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Tele pharmacy—Enabling Technology to Provide Quality Pharmacy Services in Rural and Remote Communities

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ABSTRACT

Rural and isolated areas may benefit more from the National Strategy for the Quality Use of Medicines if they have access to high-quality pharmacy services. The lack of pharmacists in remote places hinders the spread of this method. When compared to the United Kingdom and the United States, Australia does poorly. The Commonwealth of Australia and the Pharmacy Guild have signed the Fourth Community Pharmacy Agreement, which outlines 13 shared goals and includes provisions for financing efforts for professional pharmacy programs. Medication reviews and digital health programs are two examples. Delivering high-caliber pharmaceutical services to remote places is made possible by telepharmacy, an innovative use of enabling technology. In certain nations, telepharmacy is already in use. The states of Washington and North Dakota have implemented prominent telepharmacy programs, but other states including Texas, Nebraska, and Alaska have done so as well. The outcomes of Australian research have been inconsistent and less fruitful. However, telemedicine has made use of certain promising models, such as those used to provide physiotherapy and other allied health treatments. Involving pharmacists in telepharmacy services is critical, and a promising new effort in Far North Queensland will soon focus on using telepharmacy to undertake home medication assessments.

Introduction

PHARMACY SERVICES AND QUALITY USE OF MEDICINES

- Small towns and villages are spread out across large distances in Australia's rural regions. The residents and visitors of these locales lack easy access to the high-caliber pharmaceutical services that are commonplace in more populous regions. Pharmaceutical care, in which pharmacists respond to patients' drug-related needs to help them achieve their desired health outcomes, is also included in the definition of quality pharmaceutical services, along with the dispensing, supplying, and distributing of medicines; providing knowledge and information about drugs, with the primary aim of promoting and assuring QUM; and providing pharmaceutical care.¹
- The Commonwealth of Australia and the Pharmacy Guild have signed the Fourth Community Pharmacy Agreement, in which they have agreed to work together to accomplish 13 specific goals.² Professional pharmacy programs will benefit from financing efforts (such as a Better Community Health program) since they will receive:
 - **Evaluations of Medications;** grants and subsidies for remote areas; more opportunities for Indigenous people to use pharmacy

services; dosage administration assistance for those at risk

Initiatives in e-health and pharmacy-based pilot projects for improving the management of asthma and diabetes.

In response to WHO's encouragement, several nations are establishing medical drug policies to guarantee citizens' access to life-saving pharmaceuticals at reasonable prices without compromising on quality, safety, or effectiveness. In 1991, the government of Australia made an attempt to better regulate the pharmaceutical industry by forming the Pharmaceutical Health and Rational Use of Medicines Committee (PHARM) and the Australian Pharmaceutical Advisory Council (APAC). The National Prescribing Service was established in 1998, and the National Medicines Policy was enacted in 2000, as a consequence of government activity informed by the recommendations of APAC and PHARM, as well as representative organizations from all interested parties in health care.³

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Four primary goals are at the heart of the National Medicines Policy, which is built on a foundation of mutually beneficial relationships and informed by considerations of social and economic policy.⁴ These goals are defined as ensuring that people have prompt access to medications that are of sufficient quality, safety, and effectiveness, and that adhere to QUM principles at prices they can pay, all while keeping the pharmaceutical sector afloat and functioning responsibly.

To promote the prudent, appropriate, safe, and effective use of medications is the primary goal of the National Strategy for Quality Use of medications. The National Medicines Policy's primary partners are all represented on the 5 APAC that coordinates the QUM strategy's execution. The four pillars of the National Medicines Policy provide the framework for APAC's long-term strategy.⁶

Part of the Fourth Community Pharmacy Agreement's ⁷ underlying structure is the continuation and trickle-down of the National Medicines Policy and initiatives to the delivery of high-quality pharmaceutical services.

RURAL PHARMACY AND WORKFORCE CHALLENGES

There has always been a shortage of medical personnel in rural areas. The current countrywide scarcity of pharmacists is only making things worse. Employment Trends in the Pharmacy Industry, the

According to a study conducted by the Pharmaceutical Services Task

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Between the years 1990 and 1996, the death rate per 100,000 people dropped by 13.8%.⁸ The United States and the United Kingdom both had increases in the number of pharmacists per 100,000 people over the same time period, making this a stark contrast. When compared to other nations, Australia had one of

the lowest rates of pharmacists per capita.

