Curtin Medical School

Clinical Pharmacist Involvement in Mental Health Hospital in the Home

(CLIN-PHARM-IN-HITH)

Mechaiel Nabil Farag

0000-0002-9616-2017

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Declaration

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

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

The research presented and reported in this thesis was conducted in accordance with the National Health and Medical Research Council National Statement on Ethical Conduct in Human Research (2007) – updated March 2014. The proposed research study received human research ethics approval from the North Metropolitan Area Mental Health Services Human Research Ethics Committee (EC00273), Approval Number RGS0000000186 (see Appendices 1.1 and 1.2) and the Curtin University Human Research Ethics Committee (EC00262), Approval Number HRE2017-0498 (see Appendix 1.3).

Student's signature:

Date: 28 September 2022

Abstract

Background

Hospital-in-the-Home (HiTH) is a healthcare service that provides a patient with admitted care in the patient's own home. It is considered a "virtual admission", thus adhering to the same key performance indicators (KPIs) as for a patient admitted to a physical hospital bed. Mental health (MH)-HiTH programs are relatively new to Western Australia (WA), with the first being inaugurated in 2014. They operate as multidisciplinary teams (MDTs), consisting of a consultant psychiatrist, a psychiatric registrar, MH nurses, a social worker, an occupational therapist and a clinical pharmacist (CP). While the benefits of CP services have been comprehensively described in other healthcare settings, there is a paucity of evidence describing the role of the CP within this practice setting.

Aim

This aim of this research was to determine how CPs contribute to patient care in the MH-HiTH setting. Specifically, the objectives were to:

1. Review the literature in order to describe the role of a CP within an MH-HiTH program, focusing on the specific tasks performed by a pharmacist in this position, their benefits and limitations.
2. Describe the establishment and evolution of the first MH-HiTH MDT in WA and the various facets of the CP's role integrated within the service.
3. Evaluate medication safety by assessing whether CP involvement in an MH-HiTH service improved medication safety KPIs.
4. Elicit patients/carers and clinicians' views of an MH-HiTH clinical pharmacy service.

Methods

This thesis comprises four complementary studies. First, a scoping review was conducted using the broad search terms "HiTH", "clinical pharmacist" and "mental health", to elucidate any evidence describing the role and benefits of the CP within an MH-HiTH MDT. Second, an autoethnographic method was utilised to describe the establishment and evolution of the CP role within the first WA MH-HiTH MDT. In the third study, an audit of medication safety KPIs was undertaken to evaluate the benefit of the CP in this setting, compared to an MH-HiTH

without a CP. Medical records were retrospectively reviewed of all patients admitted to two WA MH-HiTH services from September to November 2015. Site 1 was a 16-bed service incorporating a CP as part of its MDT, while Site 2 was a similarly structured 18-bed service but without CP involvement. The primary outcome measure was completion of medication safety KPIs obtained from the WA Government Pharmaceutical Review Policy and MH-specific best practice guidelines. Chi-square tests or Fisher's Exact Tests were used to assess the relationship between the integration of a CP in the MH-HiTH MDT and the medication safety KPIs. Finally, MH-HiTH stakeholders – both patients/carers and clinicians – participated in semi-structured interviews within a qualitative study to gain an insight into their views of the role of the CP in this setting; data were analysed thematically.

Results

The scoping review confirmed the paucity of literature describing the incorporation of a CP in an MH-HiTH program, uncovering only six key references: two observational studies, two conference proceedings and two documents in the grey literature. There is evidence that MH-HiTH CPs improve patient care by identifying and resolving medication-related problems, improving medication adherence, hospital admission rates and emergency department presentations. The review identified that the CP's role incorporated four key areas of focus: clinical pharmacy, mental healthcare, home medicines review and facilitation of care transition through medication reconciliation and follow-up.

The autoethnography explained how this CP role was established as part of the newly inaugurated MDT, and described the nature and benefit of the tasks performed by the CP in the MH-HiTH MDT. It presented a timeline of the evolution of the CP service to stay abreast of the evolution of the MDT itself. The MH-HiTH service commenced in 2014, consisting of an MDT of a consultant psychiatrist, a psychiatric registrar, clinical nurses, an occupational therapist, a social worker and a CP. Starting with four then eight "virtual beds", it was gradually increased to 16 virtual beds. A description of the CP service to the MH-HiTH MDT was presented, as it was practised at the time of writing. The MH-HiTH CP combined hospital clinical tasks – e.g. medication reconciliation and therapeutic drug monitoring – with home medication reviews as part of the MH-HiTH MDT. The novelty of this setting required the CP to evolve pharmacy practice in order to be integrated within MH-HiTH, creating a new CP role informed by literature and research. Although some challenges were encountered, this integration was

facilitated by the CP's contribution to the implementation of an electronic health record. Lessons learnt by the CP included proactively integrating and flexibly adapting into a novel practice setting.

The medication safety study found better KPI performance in an MH-HiTH service incorporating a CP, compared to a similar MH-HiTH service without a CP. KPIs from Site 1 (n = 75 records), which incorporated a CP, demonstrated significantly ($p < 0.001$ for all analyses) higher rates of completion of medication reconciliation [65 (87%) versus 17 (29%)], accurate adverse drug reaction list [73 (97%) versus 34 (58%)], accurate discharge medication list [51 (74%) versus 18 (45%)], accurate medication profile [74 (99%) versus 40 (68%)] and medication chart review [74 (99%) versus 0 (0%)] than Site 2 (n = 59).

The qualitative study revealed that stakeholders, both clinicians, patients and carers alike, generally felt the CP was helpful in providing medication management and education. There were three patient/carer themes: that the CP is a valuable member within the MDT, helped in bridging the gap to other health services and the value of the medication review service conducted in the home setting. Clinicians reported two themes: that the CP had an extensive breadth of contribution to the MDT, but that their involvement was sometimes constrained by limitations to their accessibility, availability and flexibility. The clinician participants suggested a need for increased resource allocation to the CP role to allow them to routinely undertake home visits for all patients, out of normal business hours if necessary. Few other limitations to the pharmacy service were identified.

Conclusion

To our knowledge, this is the first suite of studies to comprehensively describe the integration and evolution of a CP role within an MH-HiTH MDT, and to provide preliminary evidence of the value of the MH-HiTH CP. This integration significantly improved achievement of medication safety KPIs, and was well-accepted by patient and clinician stakeholders. More research is needed to further evaluate the benefits of a CP in this healthcare setting.

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Abbreviations

AACP	Australian Association of Consultant Pharmacy
ADR	Adverse drug reaction
APAC	Acute Post-Acute Care
BPS	Best Practice Software®
CAUL	Council of Australian University Librarians
COPD	Chronic obstructive pulmonary disease
CP	Clinical pharmacist
ED	Emergency department
eMMP	Electronic Medication Management Plan
ESCP	European Society of Clinical Pharmacists
GP	General practitioner
HAD	Hospitalisation à Domicile
HAH or H@H	Hospital at Home
HBH	Home-based Hospital
HiTH	Hospital-in-the-Home
HMR	Home medicines review
ID	Infectious disease
IJCP	International Journal of Clinical Pharmacy

IT	Information technology
IV	Intravenous
KPI	Key performance indicator
LAI	Long-acting injection
LoS	Length of stay
MDT	Multidisciplinary team
MeSH	Medical Subject Headings
MH	Mental health
MH-HiTH	Mental Health Hospital-in-the-Home
MMP	Medication Management Plan
MOC	Model of Care
MRP	Medication-related problem
NMHS-MH	North Metropolitan Health Service – Mental Health
NMHS-MHPHDS	North Metropolitan Health Service – Mental Health, Public Health and Dental Services
OPAT	Outpatient Parenteral Antibiotic Therapy
OT	Occupational therapist
PBS	Pharmaceutical Benefits Scheme
PhD	Doctor of Philosophy
PIM	Potentially inappropriate medication

PRISMA-ScR	Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for scoping reviews
PSA	Pharmaceutical Society of Australia
QoL	Quality of life
RCT	Randomised controlled trial
RiTH	Rehabilitation in the Home
RMMR	Residential medication management review
RSAP	Research in Social and Administrative Pharmacy
SA	South Australia
SHPA	Society of Hospital Pharmacists of Australia
SW	Social worker
TDM	Therapeutic drug monitoring
UK-ACT	United Kingdom Assertive Community Team
US-ACT	United States Assertive Community Team
WA	Western Australia (or Western Australian)

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List of Publications and Conference Presentations

Papers Published in Peer-Reviewed Journals

Farag M, Chalmers L, Hoti K, Hughes J. The role of the clinical pharmacist in mental health hospital-in-the-home: A scoping review. Res Soc Admin Pharm. 2022;18:3724-3735. https://doi.org/10.1016/j.sapharm.2022.04.004.

Farag M, Hoti K, Hughes J, Chalmers L. Establishment and evolution of a clinical pharmacy mental health hospital-in-the-home service: An autoethnography. Res Soc Admin Pharm. 2022;18:3550-3559. https://doi.org/10.1016/j.sapharm.2022.03.013.

Farag M, Hoti K, Hughes J, Chalmers L. Impact of a clinical pharmacist on medication safety in mental health hospital-in-the-home: A retrospective analysis. Int J Clin Pharm. 2022;44:947-955. https://doi.org/10.1007/s11096-022-01409-4.

International Conference Presentation

Farag M, Chalmers L, Hoti K, Hughes J. Mental health hospital in the home clinical pharmacist improves medicines safety. Conference Poster. 49th European Society of Clinical Pharmacists (ESCP) virtual symposium on clinical pharmacy: Clinical pharmacy, working collaboratively in mental health care; 19-21 Oct 2021; Online: Int J Clin Pharm; 2021. p. 1748-1749. https://doi.org/10.1007/s11096-021-01352-w.

