

Telepharmacy for remote hospital inpatients in north-west Queensland

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Abstract

Clinical pharmacy service delivery is currently a significant challenge in remote areas. Mount Isa Base Hospital provides clinical pharmacy support to ten remote sites across an area of over 300,000 square kilometres. These sites do not have on-site pharmacists available and, due to the vast distances and unpredictable travel conditions, the outreach pharmacist from Mount Isa Base Hospital only visits sporadically. Provision of direct patient care and advice on medication safety with this model was restricted and insufficient. Telepharmacy provides an opportunity for these services to be vastly expanded. In an attempt to increase pharmacist accessibility for remote hospital sites, the Mount Isa Base Hospital pharmacy department developed an inpatient telepharmacy service. Telehealth equipment is being used to communicate directly with patients and hospital staff, review inpatient medication charts, generate patient medication lists, identify and resolve clinical interventions and provide medication-related advice and counselling. As a result of this implementation, all patients and health professionals in remote north-west Queensland hospitals now have access to a pharmacist. The number of inpatient medication reviews, clinical interventions and patient–pharmacist/clinician–pharmacist interactions occurring at each remote hospital site has increased. Since service initiation, 106 medication-related reviews have been completed via telepharmacy, including 48 patient interactions, and 111 medication-related interventions have been made. This paper outlines the process for the development of an inpatient telepharmacy service for remote hospitals and discusses the benefits and limitations associated with implementation.

Keywords

Telepharmacy, telehealth, medication review, pharmacist, inpatient

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Introduction

Clinical pharmacists are trained to deliver high quality medication-related advice and services. Medication chart reviews by pharmacists in the hospital setting have shown positive results, including improved clinician prescribing and patient satisfaction, as well as reductions in drug-related readmissions, length of stay and costs.¹ Kaboli et al. found clinical pharmacist interventions produced significant reductions in preventable adverse drug events, prescribing of inappropriate medications and costs, and significant improvements in patient responses to therapy.² Pharmacists were more likely to identify and document adverse drug reactions, and medication histories documented by pharmacists were more accurate than those taken by nurses.² Discharge counselling provided by pharmacists led to significant improvements in medication adherence and patient knowledge.² These findings show pharmacist input in the hospital setting helps improve medication safety and treatment outcomes for patients.

Queensland Health's North West Hospital and Health Service (NWHHS) provides healthcare to patients at 11 hospitals and health centres across an area of approximately 300,000 km.^{2,3} The pharmacy department at

Mount Isa Hospital acts as a hub for the supply of clinical pharmacy services to other remote sites. The populations in remote towns outside Mount Isa do not individually support a full-time workload for an on-site hospital pharmacist, thus the responsibility for medication supply and stock control falls to nurses. Due to the vast distances to be covered, the sole pharmacist responsible for administering inpatient services to all five remote hospitals is only able to visit sites once, twice or four times a month depending on location and weather. The pharmacist's limited time on-site must be distributed between dispensing, stock control, medication chart reviews, patient counselling and staff training. Provision of direct patient care and advice on medication safety with this model was restricted and insufficient. Telepharmacy provides a potential solution to this problem.

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Telepharmacy involves the provision of pharmaceutical services using communication technology to patients who may be otherwise unable to access such services. Videophones have been successfully used to improve patient, case manager and clinician access to pharmacist advice, but the poor video quality has prevented them from being widely adopted.^{4,5} Videoconferencing has been found to improve outpatient access to medication and device counselling, and is superior to written information provision alone.^{6,7} Remote dispensing has also been successfully achieved via telepharmacy, with videoconferencing used to clarify items dispensed by a technician and provide patient counselling.^{8,9} Limited studies have explored the use of telepharmacy to provide inpatient pharmacy services to remote hospitals. Cole et al.¹⁰ used high-resolution video to help pharmacists remotely review hospital medication charts, current medications and physical medications to approve the release of new orders after-hours.¹⁰ A large number of medication-related errors were prevented, suggesting telepharmacy may reduce patient length of stay and prevent fatal outcomes.¹⁰ Furthermore, Poulson et al. suggested there was no significant difference noted for inpatient medication reviews carried out via telepharmacy when compared with provision of reviews by an on-site pharmacist; however, the study did experience setbacks with immobile videoconferencing equipment.¹¹ Telepharmacy appears to be a viable option for providing inpatient pharmacy services to patients in remote hospitals.