100 000 people, and it didn't even account for Australia's enormous size.

The Department of Employment and Workplace Relations conducted a research on pharmacist shortages in all states and territories in December 2002.⁹ Both New South Wales hospitals and outlying communities in Queensland had critical shortages of pharmacists. There were already nationwide shortages of community and hospital pharmacists in all states save NSW, but this suggested the situation had gotten more dire since the assessment by the Department of Employment and Workplace Relations and Small Business in December 1999.¹⁰

According to research conducted in 1999 by Health Care Intelligence Pty Ltd (HCI), the need for hospital pharmacists might be met by 2010, whereas a shortfall of community pharmacists could emerge by that same year.¹¹ According to O'Leary et al.'s 'A demand model for hospital pharmacists' (2001), three major drivers of the demand for hospital pharmacists are the National Medicines Policy, implementation of the APAC guidelines which follow on from the National Medicines Policy, increased patient safety, and the introduction of Pharmaceutical Benefits Scheme dispensing in public hospitals.¹² Due to these factors, the HCI 1999 research and the O'Leary report reached different workforce findings.

According to the O'Leary research, there are now 310 open posts for competent pharmacists in Australian hospitals. There was a need for an extra 395–515 hospital pharmacists between 2001 and 2006, and another 715–1330 are expected to be needed between 2006 and 2010. There would need to be at least 860 more licensed pharmacists as a result.

HCI's 'A study of the demand and supply of pharmacists, 2000-2010' report was revised to include insights from the O'Leary research.¹³ Community and inpatient pharmacy staffing needs were analyzed for this paper. In this report's Appendix 5, the Pharmacy Guild lays out its long-term goals, including a shift in the profession's emphasis from drug distribution to patient care.

TELEPHARMACY

Telepharmacy, as defined by the US Health Resources and Services Administration, is the delivery and facilitation of pharmacy services across long distances using electronic information and communication technologies.¹⁶ When compared

to the conventional method of delivering pharmaceutical services, telepharmacy stands out as a novel and inventive approach that yet adheres to all the same safety standards. Restoration of health care, pharmacy services, and pharmacists; increased likelihood of attracting and retaining pharmacists in rural communities; provision of new clinical training sites for pharmacy students to learn how to provide pharmacy services in novel ways; these are just some of the potential benefits to rural communities.¹⁷

Telepharmacy Models

The United States is home to a number of active telepharmacy efforts, each using a unique paradigm (Table 1). North Dakota's telepharmacy locations are fully stocked retail pharmacies selling everything from OTC to prescription medications, cosmetics, and health supplies.¹⁷ Traditional pharmacy services, such as prescription fulfillment, medication review, and patient counseling, are all available via telepharmacy sites as well. For North Americans, the telepharmacy sites are a patient counselling conducted by pharmacist via telephone or by prescriber/nurse/healthcare worker (as required)

The State of South Dakota Board of Pharmacy rules for pharmacists. The only difference between remote and conventional pharmacy services is the physical location of the pharmacist, technician, and patient. With the use of modern audio and visual computer linkages, a licensed pharmacist in one place may monitor a pharmacy technician at a different location while they dispense medications (see Figure 1).

As long as they are working under the close supervision of a registered pharmacist, pharmacies are authorized to employ pharmacy technicians to help with the filling of prescriptions. A group of pharmacists in North Dakota concluded that there was no reason why such monitoring couldn't take place remotely, thanks to advances in communication and computing. In response to this concept, North Dakota became one of the first US states to enact administrative regulations permitting pharmacies to operate in select rural regions without a pharmacist on site. The North Dakota State Board of Pharmacy has issued

"Telepharmacy Rules" outlining best practices for the safe and effective use of telepharmacy in the state.¹⁸ In this setup, patients bring their prescriptions to a remote pharmacy location, where a licensed pharmacy technician processes them before being given to a pharmacist for dispensing. The pharmacist checks the patient's medication profile for drug interactions and other possible concerns, then uses video conferencing technology to evaluate digital images of the filled prescription for correctness. As soon as the chemist has

pharmacy technician takes patient to private consultation room where pharmacist may advise on drug usage after prescription is authorized. The North Dakota Board of Pharmacy mandates that all patients receiving telepharmacy services also participate in video-based patient education sessions. All information about a patient's prescription will be kept private. The pharmacist has the ultimate responsibility for accurate drug preparation and distribution.