Chapter 1: Introduction

1.1 History and overview of HiTH services

1.1.1 History of HiTH internationally

Hospital-in-the-Home (HiTH) – also known internationally by a wide range of synonyms, such as *Hospitalisation à Domicile* (HAD), Home Hospitalisation, Hospital at Home (HAH or H@H) and Outpatient Parenteral Antibiotic Therapy (OPAT) [see Table 1.1][1,2] – is a healthcare service that provides hospital-style treatment by hospital staff to patients in their own home.[3] Physician home care dates back to the ancient Babylonian and Egyptian civilisations.[4] During the medieval period, in the 5th century AD, home care became secondary to the hospital.[5] It was not until the late 1940s when home care began to take form as an alternative means to treating patients in a similar way to the healthcare and treatment they received in hospitals.[6] This modern home hospitalisation model began in 1947 in New York to overcome the crowding of patients in the Montefiore Hospital.[6] The hospital embarked on a new pathway to provide a better service to the public by providing its "superior scientific facilities" to the patients beyond the limits of its walls, into patients' homes.

Table 1.1 List of synonyms for Hospital-in-the-Home (HiTH)

Acute Demand	Hospital at Home (HAH or H@H)
Acute Post-Acute Care (APAC)	Hospital without beds
Ambulatory care	Hospital-in-the-Home
Chemo @ home	Hospitalisation à Domicile
Domiciliary care	In-home care
Extra-mural hospital	In-home services
Home based care	Outpatient Parenteral Antimicrobial Therapy (OPAT)
Home care	Rehabilitation in the Home (RiTH)
Home hospital	The Daily Living Programme
Home hospitalisation	Virtual hospital
Home treatment	
Hospice at home	

In 1951, HAD was instituted in France and offered more structure than the service offered in New York to ensure the continuity of patient treatment.[2] The HAD model was subject to

patient/family consent and the continuity of treatment by the attending doctor from the hospital.[2] Subsequently, the HAD model was replicated in other western countries like Australia where the model was named HiTH (or a synonym of HiTH – see Table 1.1).

1.1.1.1 The modern HiTH services

HiTH services benefit the patient and health system by taking pressure off Emergency Departments (EDs), improving patient satisfaction, and reducing detrimental events related to hospitalisation (e.g. confusion in elderly and demented patients, iatrogenic infections, etc.) and costs to the health system.[7]

The benefits of the modern HiTH service were clearly demonstrated in a 2012 meta-analysis of 61 randomised controlled trials (RCTs) comparing HiTH care with standard in-hospital care.[8] The HiTH treatment modality was found to reduce mortality (odds ratio [OR], 0.81; 95% confidence interval [CI], 0.69 to 0.95; p = 0.008; 42 RCTs with 6992 patients), with the number needed to treat at home to prevent one death found to be 50. A reduction was also observed in readmission rates (OR, 0.75; 95% CI, 0.59 to 0.95; p = 0.02; 41 RCTs with 5372 patients) as well as cost (mean difference, -1567.11; 95% CI, -2069.53 to -1064.69; p < 0.001; 11 RCTs with 1215 patients). In 21 of 22 studies, patient satisfaction was higher in HiTH, while carer satisfaction was higher in six of eight studies.[8]

The HiTH model of care also benefits patients in that they are in a more comfortable environment while they are being treated[9] and reduces their risk of adverse events occurring from hospitalisation.[10] This historical evolution and a contemporary overview of HiTH services has been described in the literature, specifically from an OPAT perspective.[3]

1.1.2 Evolution of HiTH in Australia

The pioneers in establishing HiTH services in Australia in the 1990s, such as Caplan[8] and Montalto,[11,12] laid the foundation for considering this treatment modality in various specialties in medicine, most commonly beginning with the treatment of infectious diseases. Following the "citation trail" from these two influential Australian physicians offers a good indication of the development of HiTH services throughout Australia.

HiTH began in Australia in 1994, branching off hospital funding in Victoria and New South Wales.[13] At the start of this program, it was clinically guided by not only government, but also

commercial organisations and healthcare professionals, until 2006.[13] In that year, the *Hospital in the Home Society of Australasia* was formed, providing representation for HiTH services. In Australia, the HiTH healthcare model serves two main purposes. It extends the hospital patient care after the patient has physically left the hospital, facilitating earlier transition from the physical hospital to the community.[14-19] This is sometimes known as the "early discharge" HiTH pathway. The alternative HiTH pathway is "admission avoidance", where a patient is admitted to a HiTH virtual bed (i.e. the patient is physically at home but receiving hospital-style treatment). The "admission avoidance" pathway accepts patients directly from their community healthcare provider or from a hospital ED.[8,20] Now, HiTH is available Australia-wide[21] and in 2017-18 represented approximately 5% of inpatient hospital admissions.[19]

Initially, HiTH was a nurse-led service, administering intravenous (IV) antimicrobials to patients after their discharge from hospital.[8] As more data were gathered, evidence of these programs' success advanced HiTH services to other health conditions or settings, such as heart failure,[22] chronic obstructive pulmonary disease,[23] paediatrics,[24] anticoagulation,[25] cancer chemotherapy[26] and geriatrics.[27-30]

1.1.3 Mental health HiTH (MH-HiTH) internationally and in Australia

Mental health (MH) HiTH services are a relatively new addition to the HiTH repertoire, having operated in Australia for only 20 years. As such, information on this specialty remains scarce. The paucity of reference to MH services in the HiTH setting makes it challenging to make strong conclusions about its value to date. However, literature regarding international experiences in MH-HiTH or similar services indicate the HiTH treatment modality reduces costs, reduces pressure on inpatient services and provides clinical care that is acceptable to MH patients and their families.[31-37]

Early work by Johns et al. explored how implementing a home-based intervention that reduced hospital readmission rates could decrease the utilisation of healthcare services related to mental illness and substance abuse.[31] It was found that among the patients with frequent readmissions to an MH hospital, 40% of admissions were due to social factors, 31% were due to psychiatric and physical-related factors, 20% were due to potential harm to self or others, and approximately 10% were due to substance abuse.[38] The authors concluded that when a home

intervention program for MH patients addressed these factors that contributed to readmission, it led to a reduction in their readmissions of 86% ($p < 0.0001$).[31]

While Johns et al.'s study was conducted in the United States of America, Australian studies have shown similar findings. One such study by Kalucy et al. investigated whether a HiTH service model could relieve the pressure on public EDs and enhance capacity in psychiatric inpatient units in South Australia.[32] In their trial, they called this new service *Mental Health Hospital @ Home (MHH@H)*. They found that MHH@H was successful in diverting MH patients from the ED directly to this intensive home-based service. They also found there was a flow-on effect whereby suitable patients could also be discharged sooner from the inpatient unit to MHH@H, thus freeing up inpatient psychiatric beds. This finding was supported by Burns et al. who, in their systematic reviews of 91 studies, found that the home-treatment setting reduces days spent in hospital compared to in-hospital treatment of patient with mental illness by, on average, approximately five days per patient per month.[39]

In South Australia, Singh et al. evaluated the effectiveness of psychiatric Hospital at Home.[37] They evaluated the outcomes of patients with an acute psychiatric episode who were treated by the Hospital at Home team, who would have otherwise been treated via the in-hospital care pathway. Their patients' most common diagnoses were mood disorders and non-affective psychoses. They found the in-home treated patients had comparable symptom improvement and length of stay to in-hospital treatment, with only one adverse event during the one-year study period. Singh et al. thus concluded that Hospital at Home services can provide a safe and effective alternative to in-hospital care for suitable patients.

Later studies focused on specific MH subspecialties. Klug et al., for example, conducted a study to elucidate patient outcomes following hospital discharge in the psychogeriatric subspecialty setting.[33] These patients had depressive and delusional symptoms and were discharged to a service called *Geriatric psychiatry home treatment*. Although it was only a pilot study with a small number of patients ($n = 12$), this one-year longitudinal study found that (1) no study patient required an inpatient psychiatric hospitalisation or nursing home admission; (2) mental quality of life significantly improved; (3) patients remained functionally stable; and (4) patients' Brief Psychiatric Rating Scale did not deteriorate. The improvement in quality of life supported previous findings by Sherwood and Morris in the home setting for geriatric patients, and those with psychiatric and intellectual impairment.[36]

Cost-effectiveness of the MH-HiTH model was assessed by Knapp et al. in a four-year randomised controlled study.[34] This study compared home-based versus hospital-based care for patients with schizophrenia and affective disorders. They called their service *The Daily Living Programme*. The study found home-care to be less costly than hospital care with post-discharge outpatient care, especially in the first 20 months of the service.

Mwale et al. reported that MH-HiTH was shown to reduce psychiatric in-hospital admissions and provide effective treatment without the need for in-hospital admission.[35] Mwale et al. found the remission of acute psychiatric symptoms to be 15-35 days for in-home care patients, compared to an average of 42 days for in-hospital patient in Malawi. In addition, in-home care was found to confer increased awareness and understanding of mental illness as well as improved family and community involvement in patients' care.[35]

Before the commencement of the Graylands Hospital (Mount Claremont, WA) MH-HiTH Program in 2014, it was accepted in many states of Australia that HiTH was not feasible for the treatment of acute mental illness. This view was not only held in WA but also in other states such as Queensland.[40] Since that time, the exclusion of acute MH treatment from HiTH services was revised.[14] Now there are numerous MH-HiTH services throughout WA and other states of Australia. In South Australia, the Metropolitan Referral Unit offers a Hospital Avoidance and Discharge Support Services program; this includes a mental health team. Of note, the care model mentions allied health services but there is no specific mention of clinical pharmacy services.[41]

As MH services evolved, quality improvement and innovation led to the formation of the first MH-HITH program in WA at Graylands Hospital in 2014. The history of MH-HiTH services in WA is described in detail in Chapter 2. In summary, however, to this day, the WA MH-HiTH service offers in-home MH treatment to suitable patients via a multidisciplinary team (MDT) as an alternative to hospitalisation in a physical hospital bed. The MDT consists of hospital-based clinicians, namely a consultant psychiatrist, a psychiatric registrar or medical officer; MH nurses; an occupational therapist; a social worker and a clinical pharmacist (CP). This service provides home visits to patients on a daily basis for an intended length of stay (LOS) of 14 days, with flexibility to shorten or lengthen this time based on the clinical needs of the patients. Patients eligible to this treatment are those diagnosed with any mental illness, such as psychotic disorders, affective disorders and personality disorders. Patients are accepted via the

admission avoidance (e.g. from EDs) or early discharge (i.e. from an in-hospital psychiatric inpatient unit) pathways.