The present study describes the implementation of an inpatient pharmacy service delivered via telepharmacy to remote hospitals in north-west Queensland. The aim of the service was to increase the number of pharmaceutical reviews being performed and the number of pharmacist interventions being made at these sites, thereby improving medication safety and patient access to pharmacy services.

Methods

Ethics approval was not required for the establishment of this service. Verbal patient consent was obtained prior to each videoconference encounter.

Stakeholder engagement and site capacity

Prior to service planning, key stakeholders were identified and contacted to gauge level of interest and willingness to contribute. Stakeholders included the NWHHS Executive Director for Medical Services, NWHHS Director for Rural Hospitals, directors of nursing and/or nurse unit managers for the five remote hospitals, NWHHS telehealth coordinators, NWHHS iProgram Council, quality and safety department, program support officers and finance officers.

The staffing capacity and telehealth capabilities for each site were established to determine their suitability for service implementation. A staged commencement plan was developed and service introduction was

individualised based on site capabilities and preferences. The service was offered to Cloncurry, Doomadgee, Julia Creek, Mornington Island and Normanton hospitals.

Training and provision of information

Calendars to indicate days on which telepharmacy would run (see Figure 1) and a flowchart detailing the process (see Figure 2) were provided to staff. Two days per week were allocated to each site for telepharmacy service provision. Training on the calendar and flowchart was provided verbally in person by the travelling outreach pharmacist. It was assumed the staff knew how to use the teleconferencing equipment present at their site.

Review process

Receiving sites used the calendar (see Figure 1) to determine whether telepharmacy services would be provided that day. The site was required to scan through the ward bed list, patient progress notes, medication charts and fluid charts for each inpatient to the pharmacist at Mount Isa. The pharmacist reviewed this information, gathered any extra details required from various sources and organised a convenient time to speak with new patients on the ward.

Most sites had access to an iPad[®] with the Cisco Jabber videoconferencing application, which was taken around the ward to patients by a nurse or telehealth coordinator. This support person also aided in locating the patient's own medications and displaying these on the screen, and provided any required additional clinical information to the pharmacist. The pharmacist used a laptop computer with Cisco Jabber videoconferencing technology and a webcam to dial into the remote site's iPad[®]. If the iPad[®] was unavailable due to concurrent telehealth appointments, or in the event of Internet downtime or technology failure such as low battery, the telephone was used to speak with the patient instead. All sites also had access to larger, immobile telehealth equipment; however, this was not used as the patient had to be moved from their bed to use it.

The pharmacist completed a full medication review for each patient they received documents for, details and guidelines for which are outlined in the Society of Hospital Pharmacists of Australia (SHPA) Standards of Practice for Clinical Pharmacy Services.¹² Components of this review included development of a medication action plan, medication reconciliation, assessment of current medication management, therapeutic drug monitoring, adverse drug reaction management, provision of information, and counselling. Outcomes of this review were recorded electronically, communicated to the prescriber via telephone or iPad[®] and emailed to the receiving site. The pharmacist also wrote and emailed progress notes detailing the outcomes of the review and prescriber interaction. Interventions made by the pharmacist were entered into iPharmacy dispensing software, and number

July 2017				
Mon	Tue	Wed	Thu	Fri
3	4 Inpatient reviews via telepharmacy – please email charts	5	6	7 Inpatient reviews via telepharmacy – please email charts
10	11 Inpatient reviews via telepharmacy – please email charts	12	13	14 Inpatient reviews via telepharmacy – please email charts
17	18 Inpatient reviews via telepharmacy – please email charts	19	20	21 Inpatient reviews via telepharmacy – please email charts
24	25	26 Pharmacist on site today – no telepharmacy	27	28 Inpatient reviews via telepharmacy – please email charts

Figure 1. Calendar for remote sites indicating days on which telepharmacy is to occur.

of patients seen, medication action plans completed and number of telehealth interactions were recorded in an Excel data spreadsheet.