Dispensing devices that are operated remotely are legal in the state of Washington.¹⁹ The stages involved in the remote dispensing of medicine and patient education in this paradigm are as follows. The prescription is sent electronically from the outpost clinics to the main pharmacy. The pharmacist at the central location reviews the prescription information and sends an electronic command to the outlying location, where an automated drug dispensing system (ADDS) is set up and ready to dispense the correct medicine and print the label. An authorized user at the off-site location accesses the system and sends commands to the ADDS computer, which subsequently processes the prescription and scans the bar code. After the bar code is scanned and validated, a label is produced. A barcode scan is performed on the label before it is applied to the package. A two-way video conferencing device is used to visually check the drug and label and to advise the patient. The patient is taken by the pharmacy technician to the counselling room where the comms gear is located. In outlying areas, where

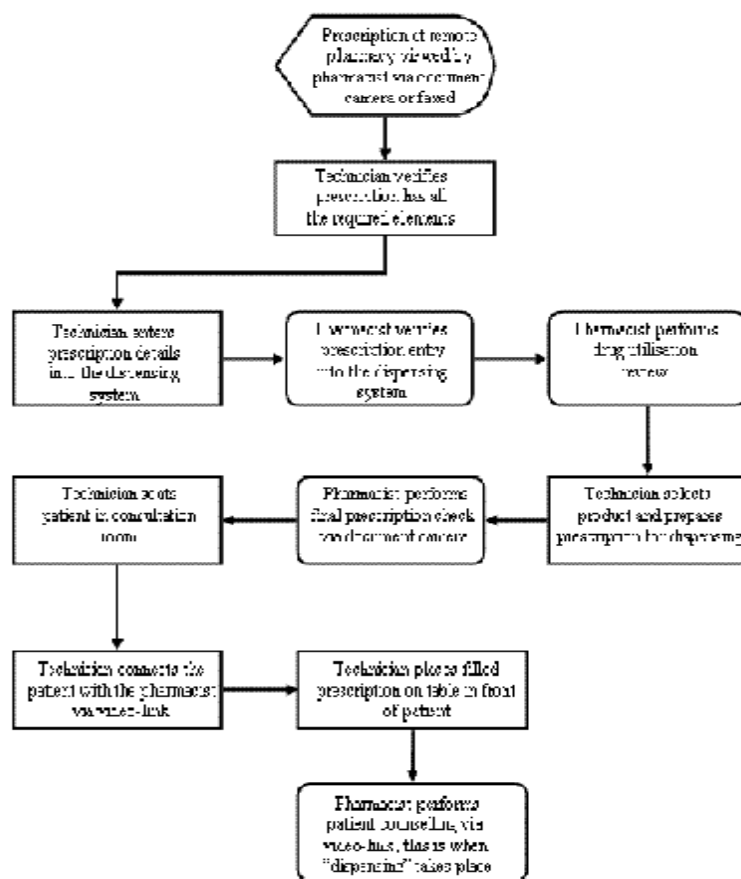


Figure 1. Protocol for processing new prescriptions at a remote telepharmacy site (North Dakota Telepharmacy Project)

Medication is dispensed either locally by a physician or nurse practitioner or remotely by a pharmacist using a two-way video conferencing system to do label verification and counseling. It is often up to the discretion of the treating physician or nurse practitioner to decide whether or not to have the pharmacist provide counseling to the patient.¹⁹