1.1.4 Traditional pharmacy services in Australian HiTH programs

HiTH programs have traditionally called upon pharmacy services to provide the medications for their patients. In many HiTH services, the role of the pharmacist has been limited solely to medication supply services,[17] particularly the preparation of IV medications[42] for the HiTH nurses to administer to patients in their homes. There has been a slow evolution in the role to include clinical services, including reviewing the patient's complete medication regimen, identifying any medication-related problems and assessing such problems.[43] In some HiTH service models, the pharmacist may also assess medication adherence, and the patient's understanding of the medical condition and medication regimen.[44,45] Most published literature does not elaborate further on the role of the pharmacist in this setting.

There is a marked distinction between dispensing HiTH pharmacists, mostly dispensing aseptic IV antimicrobials and IV chemotherapy; and CPs providing services to MH-HiTH programs, where medication reconciliation and home medication review-style services, as well as other clinical activities, are conducted. This is a very important distinction, and critical to this PhD thesis.

1.2 Clinical pharmacy

Clinical pharmacy is defined by the American College of Clinical Pharmacy as an "area of pharmacy concerned with the science and practice of rational medication use".[46] The aim of clinical pharmacy is to employ pharmaceutical care in order to optimise medication therapy thereby promoting health and preventing disease.[46] CPs utilise specialised pharmacotherapeutic knowledge, experience and judgement to strive for optimal patient outcomes. The Society of Hospital Pharmacists of Australia (SHPA) provides a complementary definition, stating: "The objectives of a clinical pharmacy service and clinical pharmacy activities are to minimise the inherent risks associated with the use of medicines, increase patient safety at all steps in the medicines management pathway and optimise health outcomes." [47] See Figure 1.1 for an illustration of the various activities undertaken by pharmacists as part of hospital-based clinical pharmacy services.

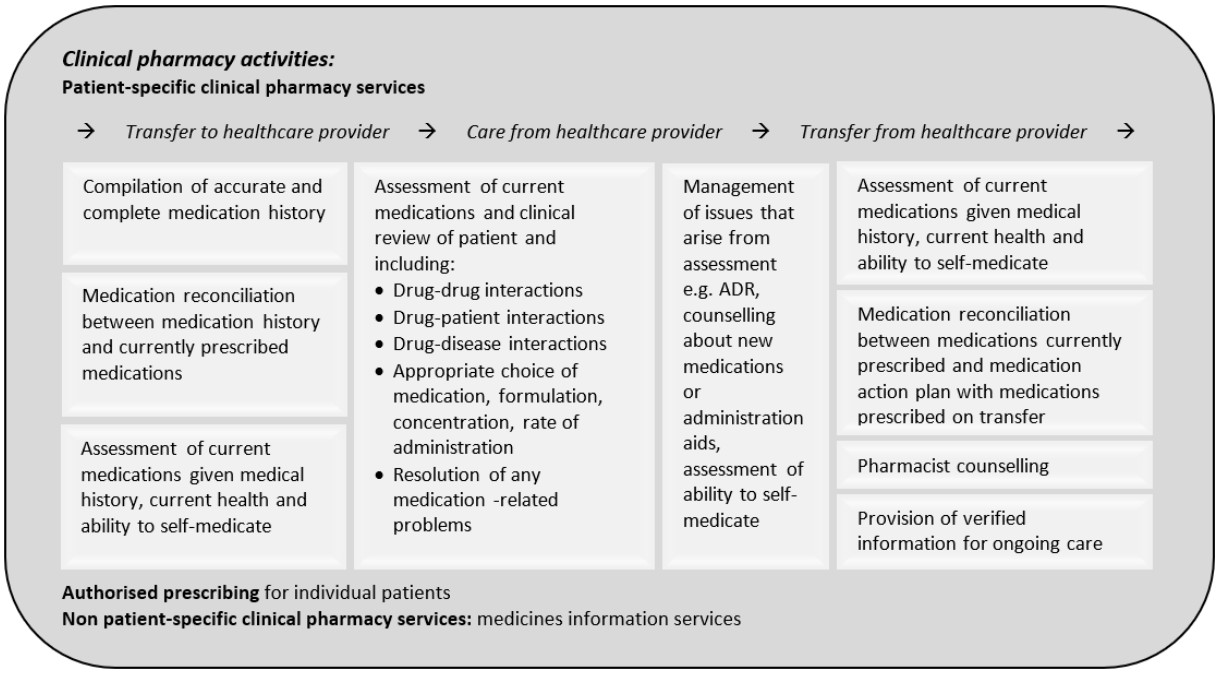


Figure 1.1 Aspects of clinical pharmacy services in Australia – adapted from Taylor, 2013[47]

(ADR = adverse drug reaction)

1.2.1 Clinical pharmacy in the hospital setting

Clinical pharmacy originated in the hospital setting.[48] There is now a wide body of evidence for the value of clinical pharmacy services in the inpatient setting.[49] The most comprehensive evaluation of clinical pharmacy services in Australia was published by Dooley et al. in 2004.[50] This study aimed to determine the cost savings of pharmacist-initiated changes to the pharmacotherapy of patients admitted in eight major government hospitals in Australia; these changes were defined as interventions. An independent clinical panel at each hospital assessed the resource implications of pharmacists' interventions. It was found that 835/1399 (59.7%) interventions impacted on medication costs, 511 (61.2%) of which were evaluated by the panels. Three-quarters of the interventions were assessed as having an impact on LOS, readmission probability, medical procedures or laboratory monitoring – 96 interventions were deemed to have reduced LOS and 156 to have reduced the potential for readmission. This

resulted in $AUD263,221 in cost-savings for the eight hospitals during the period of the study, equating to an annualised total cost saving of $AUD4,444,794 for the eight hospitals.

Subsequent studies have confirmed the cost-effectiveness of inpatient clinical pharmacy services. A recent systematic review of economic evaluations of clinical pharmacy services included nine services delivered in the acute inpatient setting.[51] It demonstrated that clinical pharmacy services were mainly related to disease state management, general pharmacotherapeutic monitoring, target medication programs and patient education. The cost-benefit ratio of clinical pharmacy services was reported to be between 1:1.05 to 1:25.95.[51]

The value of CPs in reducing medication-related harm in acute care was recognised by Roughead et al.[52] Of particular note, in their literature review, the authors reported that CPs are effective at detecting unintentional discrepancies during medication reconciliation. Of these discrepancies, 6% were deemed by an expert panel to have very significant impact on patient health outcomes and 52% were deemed to have a significant impact. A more recent meta-analysis has also demonstrated that participation of a CP is an important strategy to improve communication between different healthcare settings, especially during transitions of care.[53]

1.2.2 Clinical pharmacy services to HiTH

There is increasing evidence for the value of clinical pharmacy services outside traditional hospital settings. A critical analysis of 439 randomised controlled trials (RCTs) over 40 years found that an increasing proportion of studies evaluating clinical pharmacy services were conducted in the community pharmacy setting.[49] A systematic review of 116 studies evaluating non-dispensing pharmacist services for non-hospitalised patients reported pharmacist services may reduce the percentage of patients whose blood pressure is outside the target range (18 trials, N = 4107, OR 0.40, 95% CI 0.29 to 0.55) and slightly improve physical functioning (7 trials, N = 1329, mean difference 5.84, 95% CI 1.21 to 10.48).[54]

In Australia, CPs have been demonstrated to improve medication safety in the Home Medicines Review (HMR) setting by detecting and reporting medication-related issues.[55] During the HMRs process, CPs undertake home-based clinical pharmacy services that involve that pharmacist visiting the patient's residence, sighting the patient's medications, reconciling the sighted medications with the prescriber's medication regimen, providing verbal and written medication

information to the patient, and reporting the findings and recommendations to the prescriber.[56,57]

At the time of inception of this PhD research, there was also emerging evidence that CP integration into general HiTH services improved medication safety parameters.[58-61] McAllister[60] described the role of the pharmacist in home health care as an educator, clinician and administrator. He added that the pharmacist is able to coordinate the hospital's initiation of a home infusion service by screening selecting and training patients for the home infusion service before hospital discharge. The pharmacist may have further input in medication selection and compounding to ensure optimal patient outcomes and minimise cost. To ensure patient safety, the pharmacist conducts clinical monitoring activities such as telephone interviews with patients at home and assessment of clinical progress during the patient's appointment at the clinic.[60]

Chung et al.[58] described the development and implementation of a pharmacist managed OPAT program at a county teaching hospital. The pharmacist's role was to provide consistent evaluation, approval and monitoring of patients requiring OPAT for the treatment of infection. The pharmacist assisted with appropriate patient and medication regimen selection, confirmation of prescriptions on discharge, assuring appropriate laboratory tests were performed and evaluated, performing routine monitoring for adverse effects and line complications and ensuring the removal of the vascular access device on completion of the OPAT.[58] Sheridan et al. further demonstrated that a pharmacist managed OPAT program successfully reduced and maintained lower 30-day readmission rates compared to in-hospital care.[61]

Dooley et al.[59] conducted a pilot study of 46 patients dosed by an independent pharmacist anticoagulation service in the HiTH setting. All patients in this study were dosed by credentialed pharmacists until two consecutive therapeutic International Normalised Ratios (INRs) were achieved. The mean time to first therapeutic INR was found to be 7.7 days ($p = 0.009$) and it took 8.8 days to reach two consecutive therapeutic INRs ($p = 0.002$). They concluded that an independent pharmacist anticoagulant dosing service is safe, effective and sustainable in the ambulatory setting.