Results

Inpatient telepharmacy services were commenced in February 2017 for Cloncurry, March for Mornington Island and Julia Creek, April for Normanton and will commence in Doomadgee late September. Table 1 shows the number of patients seen via telepharmacy, number of medication action plans (MAPs) completed and total number of inpatient reviews completed for each remote site from service initiation to July 2017.

A total of 111 clinical pharmacy interventions were made by the pharmacist across three remote hospital sites (see Table 2).

These interventions were categorised into five groups:

- Dose alterations – suggestions made for dose increases, decreases or frequency/timing alterations, e.g. metformin dose reduction suggested for creatinine clearance <30 mL/min.
- Addition, cessation or change to charted medication – suggestions made for drugs to be added, ceased or changed to alternatives, e.g. perindopril/indapamide combination charted but patient only takes perindopril alone at home.
- Monitoring – any suggestions related to drug monitoring, e.g. patient commenced on magnesium for low level but no follow-up level taken.
- Administration – any advice given or interventions made relating to drug administration, e.g. ‘no stock’ recorded for latanoprost eye drops, nurses asked to check refrigerator where stock was then found.
- Other – includes incomplete/unclear medication orders, or any other interventions that did not fit the above categories, e.g. pantoprazole order written but not signed.

The percentage of antimicrobial-related interventions is depicted in Table 2.

Discussion

Telepharmacy has proven to be an effective model for provision of inpatient-related pharmacy services to remote hospitals. The total number of patient reviews completed were in addition to the limited number of on-site reviews completed by the travelling pharmacist. The reviews occurred more frequently as the pharmacist was not required to travel. This indicates that the service has helped to increase access to clinical pharmacists. Some reviews were completed without patient interaction as only new patients to the ward were videoconferenced and some patients were unsuitable for videoconference due to hearing or cognitive impairment.

Studies have previously used interventions to successfully evaluate the weight and benefits of pharmacist input both on-site and via telepharmacy.^{13,14} The clinical interventions depicted in Table 2 indicate inpatient telepharmacy is making a difference to patient care and potentially