Nebraska has a dispensing paradigm that allows for non-pharmacist healthcare practitioners to handle the filling of prescriptions.²⁰ The state of Arizona allows for remote prescription verification, but other states like Minnesota and Iowa only grant telepharmacy requests on a case-by-case basis.¹⁷ The western part of the state may now get pharmacy services thanks to a pilot telepharmacy program being run by Texas Tech University Health Sciences Center.²¹ To better manage medicine stock, healthcare providers in nine remote locations of Alaska are testing out a system that employs remote drug dispensing equipment to provide medication to patients. Prescriptions from participating remote clinics are sent to the Alaska Native Medical Center in Anchorage, where a pharmacist issues a computerized order to lock the clinics' medication dispensing devices. The system employs bar codes to keep track of which medications are given to which patients at the Alaska Native Medical Center and when. Prescription mistakes and adverse medication reactions, it is said, may be avoided with the use of bar code technology. The items within each vending machine are unique.²²

Telepharmacy in Australia

Multiple research have been undertaken in Australia on the topic. In 2002, Victoria conducted a review of a trial video phone service connecting a private pharmacy in Bairnsdale with a licensed pharmacy depot in Omeo. The Pharmaceutical Society of Australia and the Monash University

School of Rural Health collaborated on this pilot project thanks to a funding from the Victorian Department of Human Services.²³ The study concluded that the experiment proved the feasibility of providing pharmaceutical consultations and guidance through video call.

Nissen and Tett conducted a second, less fruitful research in Queensland using video phones as a means of communication, although this time with mixed results. There were a lot of technical and logistical hurdles to overcome. Researchers found that pharmacists and other healthcare professionals believed telepharmacy could be useful for things like case conferences, patient counseling, graduate student support in rural areas, OTC drug recommendations, and remote dispensing.¹⁵

Wai Yan Lee's 2005 study of pharmacists on telepharmacy supported these findings.²⁴ Australian community pharmacists surveyed had a positive outlook on the use of telepharmacy to enhance the delivery of health care, patient counseling, medication reviews, and the ability of pharmacies to serve as hub sites for surrounding outlying communities without access to physical pharmacies. The vast majority of respondents discussed their feelings on telepharmacy freely and were optimistic about the possibility of bringing pharmaceutical treatment to underserved areas remotely.

The vast majority of the surveyed distant community pharmacists

were in favor of the possibility of telepharmacy to enhance healthcare delivery to neighboring rural communities without access to physical pharmacies. When asked whether they thought telepharmacy might enhance the delivery of health care in rural and distant locations, pharmacists who did not provide these services were less confident than their counterparts who did. Pharmacists in rural towns who had been traveling to neighboring isolated regions believed that telepharmacy may improve the delivery of pharmaceutical care to rural areas. Despite the survey's positive findings, many respondents remained skeptical of telepharmacy and either preferred traditional methods of providing healthcare or would only consider telepharmacy if certain problems were resolved.

There have been legitimate concerns and questions raised regarding this new method of medication. Among them were the time and money required to build and maintain the system, technological constraints, and the need of laws and legislation. Time, distance, and the availability of qualified staff were all mentioned as potential obstacles to the widespread use of telepharmacy.

These concerns have been voiced by professionals in fields other than telepharmacy as well, such as physiotherapy. There have been challenges, but there have also been significant achievements, such as the prospective randomized controlled trial of a telemedicine physiotherapy system in Queensland.²⁵ The 65 participants all underwent complete knee replacements, and the research looked at their recovery times. Participants were assigned at random to receive treatment over the course of six weeks either through regular face-to-face therapy or via telemedicine rehabilitation. The findings proved that the rehabilitation outcomes generated by the telemedicine system were comparable to the conventional method. Participants who got the telemedicine therapy reported a high degree of satisfaction and saw significant gains in a variety of functional outcome metrics.

IMPORTANCE OF PHARMACIST INVOLVEMENT

About half of the pharmacists who responded to Lee's 2005 study and who serve rural and outlying areas expressed an interest in doing HMRs through telepharmacy.²⁴ Since HMRs are a top priority under the Fourth Community Pharmacy Agreement, this might be a huge boon to far-flung communities that rely on traveling pharmacists to do these evaluations (Figure 2). Therefore, in the middle of 2006, a study will be run in Far North Queensland to assess the efficacy of telepharmacy in HMRs.