The findings of these studies, coupled with emerging evidence that MDTs, including a CP, improved the healthcare provided by HiTH programs,[62] has therefore led to evolution of the

MDT pharmacist's role from aseptic dispensing to clinical tasks, such as antimicrobial stewardship in OPAT,[61] medication reconciliation,[63] therapeutic drug monitoring (TDM)[59] and resolving medication-related problems (MRPs), including in the home setting.[57,64] The literature, however, has been largely silent on CP services to MH-HiTH.

1.3 Study rationale

The benefits of HiTH programs in other healthcare settings (including to some extent, MH-HiTH) and clinical pharmacy services have been well described. Nevertheless, there was a significant gap in the literature regarding clinical pharmacy services within MH-HiTH at the time of inception of this PhD, with little evidence regarding CP activities, governance frameworks, clinical outcomes and stakeholder perceptions within the MH-HiTH setting. This PhD program was therefore designed as the first comprehensive, multi-faceted evaluation of clinical pharmacy service in an MH-HiTH setting.

At the time of inception of this PhD, the topic of this research was highly relevant to contemporary healthcare in MH, particularly in WA. The *Western Australian Mental Health, Alcohol and Other Drugs Services Plan 2015-2025*[65] focuses on a gradual reduction of inpatient MH beds by promoting the growth of MH-HiTH programs. This strategy is already employed in the eastern states of Australia and is currently being implemented in WA. As more MH-HiTH programs commence operation, administrators will seek ways to assess the potential value of incorporating clinical pharmacy services within them. Due to the limited amount of published literature describing clinical pharmacy MH-HiTH services, it was believed that these doctorate studies had the potential to provide valuable information to inform administrators of how to structure and evaluate clinical pharmacy services in the MH-HiTH setting.

There is strong evidence that medication-related adverse events are a significant cost to health systems[66] as well as being detrimental to patient outcomes.[67] Specifically, 250,000 hospital admissions annually are a result of medication-related problems in Australia, at an annual cost $AUD1.4 billion.[68] Given this significant burden, there was a strong focus throughout this work on medication safety, especially at transitions of care which are recognised as high-risk times for medication error.[53]

As the pharmacy profession evolves internationally, there exists a need for more information on novel practice methods. It was hoped that the results produced in this PhD study program

may assist in the development of similar service models in other countries around the world. It was also hoped that such initiatives would contribute to the improvement of MH services as a whole with the ultimate aim being to improve the quality of life of MH patients through better medication management across all health settings.

1.4 Aims and objectives

This series of complementary studies aimed to determine how CPs contribute to patient care in the MH-HiTH setting. Specifically, the objectives of this research were to:

1. **Review** the literature in order to describe the role of a CP within an MH-HiTH program, focusing on the specific tasks performed by a pharmacist in this position, their benefits and limitations.
2. **Describe the establishment and evolution** of the first MH-HiTH MDT in Western Australia (WA) and the various facets of the CP's role integrated within the service.
3. **Evaluate medication safety** by assessing whether CP involvement in an MH-HiTH service improved medication safety key performance indicators (KPIs).
4. **Elicit stakeholders' views** (patients/carers and clinicians) of an MH-HiTH clinical pharmacy service.

1.5 Thesis framework

Although this PhD research was designed using a pragmatic approach, it was useful to frame the evaluation of MH-HiTH CP services around the *Medical Research Council Framework for Developing and Evaluating Complex Interventions*. Using this framework effectively illustrates how the different facets of the research contribute to a comprehensive, multi-faceted evaluation.[69] This approach is also justified as the MH-HiTH CP service may readily be considered a complex intervention, as it involves a number of components, targets a range of behaviours, requires expertise and skills by the CP delivering the intervention, and targets a relatively new healthcare setting.[69] One of components involved in the service include provision of continuity of pharmaceutical care during the transition of care from community healthcare to MH-HiTH or from in-hospital healthcare to MH-HiTH. This is important as it is known that medication-related problems are more likely to occur at the point of transition of care.[70] Additionally, the intervention targets patients with a wide range of psychiatric diagnoses, each

of whom may require additional pharmaceutical support related to their primary or co-morbid psychiatric conditions. Furthermore, the CP is integrated into an MDT, requiring an advanced level of communication with the various levels of the MDT relating to the patient's pharmacotherapy. As MH-HiTH is relatively new to the WA health system landscape and it involves the CP making advanced independent decisions, the MH-HiTH CP service demands a unique set of skills with proficiency in MH clinical pharmacy practice and additional skills in conducting medication reviews in the home setting.

This framework is also useful in that it goes beyond the consideration of whether the intervention is efficacious in an experimental or ideal setting; it also provides guidance on assessing the effectiveness of the intervention as being "implementable, cost effective, transferable, and scalable in real world conditions."[69] As the MH-HiTH CP service is already an established service model, this PhD research considered the *evaluation* phase of the framework.

The framework describes six core elements that must be considered at each phase.[69] This thesis addressed five of these six core elements, as detailed below and illustrated in Figure 1.2.

1. What is the underpinning programme theory ("how an intervention is expected to lead to its effects and under what conditions")?
   This was addressed in Objective 1 of the thesis. Due to the paucity of literature on CP integration into MH-HiTH programs, a scoping review was undertaken to explore what was known the three main elements of the research question – "clinical pharmacy", "mental health", and "HiTH", and how they were known to intersect. There was a particular focus on the question "how" the intervention would contribute to patient care; that is, the specific tasks performed by a CP involved in an MH-HiTH.
2. How does the intervention interact with its context?
   This was addressed in Objective 2 of the thesis. An autoethnography using the descriptive-realistic style was used to describe the establishment and evolution of the MH-HiTH MDT and, most importantly, the integration of the CP within the service, from the perspective of the CP responsible for delivering the intervention.
3. What are the key uncertainties?
   This was addressed in Objective 3 of the thesis. As discussed previously, clinical pharmacy services are well recognised in improving medication safety,[52] and this was

the intended outcome of the CP within the WA MH-HiTH in this study. The effectiveness of the CP in relation to achievement of medication safety KPIs was explored in retrospective observational study.

4. How can diverse stakeholder perspectives be included in the research? and
5. How can the intervention be refined?

   Elements 4 and 5 were addressed in Objective 4 of the thesis. The *Medical Research Council Framework* highlights the value of engaging stakeholders, those "who are targeted by the intervention", in the evaluation of an intervention beyond its effectiveness, to optimise its potential to improve health outcomes.[69] A qualitative study was conducted to elicit the views of the MH-HiTH stakeholders – namely patients, carers and clinicians – of the MH-HiTH clinical pharmacy service, including the benefits and limitations of the service, as well as potential improvements.

6. What are the comparative resource and outcome consequences of the intervention? – Element 6 was outside the scope of this work, but represents a future direction for this research.

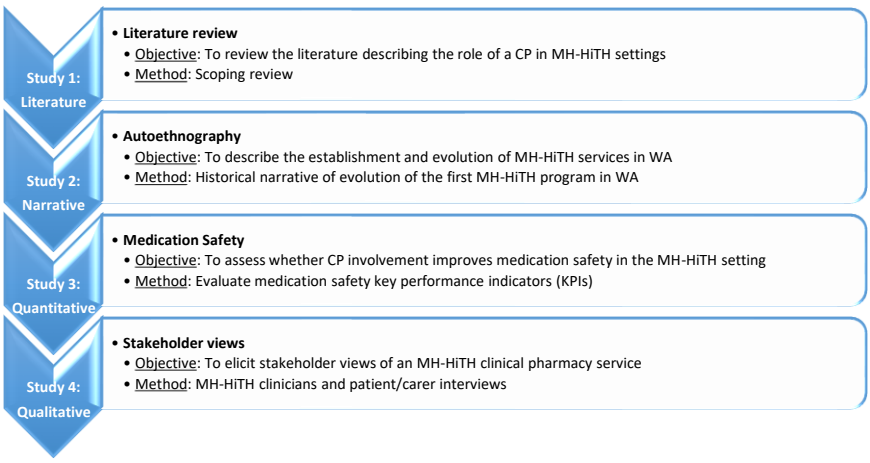
Thesis facets, objectives, and methods	MRC Framework core elements addressed
	1 2 3 4, 5

Figure 1.2 The four facets of the PhD research aligned to the Medical Research Council (MRC) Framework for Developing and Evaluating Complex Interventions[69]

(CP = clinical pharmacist, MH-HiTH = Mental Health Hospital in the Home)

1.6 Thesis structure

This thesis contains seven chapters. After this Introduction (Chapter 1) that links the work together and with the existing literature, there are three chapters that reflect research that has been published in peer-reviewed international pharmacy journals (Chapters 2-4), and then Chapter 5, which has been formatted as a manuscript for submission. Each chapter is presented in a consistent format and is preceded with a title page indicating publication status and the contributing authors. Each chapter also has a statement of attribution presented at the beginning. The order of the chapters is as follows:

- Chapter 2 - The role of the clinical pharmacist in mental health hospital-in-the-home: A scoping review.
- Chapter 3 - Establishment and evolution of a clinical pharmacy mental health hospital-in-the-home service: An autoethnography.
- Chapter 4 - Impact of a clinical pharmacist on medication safety in mental health hospital-in-the-home: A retrospective analysis.
- Chapter 5 - Embedding a clinical pharmacist in mental health Hospital-in-the-Home: A qualitative evaluation of stakeholders' perceptions.

Finally, the thesis concludes with Chapter 6 (Discussion) and Chapter 7 (Conclusion and recommendations).