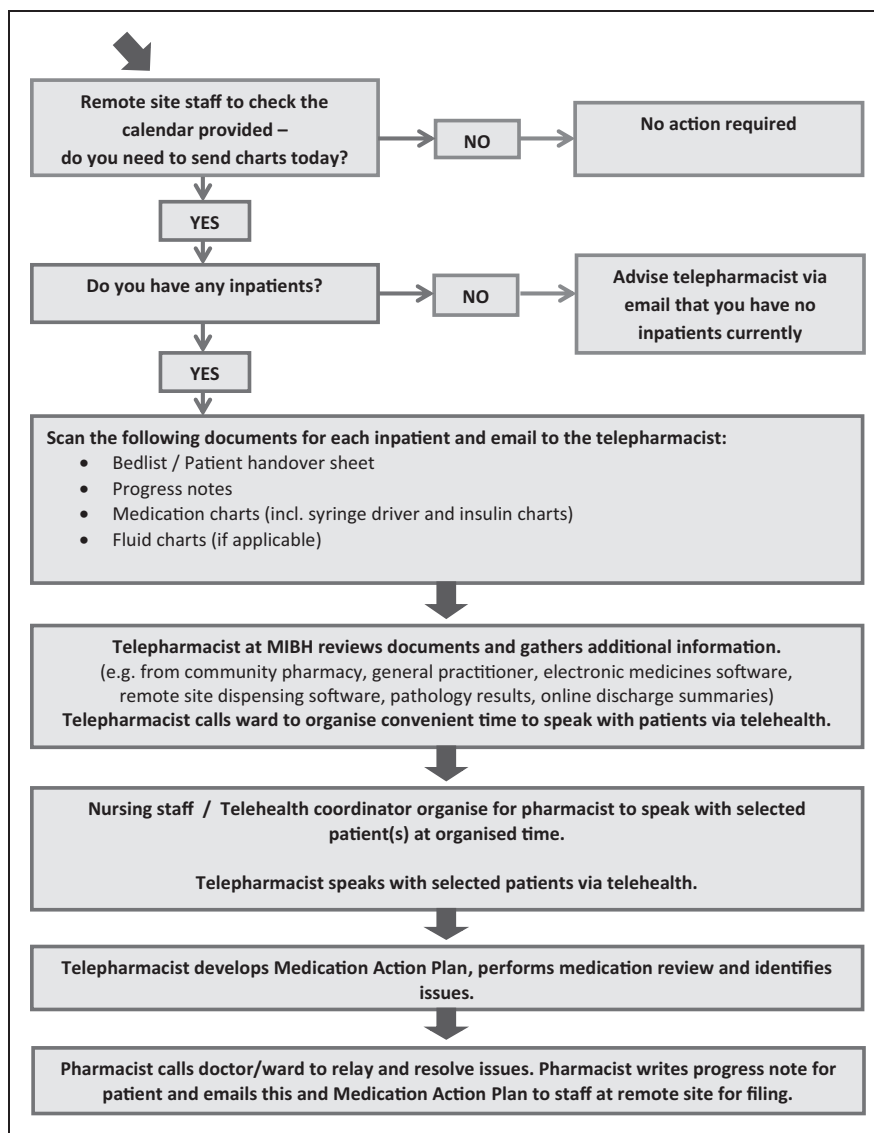


Figure 2. Inpatient telepharmacy service flowchart for remote sites.

Table 1. Number of individual patient interactions via telephone or videoconference, number of MAPs completed and number of reviews completed by location

Hospital site / Activity	Patients seen via telepharmacy	MAPs completed	Total inpatient reviews completed
Cloncurry	17	18	44
Mornington Island	9	10	14
Julia Creek	0	0	4
Normanton	22	27	44
Total	48	55	106

preventing adverse patient outcomes. There were no interventions made at Julia Creek as no medication changes had occurred since the last on-site review and this site has few new admissions. It was noted that a large number of interventions were related to antimicrobial stewardship (AMS), or the inappropriate prescribing of antimicrobials.

Table 2. Number of pharmacist interventions by type and hospital

	Cloncurry	Mornington Island	Normanton
Dose alterations	13	4	5
Addition, cessation or change to charted medication	27	7	22
Monitoring	3	2	2
Administration	2	2	1
Other	7	1	13
TOTAL	52	16	43
Antimicrobial related (%)	15%	25%	18.6%

There appears to be potential for the service to aid in AMS-related campaigns.

The success of this telepharmacy intervention is attributed to a number of factors. The availability of a stable

contact person at the remote site helped to promote and coordinate the service, deal with problems in a timely manner and aid in the training of staff. Each of the sites already had telehealth capability, which allowed us to commence the service almost immediately. The use of iPads® was effective at overcoming previous barriers such as poor video quality and immobile equipment, and provided faster reviews that were more convenient for the patient and staff. Clear flowcharts (Figure 2) and calendars (Figure 1) appeared to be useful in reminding sites of the service process. A regular routine, i.e. sending the charts on the same two days of the week every week, allowed the sites to more easily work the service into their daily schedule.

Staffing pressures were perhaps the largest barrier to service provision. For the service to occur, staff must be present at the receiving site to send patient documents and organise the videoconference. Reduced staff, absence of the regular nurse contact, emergencies at the hospitals, high staff turnover and construction on one particular ward resulted in fewer reviews than initially anticipated. Technological difficulties such as iPad® unavailability due to concurrent telehealth appointments or low battery and Internet downtime impacted on the ability to complete videoconferencing. This was managed using facsimiles and telephones instead. Timetabling of telepharmacy consultations could aid with iPad® unavailability. It was often difficult to contact doctors due to their frequent rotation and intense workloads, and nurses were often left to communicate issues. Future research of this service should involve collecting prescriber opinions of the service and utilising these to make improvements. Performing telepharmacy only twice a week for each site made it difficult to follow up interventions and ensure resolution as most patients had been discharged before their second review. Daily inpatient reviews could improve this.

Conclusion

The implementation of telepharmacy in north-west Queensland hospitals has been successful. The number of inpatient reviews has increased significantly and the number of clinical interventions made suggests patients are benefiting from this service. Potential future opportunities for this service include AMS-related activities, nursing education and pharmacist participation in medical ward rounds via videoconference.

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