To ensure the public's security, safety, and well-being in relation to the use of pharmaceuticals, it is essential that whichever model is adopted incorporates and keeps the active involvement of the pharmacist in the delivery of pharmacy services.¹⁷ The role of the pharmacist in patient care is crucial.

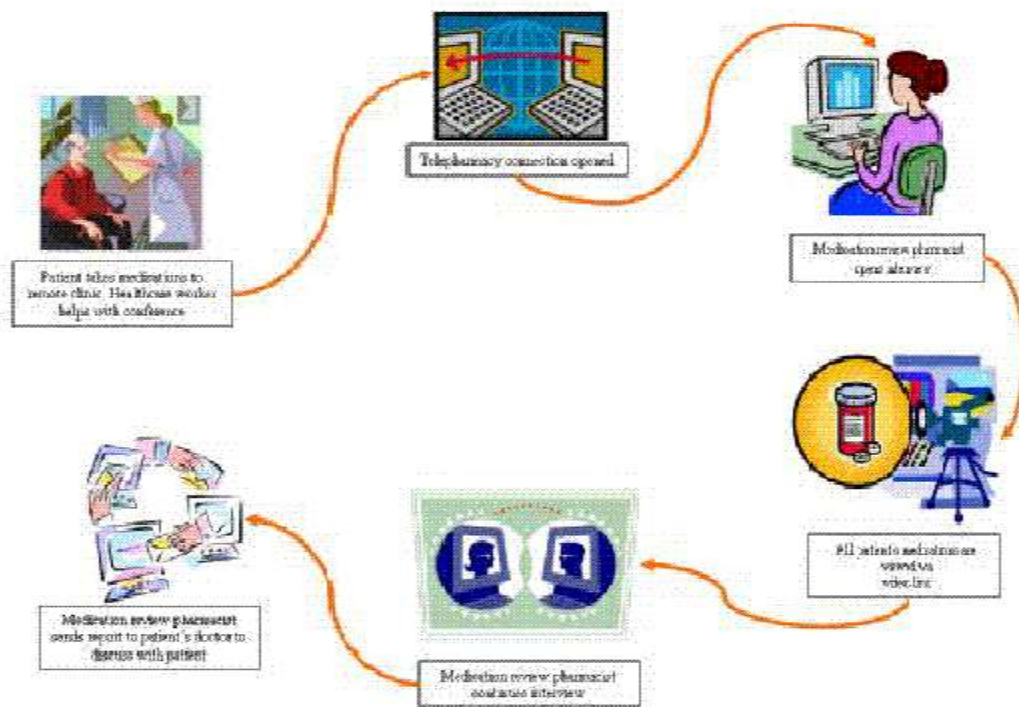


Figure 2. Possible telepharmacy applications: medication reviews via video-link

reviews of therapy and prescription drugs. Patients may be put at greater risk if the pharmacist is not included in the care team. This may result in more medication mistakes, adverse events, costly drugs, and unsuccessful treatments. Internet pharmacies and models that transfer the pharmacist's tasks to other health professionals like nurses are two examples of models that often do not involve pharmacists, especially in offering patient counselling. At the current day, such designs are widely distributed throughout rural and isolated Australia.

Using data collected by PhARIA, we can see that over 2,000 Australian medical facilities are dispensing medication independently of pharmacists.²⁶ Pharmacists are in limited supply in rural and isolated locations, hence other medical professionals (doctors, nurses, aboriginal people, etc.) are typically tasked with delivering pharmaceutical services to patients. This may have resulted in a system that does not provide all Australians with the high-quality pharmaceutical services guaranteed under the National Medicines Policy. This shortfall may be remedied using telepharmacy. Trials of telepharmacy should engage the pharmacy profession in rural Australia.

References

Association of Pharmacy Registering Authorities Inc. Best practice model for the supply of pharmacy services to residential care facilities. Canberra: APRA; 1997; p. 1-16.

2. The Australian Commonwealth. The Australian Government and the Pharmacy Guild of Australia have entered into their fourth Community Pharmacy Agreement. p. 1-45 in Canberra: Commonwealth of Australia, 2005.