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Chapter 2: The role of the clinical pharmacist in mental health Hospital-in-the-Home: A scoping review

FARAG Mechaiel[1,2], CHALMERS Leanne[1], HOTI Kreshnik[3], HUGHES Jeff[1]

Affiliations:

[1] Curtin Medical School, Faculty of Health Sciences, Curtin University, Kent Street, Bentley, Western Australia, 6102, Australia

[2] North Metropolitan Health Service – Mental Health Pharmacy, Graylands Hospital, Brockway Road, Mount Claremont, Western Australia, 6010, Australia

[3] Faculty of Medicine, Division of Pharmacy, University of Prishtina, Pristina, Republic of Kosovo

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The publisher's statement permitting use of the published article is in Appendix 2.

Attribution Statement for Thesis Chapter 2

	Conception and Design	Acquisition of Data and Method	Data Conditioning and Manipulation	Analysis and Statistical Method	Interpretation and Discussion
Co-Author 1 (Leanne Chalmers)		✓	✓	✓	✓
Co-Author 1 Acknowledgment: I acknowledge that these represent my contribution to the above research output and I have approved the final version. Signed:					
Co-Author 2 (Kreshnik Hoti)	✓	✓	✓	✓	✓
Co-Author 2 Acknowledgment: I acknowledge that these represent my contribution to the above research output and I have approved the final version. Signed:					
Co-Author 3 (Jeff Hughes)	✓	✓	✓	✓	✓
Co-Author 3 Acknowledgment: I acknowledge that these represent my contribution to the above research output and I have approved the final version. Signed:					

2.1 Introduction to the manuscript

This chapter provides a synthesis and critique of the literature relating to the role of a CP within an MH-HiTH setting. The purpose of conducting a scoping literature review as part of this thesis was to enable the description of the role of the CP in delivering clinical pharmacy services to a group of patients who are vulnerable to medication-related harm, namely patients with mental illness, given the existing paucity of literature on this role. An MH-HiTH episode of care involves two points of transition of care: one at the beginning of the MH-HiTH admission and another at discharge. It is known that transitions of care are periods of the patient's health journey during which there is a higher risk of medication-related problems. The findings from this chapter complement the previous chapter in explaining the rationale for establishing an MH-HiTH CP service. The relative lack of literature, especially regarding the development and implementation of such a service, highlighted a gap that was subsequently filled by the autoethnographic study, which is presented in Chapter 3.

2.2 Publication

2.2.1 Abstract

Background

The concept of integrating a clinical pharmacist (CP) within a Hospital-in-the-Home (HiTH) program is relatively new. Little is known about the role of a pharmacist in HiTH programs focused on mental health (MH).

Objectives

To describe the role of a CP within an MH-HiTH program, focusing on the specific tasks performed by a pharmacist in this position, their benefits and limitations.

Methods

MEDLINE, CINAHL, EMBASE, Cochrane Database of Systematic Reviews, PsycINFO, Web of Science and the grey literature were searched without any date limits for references in English that included 2 or more of the following key terms (or their synonyms): "HiTH", "clinical pharmacist" and "mental health". Two reviewers independently screened and analysed the data.

Results

Of 60,482 screened references, 6 included all 3 key terms: 2 were HiTH guideline documents, 2 were conference abstracts and 2 were journal articles. These papers discussed MH-HiTH programs or similar home care services where a CP was incorporated in the treating team to address medication management and adherence during a home visit. There is evidence that MH-HiTH CPs identify and resolve medication-related problems (MRPs), as well as improve medication adherence, patient care, hospital admission rates and emergency department presentations. An additional 54 references including 2 key terms provided corroborating evidence of an MH-HiTH CP role focused on improving patient care via 4 key groups of tasks: clinical pharmacy, mental healthcare, home medicines review and facilitation of care transition through medication reconciliation and follow-up.

Conclusions

Although there is currently a paucity of literature describing the incorporation of a CP in an MH-HiTH program, preliminary evidence shows it can improve medication management. This has potential to improve patient outcomes as has been seen in similar home-based settings, but limitations such as time constraints are notable barriers. More robust studies are needed to evaluate these outcomes.

2.2.2 Keywords

Clinical pharmacist; mental health; Hospital in the Home; HITH; home health care; scoping review

2.2.3 Introduction

In Australia, 2%–3% of hospital admissions are medication-related,[1] and approximately 50% of adverse drug event-related admissions are potentially preventable.[1] Clinical pharmacists (CPs) are ideally placed to identify and resolve medication-related problems (MRPs) that lead to adverse drug events. The medication safety benefits of CP involvement are well established in various healthcare settings. These include CPs in hospitals[2,3] ; home-based clinical pharmacy services, such Home Medicines Reviews (HMRs)[4] ; and in general Hospital-in-the-Home (HiTH)

programs,[5] notably the French model of care known as Home-Based Hospital (HBH), where patients receive intensive hospital-style treatment and monitoring in their own homes.[6] Belaiche et al. reported in a recent article that CPs working within this model of care detect medication-related problems, thus preventing health complications in these patients.[6]

HiTH programs are those where a patient is treated in their home for an acute or sub-acute illness by hospital staff. HiTH services have been shown to reduce morbidity, mortality, hospital length of stay (LoS) and readmission rates.[7] Despite initial concerns,[8] thorough risk assessment by experienced clinicians has allowed safe delivery of subacute to acute mental health (MH) treatment in a HiTH environment.[9–12] The number of MH-HiTH programs in Australia is increasing with recognition of their benefits in terms of costs, patient satisfaction[13] and improved patient outcomes.[13,14] Such MH-HiTH programs manage patients via daily home visits by MH-HiTH clinicians over a defined LoS dependent on the clinical needs of the patient, with each member of the team contributing to multidisciplinary care to diagnose and prescribe medications if required (psychiatrist), provide counselling (psychologist), address psychosocial issues (social worker), resolve work and organisational issues (occupational therapist) and optimise medication management (clinical pharmacist).

The integration of a CP into an MH-HiTH multidisciplinary team (MDT) is a concept that has not been prominently described in the literature. As MH-HiTH is a service where patients are admitted and discharged, a CP is important to ensure medication safety, given that medication errors are more likely to occur at transitions of patient care between healthcare providers.[15] Accordingly, it may be hypothesised that if CPs have demonstrated medication risk reduction and admission avoidance in other settings,[16] they are likely to have the same benefit in MH-HiTH. A recent systematic review by Ng et al. provided evidence that pharmacist-led interventions improve clinical outcomes in patients with mental illness; however, no evidence was provided from the MH-HiTH setting.[17] Hence, to our knowledge, the role of a CP in an MH-HiTH program has not been previously reviewed. The objective of this scoping review was, therefore, to describe the role of a CP in the MH-HiTH setting. It aimed to explore available literature to clarify the tasks involved in such a role, any subsequent benefits for patient medication management and potential limitations of the role.

2.2.4 Methods

A scoping review approach was adopted following a preliminary literature review which showed there was limited literature discussing the role of CPs in the MH-HiTH setting. Scoping reviews are preferred for identifying key concepts in an area that has not been previously comprehensively studied.[18] This scoping review was guided by the framework described by Arksey and O'Malley,[18] which was later enhanced by Daudt et al.[19]

2.2.4.1 Search Strategy

A search was conducted in 6 electronic databases (MEDLINE, CINAHL, EMBASE, Cochrane Database of Systematic Reviews, PsycINFO and Web of Science) from the inception of each database until October 8, 2021 using combinations of the terms, "HiTH", "clinical pharmacist" and "mental health" and related keywords, as detailed in Table 2.1. Further references were obtained from the reference lists of identified articles and grey literature. Grey literature was obtained by searching for relevant documents on the Western Australian (WA) Health Department intranet; brochures of HiTH services from other local and interstate hospitals; by obtaining relevant procedural documents from HiTH pharmacist colleagues and Australia-wide peer networks (e.g. the Society of Hospital Pharmacists of Australia [SHPA] Transition of Care Forum), by obtaining documents from relevant organisations (such as the HiTH Society of Australasia); and by searching for relevant keywords on the internet via the Google® search engine.

2.2.4.1.1 Eligibility criteria

All identified relevant literature was screened regardless of study design. Only full-text articles (including conference abstracts) published in English were included. Following Arksey and O'Malley's enhanced methodological framework,[19] some of the inclusion and exclusion criteria were devised post hoc as familiarity with the literature increased. For example, after the initial MEDLINE search, Medical Subject Headings (MeSH) terms were used to identify related keywords not previously identified. References that exclusively discussed non-clinical pharmacy services (e.g. aseptic dispensing, inventory management); or contained less than 2 of the 3 key terms ("HiTH", "clinical pharmacist" and "mental health") were excluded.

Because the term "clinical pharmacy" has different meanings in different countries,[20] the meaning adopted in this review was that defined by SHPA, the primary Australian professional organisation for hospital pharmacists.[21] As such, clinical pharmacy involves the services delivered by pharmacists for patients to minimise the risks associated with the use of medicines and to optimise the use of medicines.[6,21–24] This is similar to the definition of the American College of Clinical Pharmacy.[25] As a guide during the screening stage, the following tasks were considered within the remit of a CP: medication reconciliation on admission and discharge; assessment of current medication management and recommendation of any optimisation; regular clinical review, therapeutic drug monitoring (TDM) and adverse drug reaction management; devising a medication management plan; providing medication information to clinicians and patients; facilitating continuity of medication management on transition between care settings; and participation in interdisciplinary care planning.[21,25]

Similarly, the term "HiTH" has different meanings in different countries. Additionally, HiTH may differ in its operation in different medical specialties in any individual country. Furthermore, there are numerous terms that are synonymous with HiTH, as can be seen in Table 2.1. For the purposes of this scoping review, HiTH was given a broad definition – where hospital-based clinicians provide an ongoing, holistic acute or subacute health service in the patient's home – to capture any relevant references that used different terminology.

