 3	39-41	Fenton	Plce	WONGAN HILLS	6603	WA	9671 1157	9671 1157
Amcal Chemist Carnarvon	Shop M14	Boulevard Shopping Centre	35	Robinson	St	CARNARVON	6701	WA	9941 1547	9941 2850
Exmouth Pharmacy			380	Maidstone	Cres	EXMOUTH	6707	WA	9949 1140	9949 1900
Pharmacy Help Dampier		Dampier Medical Centre		Huon	Crcs	DAMPIER	6713	WA	9183 0422	9183 5888
Pharmacy Help Karratha	Shop 19	Centro Karratha Shopping Centre		Welcome Road		KARRATHA	6714	WA	9185 1316	9185 1468
Pharmacy 777 Karratha	Shop 33	Karratha Village S/C		Sharpe	St	KARRATHA	6714	WA	9144 4007	9144 4664
Hedland Pharmacy	Shop 9	Boulevard Shopping Centre		Wilson	St	PORT HEDLAND	6721	WA	9173 1350	9173 2707
South Hedland Pharmacy	Shop 5	South Hedland Shopping Centre				SOUTH HEDLAND	6722	WA	9140 1089	9140 1089
Chinatown Pharmacy Broome	Shop 2-3	Paspaley Plaza, Chinatown Centre				BROOME	6725	WA	9192 1399	9192 1397
Broome Pharmacy	Shop 12	Broome Boulevard Shopping Centre		Frederick	St	BROOME	6725	WA	9192 1866	9193 5132
Cable Beach Pharmacy	Shop 1	Dakas Street Medical Centre	Lot 3063	Dakas	St	BROOME	6725	WA	9192 3298	9192 3753
Boab Pharmacy & Photographics	Shop 2		48	Clarendon	St	DERBY	6728	WA	9191 1160	9191 2110
Kununurra Amcal Pharmacy		Kununurra Shopping Centre		Konkerberry	Dve	KUNUNURRA	6743	WA	9168 1111	9168 1398
Tom Price Pharmacy	Shops 4 & 5	Tom Price Shopping Centre		Jacaranda	Dve	TOM PRICE	6751	WA	9189 1202	9189 2125
Boulevard Pharmacy	Shop 19	Boulevard Shopping Centre		Newman	Dve	NEWMAN	6753	WA	9175 2207	9262 3006

Appendix 4: Cover Letter and Follow-up Letters

SCHOOL OF PHARMACY

Curtin
UNIVERSITY OF TECHNOLOGY

GPO Box U1987 Perth
Western Australia

TELEPHONE +61 8 9266 7369
TELEPHONE +61 8 9266 2769

CRICOS Provider Code 00301J

October 19, 2006

Dear Pharmacist-Manager/Owner,

Re: Survey of rural pharmacy services in Western Australia

The survey of rural pharmacy services in Western Australia is being undertaken by Curtin University's School of Pharmacy in order to gain a better understanding of the scope of services currently provided by rural pharmacies.

The government, pharmacy bodies, and the School of Pharmacy are increasingly interested in rural pharmacy services, as it is known that the health of rural populations in Australia is commonly perceived as being poorer than urban populations. Pharmacy plays an important role in assuring the health of rural people where local health care providers and services are often limited.

Data is required on service provision and the care provided by pharmacies so that our state and national bodies can be assisted in designing appropriate programs and policies in order to improve the plight of both pharmacists and people from rural and remote areas. Clearly, if rural pharmacies become uneconomic, the consequent loss of services can be defined from these data.

This survey is for the benefit of rural pharmacies, particularly those within Western Australia.
Confidentiality is ensured under the terms approved by the Research Ethics Committee at Curtin University.

We would be grateful if you can complete the questionnaire (which should take about 30 minutes) and return it to us in the enclosed addressed postage-paid envelope by **November 10, 2006**. Please find enclosed a tea bag for refreshment while you are completing the questionnaire. Thank you and please feel free to contact either of us for further information.

Yours sincerely,

Prof. Bruce Sunderland
Project Supervisor
Phone: 92667377
B.Sunderland@curtin.edu.au

Yosi Wibowo
Primary researcher
Phone: 0410314506
yosi.wibowo@postgrad.curtin.edu.au

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CRICOS Provider Code 00301J

November 10, 2006

Dear Pharmacist-Manager/Owner,

Re: Survey of rural pharmacy services in Western Australia

A survey of rural pharmacy services in Western Australia is being undertaken by Curtin University's School of Pharmacy in order to gain a better understanding of the scope of services currently provided by rural pharmacies.

Data has been requested on service provision and the care provided by pharmacies so that our state and national bodies can be assisted in designing appropriate programs and policies in order to improve the plight of both pharmacists and people from rural and remote areas. Additionally, if rural pharmacies become uneconomic, the consequent loss of services can be identified from these data. Your cooperation in completing this questionnaire will greatly contribute to making the data accurate and reliable.

We are enclosing another questionnaire in case the first which was sent to you last month was misplaced or overlooked. Would you please kindly complete the questionnaire (which should take about 30 minutes) along with the consent form and return it to us in the enclosed addressed postage-paid envelope by **November 24, 2006**.

This survey is for the benefit of rural pharmacies, particularly those within Western Australia.
Confidentiality is ensured under the terms approved by the Research Ethics Committee at Curtin University.

Thank you and please feel free to contact either of us for further information.

Yours sincerely,

Prof. Bruce Sunderland
Project Supervisor
Phone: 92667377
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CRICOS Provider Code 00301J

November 24, 2006

Dear Pharmacist-Manager/Owner,

Re: Survey of rural pharmacy services in Western Australia

Last month, we sent you a questionnaire regarding pharmacy services in rural Western Australia. This survey was undertaken by Curtin University's School of Pharmacy aiming to gain a better understanding of the range of services currently provided. This will enable our state and national bodies in designing appropriate programs and policies in order to improve the plight of both pharmacists and people from rural and remote areas. Additionally, if rural pharmacies become uneconomic, the consequent loss of services can be identified from this data. Your co-operation in completing this questionnaire will greatly contribute to making the data accurate and reliable.

We are enclosing another questionnaire in case the previous one was misplaced or overlooked. Would you please kindly complete the questionnaire (which should take about 30 minutes) along with the consent form and return it to us in the enclosed postage-paid envelope.

This survey is for the benefit of rural pharmacies, particularly those within Western Australia. Confidentiality is ensured under the terms approved by the Research Ethics Committee at Curtin University.

If you have already returned the questionnaire please ignore this request. Thank you and please feel free to contact either of us for further information.

Yours sincerely,

Prof. Bruce Sunderland
Project Supervisor
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B.Sunderland@curtin.edu.au

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