Three, APAC PHARM. Ten years of progress toward better drug care, from 1991 to 2001. Canberra: Health and

Ageing Department, 2001.

4 The Ministry of Health and the Aged. Quality Medication Use Strategy at the National Level. The Department, Canberra, 2002.

Health and Ageing Ministry, Number 5. Statement of goals and strategy for improving medication usage quality during 2001-2003. The Department, Canberra, 2002.

The Advisory Council on Pharmaceuticals in Australia, Number 6. Plan of action for 2002-2005. Health and Ageing Department, Canberra, 2002, pp. 1-8.

9th Government Agency for Health and the Aged. The Commonwealth of Australia and the Pharmacy Guild of Australia have entered into their third Community Pharmacy Agreement. The Department, Canberra, 2000, pages 1-41.

Institute of Health and Welfare Research, Australia. Employment in Pharmacies in 1998. Series 17 of the National Health Workforce Survey. p. 1-74 in Canberra: AIHW, 2000.

Ministry of Labor and Industrial Relations. Indicators of a national and state-wide talent gap Skill gaps in Australia's professional sectors. Accessible at www.dewrsb.gov.au as of the 5th of April, 2003.

Thirteenth Reference Committee on the Nation's Pharmacy Workforce. The need for, and availability of, pharmacists from 1995 to 2010. NPRWG, Canberra, 1999.

14 - Australian Society of Hospital Pharmacists. A

hospital pharmacy staffing model: final report. Pages 1-78 in Collingwood: SHPA, 2001.

The 15th Reference Group for the National Pharmacy Workforce. The need for, and availability of, pharmacists from 2000 to 2010. Pages 1-125 in Canberra: NPRWG, 2003.

Department of Health Care Financing and Access. Ministry of Health and Aged Care, Commonwealth of Australia. Upgraded prescription drug tracking (BMMS). Information retrieved from www.health.gov.au/bmms/index.htm on 5 April 2003.

Nissen L. and S. Tett. Can telepharmacy replace on-site pharmacies for remote communities? S39-S41 in *J Telemed Telecare* (2003), Vol. 9(suppl).

Administration of Health Care Resources and Services in the United States. Definitions of pharmacy-specific jargon. Retrieved on 16 February 2006 from www.hrsa.gov/opa/glossary.htm.

Peterson, D.C., and H.C. Anderson, Jr. Restoring and sustaining pharmacy services in North Dakota's outlying areas is the goal of the state's ongoing telepharmacy effort. *J. Pharm. Technol.* 2004;20:28-39.

Requirements for Online Pharmacies. Pharmacy practice in North Dakota is governed by Section 61-02-08 of the North Dakota Century Code and the North Dakota State Board of Pharmacy. Telepharmacy guidelines may be found at http://publications.ndsu.edu/Telepharmacy_Rules.htm.

Obtainable as of February 16, 2006.

GD Clifton, H. Byer, K. Heaton, D. J. Haberman, and H. Gill. Dispensing medications through the internet and doing face-to-face consultations with patients in underprivileged areas. U.S. National Library of Medicine.

Peterson, C. D., and H. C. Anderson. Telepharmacy. Publish: in Tracy J. and Puskin D. (eds. Documents providing technical support for telemedicine, or how to get started with telehealth. Health and Human Services, US Government, Washington, 2004. p. 206-40.

S.C. Ontai, M.A. Veronin, T.D. Kretschmer, D.B. McBeath, S.C. Ontai, and others. Meeting the requirements of rural west Texas with telepharmacist education. *Journal of Pharmaceutical Education* (2004) 68(1): 21-9.

The 24th place is the Alaska Native Medical Center. The Alaska Telepharmacy Program delivers medication to outlying medical facilities. You may get it at ihealthbeat.org. Retrieved on February 17, 2006.

The Human Services Department of Victoria, Number 25. Assessment of a Pilot Program for Remote Pharmacies. The Department, Melbourne, 2002, pages 1-59.

To enhance healthcare delivery by community pharmacists in rural and regional Australia, using telepharmacy [honours thesis]. Lee, W. Y. Published by the University of Tasmania, Hobart, in 2005.