References describing significantly different models of care were excluded from the review. These included models of care focusing on home-based triage, assessment and referral at the time of mental health crisis, with or without short-term sub-acute care, such as the Crisis Resolution Teams in the United Kingdom and elsewhere[26]; and the UK Assertive Community Team (UK-ACT) model and its US counterpart (the US-ACT model), which involve significantly less intensive patient follow-up than existing MH-HiTH services.[27] The review also focused on services provided to home-dwelling patients, rather than those provided to the aged care home setting, to avoid confounding of the effects of an external "HiTH" service by the aged care services provided to these patients on a day-to-day basis.

Conversely, given the paucity of references regarding home-based clinical pharmacy services within an acute/sub-acute model of care, the definition of "HiTH" was expanded post hoc (as per Arksey and O'Malley's framework)[19] to include services that may be provided as part of sub-acute care, such as soon after hospital discharge,[28,29] but are not exclusively offered in this

setting nor solely by hospital-based practitioners. Such services included the Australian model of HMR, where patients receive a medicines review in their home, typically by a community-based clinical (or "accredited") pharmacist.[4] While acknowledging differences in the governance, communication pathways and team integration between community-based and hospital-based services, the home visit aspect of this model was considered of particular relevance in the authors' clinical context.

Table 2.1 Keywords used in database searches

Concept	Keywords
HiTH-related keywords	Hospital in the home (HiTH), Hospital-in-the-Home, ambulatory care, home care, Hospital at Home (HAH or H@H), Hospitalisation a Domicile, Acute Demand, Acute Post-Acute Care (APAC), home based, hospital without beds, home hospitalisation, home hospital, Chemo @ home, domiciliary care, extra-mural hospital, Hospice at home, in-home care, in-home services, Outpatient Parenteral Antimicrobial Therapy (OPAT), Rehabilitation in the Home (RiTH), virtual hospital
Clinical Pharmacist-related keywords	Pharmac*, medication, clinical pharm*
Mental Health-related keywords	Mental health, psychi*, mental illness/condition/disease

Note: The asterisk (*) instructed the electronic database to include any ending to that particular word.

2.2.4.2 Study Selection

Identified references were screened by title and abstract for relevance to the research question. If relevance was unclear from the title and abstract, the full text was examined. After duplicates were removed, eligibility criteria were applied as described above.

2.2.4.3 Data Extraction and Synthesis

The following parameters (if present) were extracted from each reference: authors, year of publication, study geographical location; intervention type, duration and any comparator; study participants (e.g. pharmacists, nurses); methods; outcome measures; key results; economic evaluation; and conclusions. All screened articles' citation, eligibility, and reason for inclusion or exclusion were tabulated. Subsequently, the tables and full text were independently reviewed by another author. Discrepancies were resolved by discussion until reaching consensus.

The review process is outlined in Fig. 2.1 using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses for Scoping Reviews (PRISMA-ScR) guidelines.[30]

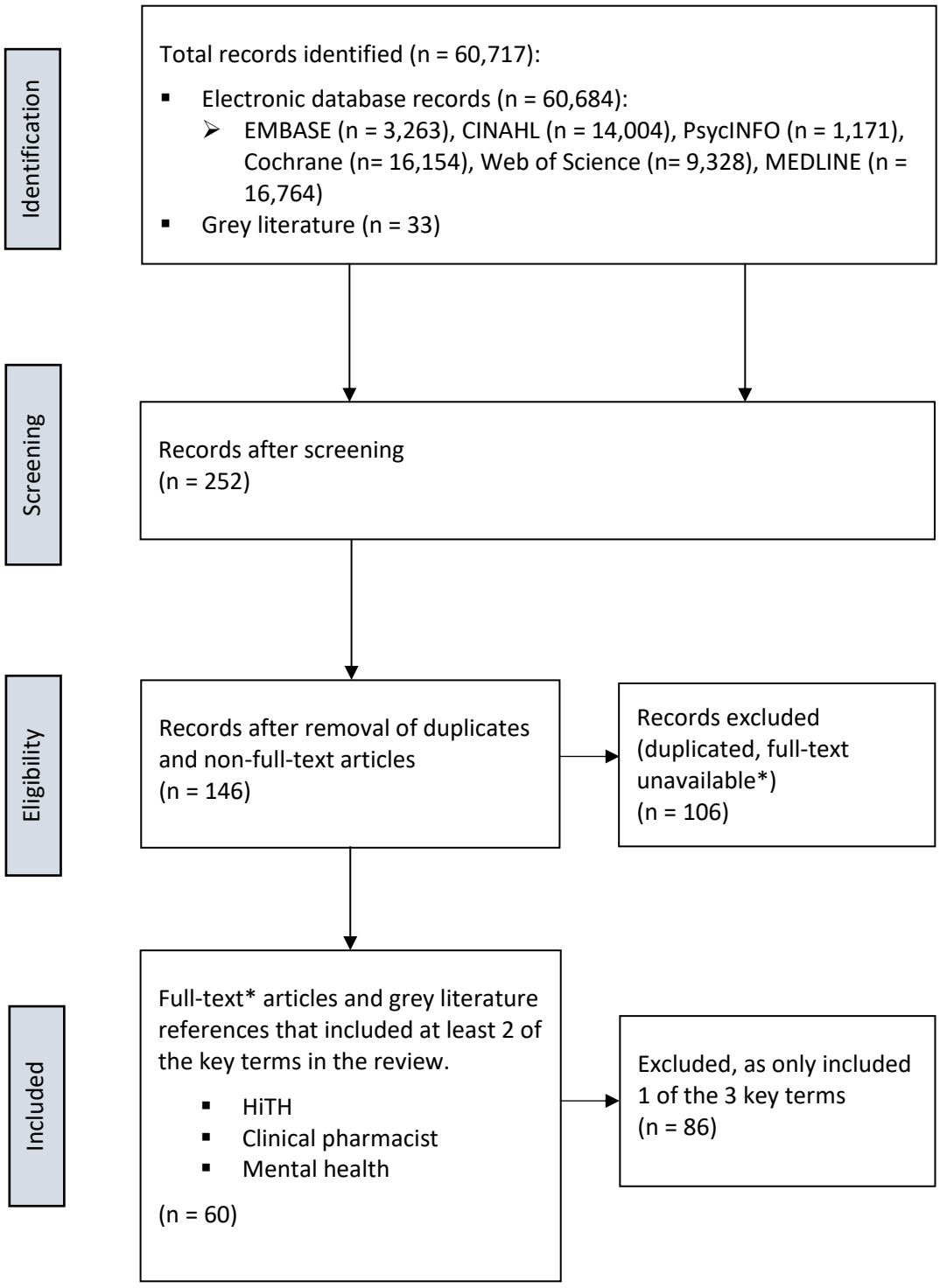

Figure 2.1 PRISMA-ScR Flow Diagram illustrating the identification, screening and inclusion process of records

*Published conference abstracts were counted as full-text articles.

2.2.5 Results

The search yielded a total of 60,684 records from electronic databases and 33 records from grey literature. After screening these records, 252 were deemed relevant. After duplicates and non-full-text articles were excluded, 146 relevant records remained. When the articles of low relevance were excluded (n = 86), the remaining 60 references were included in the review.

Of the 60 references, 6 contained all 3 key terms ("HiTH", "CP" and "MH"), so they were considered highly relevant (Table 2.2). The 6 highly relevant references consisted of 2 research articles, 2 abstracts of conference posters and 2 grey literature documents. The common theme among these references was that the role of a CP within an MH-HiTH MDT or similar setting was to optimise medication management, ensure medication safety and address any MRPs that may lead to medication-related adverse events for patients. The tasks of the CPs were described as reviewing patients' medications; identifying potentially inappropriate medications (PIMs) or MRPs; addressing them; and providing patient medication information and counselling, leading to improved medication adherence and contributing to improved patient care and outcomes, such as reduced hospital readmission rates.[31–34]

2.2.5.1 References from electronic databases

Four highly relevant references were found from electronic databases. Gillespie et al. explored the perspectives of MDT clinicians (including CPs, but excluding psychiatrists) on MH care of veterans with complex physical health needs in the home setting.[34] The consistent opinion from non-pharmacist team members was that they found management of psychotropic medications challenging. This situation was exacerbated by the lack of team-based psychiatrists, with the article calling for integration of consulting psychiatrists into their treating teams as the ultimate solution. In this context, team members from different sites found pharmacists were useful in filling the gaps in medication management; however, pharmacist numbers and capacity to cope with the current caseload were limited. The CPs' medication management advice and guidance were so valued by clinicians that they called for it to be conducted for more of their patients but recognised CP time constraints were a major limiting factor.

In the state of New Jersey, United States of America, Maroney[32] conducted a pilot project where a psychiatric pharmacist provided a comprehensive clinical pharmacy service to people with mental illness in an Integrated Health Home, which appears to be structured similarly to

one MH-HiTH program described in the grey literature.[35] A CP was found to contribute to reduced hospital readmissions, emergency department (ED) visits and medication non-adherence by being involved in medication reconciliation and patient counselling prior to hospital discharge, with a follow-up post-discharge home visit for additional medication organisation, review and counselling.[32]

Reidt et al. conducted a study within a non-profit, home-visiting nurse agency and found that when they included a pharmacist with their home-visiting nurses, MRPs were reduced by 40%, and hospitalisation rates and ED presentations were halved.[31] Although this was not an actual HiTH service in that it was not conducted by hospital staff, it provided a home-visiting healthcare service. Importantly, the identified benefits of collaboration between nursing and pharmacy professions in improving patient care supports incorporating a CP into a team of nurses in an MDT HiTH setting.

A study by Loy et al. described an MDT HiTH model providing healthcare to elderly patients with dementia living at home.[33] As part of the MDT, specialist geriatric CPs detected and addressed PIMs by recommending discontinuing inappropriate medication, reducing its dose or replacing it with a safer medication. Although a small study (n = 104 patients), it had the largest cohort of patients among the 4 most relevant articles. Accordingly, its findings support the premise that a CP improves medication safety in the home care setting by reviewing, detecting and resolving patients' medication issues.[33]

2.2.5.2 Grey literature

Thirty-three sources were identified from the grey literature. These included mainly hospital policy or government guidelines (n = 10). These were useful as they explained the operating procedures of each HiTH service. Some did not mention the MH specialty utilising the HiTH modality (e.g. Victoria HiTH Guidelines[36]). The remaining references were brochures (n = 3), consult sheets (n = 2), personal communications (n = 4), research reports (n = 5), strategic plan (n = 1) and websites (n = 8). These gave minimal information about the topic of MH-HiTH and pharmacy services to HiTH. Moreover, no relevant international grey literature was found by Google® searching. The significance of this scant reference to pharmacy services from such official sources (e.g. policy documents) provides a possible explanation of why there is little information in the literature relating to MH-HiTH clinical pharmacy services.

Two of the 33 grey literature sources, both HiTH guidelines, were deemed highly relevant. The Graylands Hospital MH-HiTH Guidelines[35] state the MH-HiTH CP performs medication reconciliation on admission and discharge (including completing the medication and allergy lists in the medical discharge summary), identifies and rectifies any MRPs, informs the MDT about any TDM requirements, conducts an HMR during a home visit, provides verbal and written patient medication information and a medication list, and removes surplus-to-requirement medications from the home to reduce the risk of deliberate overdose.

The Queensland HiTH Guidelines[37] do not stipulate any CP home visits but state that the role of the HiTH pharmacist is to reconcile medications on admission, inform the treating team of any high-risk medications or those requiring TDM, and on discharge provide an accurate medication list to the patient, general practitioner (GP) and community pharmacy if required.

The finding of only these 6 references containing all 3 key terms is an indicator of the paucity of literature specific to the CP role in the MH-HiTH setting. It was, therefore, considered that there was potential value in looking to related literature to supplement the findings of these 6 references. Accordingly, the remaining 54 references were considered of intermediate relevance as they contained 2 of the 3 key terms. Thirty-three references discussed CP and HiTH (Table 2.3), 10 references discussed MH and HiTH (Table 2.4) and 12 references discussed MH and CP (Table 2.5).

Table 2.2 Highly relevant references included in the review. These discussed all 3 key terms: "CP", "HiTH" and "MH"

Author, year	Study type	Participants	Intervention	Summary of findings
References from electronic databases				
Gillespie et al., 2019[34]	Qualitative	Interviews with MDT clinicians (including CPs) involved in the service (n=103)	Home-based primary care for veterans who needed MH care and complex physical health needs	• Management of psychotropics was challenging for non-pharmacist, non-psychiatrist clinicians. • CPs with experience in psychotropic medication management provided guidance, identified gaps and assisted to fill such gaps. • Integrating physical with MH care has an established evidence base and was validated qualitatively in this study. • Clinicians preferred CPs reviewed more patients but were limited by time.

Loy et al., 2017[33]	Cohort (conference abstract)	Elderly patients with dementia (n=104)	CP home-based intervention	• CP identified PIMs and MRPs. CP involvement improves patient care.
Maroney, 2015[32]	Cohort (conference abstract)	Patients with mental illness (n=21)	CP discharge medication reconciliation and counselling. After discharge from hospital, CP was available for a home visit to organise medications, provide medication counselling and remove extraneous medications.	• CP interventions commenced before discharge from an inpatient unit and were followed-up after discharge. • CP can provide long term management of patients with mental illness and comorbid physical illness. • CP contributed to the overall care process, including reduced hospital admissions, ED visits and medication non-adherence.

Reidt et al., 2013[31]	Cross-sectional observational study	Multiple patients including MH patients (n=70)	A non-profit, home-visiting nursing agency integrated a pharmacist with their nursing staff to assess and address MRPs. Pharmacist HMR during a home visit or patient interview and counselling via telephone (in a telehealth-style consult).	• After integrating a pharmacist in the nurse home-visiting service, 40% of MRPs were resolved. • Hospital admissions and ED visits decreased by half
References from grey literature				
Queensland HiTH Guidelines, 2017[37]	Guidelines	All HiTH patients (including MH) (n: N/A)	MDT HiTH teams treat patients during home visits. The HiTH CP role is precisely explained in terms of clinical tasks. A specific reference is made to the HiTH CP role in performing inpatient hospital pharmacist clinical tasks in addition to providing an accurate medication list on discharge to the patient and general practitioner, as well as	• These guidelines are broader in their procedures as they describe HiTH programs in general, meaning they can belong to various medical specialities.

			the community pharmacy if required.	
Western Australian Health Department – Graylands Hospital Adult HiTH Guidelines, 2015[35]	Guidelines	MH-HiTH patients (n: N/A)	Daily home visits from MDT members, including doctors, nurses, CP, occupational therapist and social worker. The CP's role is explained and includes inpatient hospital CP tasks, combined with HMR during a HiTH home visit. CP clinical tasks extended to both MH and physical health conditions.	• This document describes the operational procedures and key performance indicators of the HiTH program

Abbreviations:

CP: clinical pharmacist

ED: emergency department

HiTH: Hospital-in-the-Home

HMR: home medicines review

MDT: multidisciplinary team

MH: mental health

MRP: medication-related problem

PIM: potentially inappropriate medication

2.2.5.2.1 Clinical Pharmacy with HiTH and related services (non-MH)

The 33 identified references that explored the role of CPs in general (non-MH) HiTH programs (i.e. included the search terms "Clinical Pharmacy" and "HiTH" [including their synonyms], but not MH) are displayed in Table 2.3. These HiTH programs, that treat conditions other than mental illnesses (e.g. infectious diseases, cardiology, oncology), all have an integrated CP service, and describe improvements to medication safety contributed by this service. This associated CP integration in HiTH (albeit non-MH specialties) support the finding from the references in Table 2.2 that CPs contribute to improved medication safety in the HiTH setting.

One of the major focuses of the CP roles described was on discharge medication reconciliation.[28,38] The HiTH pharmacist does this twice – once on transfer from the hospital inpatient unit (or outpatient clinic) to be admitted to HiTH, and the second time is at discharge from HiTH to their community health provider (e.g. general practitioner).[39] The medication reconciliation process is the first step in medication rationalisation.[25,39] As the CP collates the patient's medication profile, MRPs which are detected can be addressed. This includes any necessary TDM which can be discussed with the treating team at an early stage, facilitating medication optimisation.[40] The benefits of a non-MH-HiTH CP repeatedly performing medication reconciliation provide further evidence supporting the important contribution of CPs to medication safety in general HiTH settings.[41] For instance, in the study by Delate et al.,[42] the authors found that when formal medication reconciliation was performed at the transition of care (discharge) from a skilled nursing facility back to home, mortality rates were reduced.

Table 2.3 Articles found to be related to clinical pharmacy, and HiTH and related services from a variety of medical specialties (but not related to MH)

Author, year	Study type	Participants	Intervention	Summary of findings
Alderman et al., 2013[43]	Cohort	Adult patients in a rural setting (n=100)	CP HMR	• Improved medication use and patient health outcomes.

Belaiche et al., 2020[6]	Cohort	Adult and paediatric without mental illness (n=2878)	Hospital CP providing a home-based service	• Identified a high level of MRPs and prevented patient complications.
Chan et al., 2021[44]	Cross-sectional analysis	Medically complex, frail veterans in home-care via home visit/telehealth (n=55,173)	MDT care from all team members compared to a core clinician involving additional disciplines depending on complexity.	• The higher the medical complexity and risk of hospitalisation, the more MDT clinicians (including CPs) were involved in managing the patient – a strong correlation.
Cheen et al., 2016[41]	Cohort (conference abstract)	Patients aged 60+, taking more than 5 medications with 2 unplanned admissions after their first home visit ($n_{\text{home based medication review}}$=97) ($n_{\text{non-home based medication review}}$=402)	Pharmacist-provided HMR	• Decreased hospital admission rates and ED visits. Trend observed toward reduced mortality

Chow et al., 2015[45]	Randomised controlled trial (conference abstract)	Patients with type 2 diabetes mellitus (n=150)	Home-based pharmacoeducation provided by pharmacist	• Increased disease-related knowledge and medication adherence.
Chung et al., 2016[46]	Cohort	Patients requiring outpatient parenteral antimicrobial therapy (n=203)	CP-managed outpatient parenteral antimicrobial therapy program	• Improved patient care, outcomes and MRPs.
Delate et al., 2008[42]	Quasi-experimental controlled trial	Patients discharged from a skilled nursing facility ($n_{control\ group}$=408) ($_{nOPAT\ group}$=113)	CP-managed medication reconciliation program.	• Outcome of medication reconciliation: Decreased mortality. • The importance of medication reconciliation during transition of care is highlighted.
Docherty et al., 2020[47]	Review	Outpatient parenteral antimicrobial therapy patients (n: not stated)	Home-based outpatient parenteral antimicrobial therapy with pharmacist involvement	• Safe and quality use of medications. Provided education to patients, improved patient outcomes.

Dooley et al., 2013[48]	Cohort (conference abstract)	Patients discharged into a HiTH anticoagulation program (n=148)	HiTH pharmacist-led warfarin dosing service	• The service is safe, effective and sustainable.
Elliott et al., 2017[49]	Pilot randomised controlled trial	Patients aged 50+ on polypharmacy, admitted to Home Health after hospital discharge (n=110)	Arm 1: CP HMR only. Arm 2: CP HMR + genetic testing for CYP enzyme polymorphism.	• Arm 2 had reduced rehospitalisations and ED presentations
Foust et al., 2005[50]	Qualitative observational study	Older adults (n: not stated)	CP-led (post-hospital) home medication management	• CP services should be available in home-care to address post-discharge MRPs and ensure improved patient outcomes.
Hunt et al., 2018[51]	Case-control	Patients with chronic obstructive pulmonary disease (n=173)	CP outpatient intervention	• CP group had improved patient outcomes.
Korajkic et al., 2011[52]	Randomised controlled trial	Ambulatory patients with	Pharmacist-led patient education, allowing patient-guided diuretic	• Intervention improved health outcomes and

		heart failure (n=70)	dose adjustment versus usual care.	quality of life, while decreasing hospital admission rates.
Lemay et al., 2013[53]	Cohort (conference abstract)	Hospitalised patients post discharge: adults from any medical specialty, paediatrics and neonates (n=1029)	CPs performed medication management tasks in home-care settings for recently discharged inpatients.	• CP detected and prevented MRPs, improved medication management and patient care.
Litke et al., 2018[54]	Cohort	Rural veterans with diabetes, hyperlipidaemia, hypertension or tobacco cessation (n=554)	Telehealth program including CP services.	• Intervention improved disease management and access to healthcare.
MacAulay et al., 2008[38]	Cohort	Patients discharged from internal medicine programs (n=27)	CP services at home after hospital discharge for at least 3 weeks.	• CP optimised medication regimens, identified MRPs and medication recommendations. Patients and other member of the healthcare team were very satisfied with the services.

McAllister III, 1985[55]	Cohort	Home healthcare patients (n: not stated)	Hospital pharmacists in home healthcare.	• Pharmacist involvement can improve patient outcomes and minimise costs.
Meredith et al., 2002[56]	Randomised controlled trial	Home healthcare patients, aged 65+ (n=259)	CP and nurse reviewed medication profiles together at the clinic.	• Improved medication use, reduced therapeutic duplications.
Naunton et al., 2003[28]	Randomised controlled trial	Patients aged 60+ prescribed 4+ regular medications (n=121)	HMR by pharmacist 5 days post-discharge from hospital.	• Valuable in identifying and addressing MRPs and reducing the risk of hospital admissions.
Pherson et al., 2018[57]	Cohort	Older adults with functional limitations (n=59)	Nurse-pharmacist collaboration in home-based care.	• Identified MRPs and solutions to improve quality of life.
Romanelli et al., 2015[58]	Cohort	Patients in a patient-centred medical home (n=1108)	CP-led medication management vs usual care	• More ambulatory care visits, lower hospital admission rates in CP group.
Roth et al., 2020[59]	Cohort (conference abstract)	Patients discharged from hospital (n: not stated)	Team-based home care program, including CP HMR and medication management.	• CPs reduce cost and improve patient outcomes.

Serwetman et al., 2017[60]	Cohort (conference abstract)	Patients recently discharged from the hospital (n=1455)	In-home CP-led transition programs	• Reduced hospital admissions. Positive impact on clinical quality
Setter et al., 2000[61]	Descriptive survey	Patients with type 2 diabetes mellitus (n=105)	CP home-based visits	• Improved blood glucose levels and rectified MRPs
Shcherbakova et al., 2016[62]	Cohort	Recently discharged patients (n=245)	CP home visits	• Identified MRPs. No impact on reduction of hospitalisation rates.
Sheridan et al., 2018[63]	Cohort (conference abstract)	Outpatient parenteral antimicrobial therapy patients (n: not stated)	Pharmacist-based outpatient parenteral antimicrobial therapy	• Reduction in 30-day readmission rate.
Sok et al., 2015[64]	Cohort	Paediatric palliative care patients with rapid escalation, or complex and unstable symptoms (n=9)	Hospital pharmacist-led HMRs in palliative care in the home setting	• Identification of MRPs, benefit caregivers and health professionals.
Stewart et al., 2020[65]	Cohort	Geriatric patients (n=25)	CP HMR	• Identified high-risk patients of medication non-adherence.

Terry et al. (1), 2011[40]	Cohort (conference abstract)	Medicare (USA) advantage patients (n=86)	CP-led in-home care management for 30-day post discharge.	• Reduction in hospital admission rate: 19-28%. Reduction in healthcare costs.
Terry et al. (2), 2011[66]	Cohort conference abstract)	Medicare (USA) advantage patients (different paper to Terry et al. [1], 2011). (n=361)	CP-led in-home care management for 30-day post discharge.	• 28.4% reduction in 30-day hospital readmission rates and net cost savings
Traynor, 2016[67]	Cohort (pilot study)	Homebound patients (n=152)	CP medication management including a home visit vs usual care	• CP medication management at home led to a reduction in hospital admissions vs control group (usual care): 6% vs 16%.
Traynor, 2019[68]	Cohort (pilot study)	Homebound patients at high risk of medication errors (n=9)	CP medication management during HMR	• CP identified MRPs, including wrong medication doses, incorrect directions for taking medications and medically-ceased products that remained on the medication list.

				• CP interventions included clarifying medication dosage/directions, medication counselling.
Triller et al., 2007[69]	Randomised controlled trial	Patients aged 21yrs+ with heart failure who were referred to receive skilled nursing services (n=154)	Usual care or pharmaceutical care from a CP in home over 3 weeks.	• No significant changes in rate of mortality or rehospitalisation rate.

Abbreviations:

CP: clinical pharmacist

ED: emergency department

HiTH: Hospital-in-the-Home

HMR: home medicines review

MDT: multidisciplinary team

MH: mental health

MRP: medication-related problem

PIM: potentially inappropriate medication

2.2.5.2.2 Mental Health and HiTH (not CP-related)

While HiTH is a well-known treatment modality in non-MH medical treatment, MH-HiTH is infrequently described in the literature. In Table 2.4, the 10 articles that discussed MH-HiTH programs are displayed. These articles do not make any reference to pharmacy services but

they demonstrate that there is some evidence, albeit low level evidence – mostly from observational studies – that MH-HiTH programs improve patient care, reduce hospitalisation rates[70–72] and reduce healthcare costs.[71–74] The systematic review by Klug et al.[71] only included patients aged at least 60 years old and found only 3 studies eligible for review. This demonstrates the need for more studies to evaluate the benefits of MH-HiTH programs.

Table 2.4 Articles found to be related to MH and HiTH (but not related to CPs)

Author, year	Study type	Participants	Intervention	Summary of findings
Johns et al., 2007[70]	Cohort	MH patients (n=52)	Home intervention program	• Intervention reduced hospital admission rates
Ju et al., 2014[73]	Cohort	Patients with schizophrenia in home care (n=1755)	Oral vs long-acting injectable antipsychotic in home-based treatment.	• Long-acting injection home-based treatment led to clinical and economic benefits.
Kalucy et al., 2004[13]	Case-control	MH patients. No pharmacist (n=285)	MH-HiTH service	• Consumers and caregivers are highly satisfied. Facilitated safe hospital admission avoidance and early discharge.
Klug et al., 2008[75]	Cohort	Elderly MH patients (n=12)	Geriatric MH home treatment	• After 1 year: no improvement in hospital admission rates nor quality of life. Functionally stable, rate of

				psychosis did not deteriorate.
Klug et al., 2019[71]	Systematic review	MH patients, aged 60+, living at home (n: N/A)	Psychogeriatric treatment model which includes home visits.	• Home treatment showed improved symptoms, psychosocial problems and lower hospital admission rates and costs.
Knapp et al., 1998[74]	Randomised controlled trial	MH patients (n=189)	Home-based care for 20 months, followed by half participants returning to standard care for 25 months (total 45 months)	• Improvement in cost-effectiveness.
Muskens et al., 2019[76]	Cross-sectional	Adolescents (aged 11-18 years) with acute MH disorders (n=112)	Intensive home treatment – psychiatrist, psychologist and nurse	• 50% decrease in symptoms over 4 months – less risk for hospital admission.
Mwale, 2011[72]	Descriptive study	MH patients (n=275)	Domiciliary care in a community setting (offering home-based acute mental health care to patients within their homes)	• Responding to both health and social needs reduced hospital admissions. Is cost-effective and feasible.
Sherwood et al., 1983[77]	Cohort	Ageing and mental impairment in	Domiciliary care program (10 months). May be seen as a	• Provided needed services (e.g. meals, laundry), improved

		adult populations (n: not stated)	precursor to modern HiTH as it replaced prolonged/indefinite institutionalisation.	living conditions, improved socialisation, reduced institutional days.
Singh et al., 2010[14]	Cohort	Acute MH patients (n=111)	HiTH service without a pharmacist	• Provided safe and effective care. Had potential to reduce costs, reduce pressure on in-inpatient services (via admission avoidance and early discharge), and provide acceptable care according to patients and their families.

Abbreviations:

CP: clinical pharmacist

ED: emergency department

HiTH: Hospital-in-the-Home

HMR: home medicines review

MDT: multidisciplinary team

MH: mental health

MRP: medication-related problem

PIM: potentially inappropriate medication

2.2.5.2.3 Mental Health and Clinical Pharmacy (non-HiTH)

Table 2.5 summarises the 12 articles that were found to be related to clinical pharmacy services in the MH specialty, but not in the HiTH setting. An important recurring theme is that pharmacist interventions in this specialty improve medication safety, patient outcomes and reduce medication-related costs.[78–88] Of particular note, pharmacist-led medication safety initiatives were not limited to psychotropic medications, with the study by Richardson et al. showing that approximately 44% of MH pharmacists' interventions related to non-psychotropic medication issues.[81] This indicates MH pharmacists also significantly contributed to the medication safety of physical health medications.

Table 2.5 Articles found to be related to MH and CP (but not related to HiTH services)

Author, year	Study type	Participants	Intervention	Summary of findings
References from electronic databases				
Bingham et al., 2018[78]	Cohort (pilot)	Adult patients with MH diagnosis taking no less than 2 psychotropic medications (n=20)	One pharmacist conducted telephonic, medical, and MH risk assessment, and counselling. Aim: to improve nutrition, physical activity, and sleep status, both initially and at 2-week follow-up.	• Pharmacist-led, targeted, telephonic counselling improved short-term physical and mental health outcomes, e.g. improved Duke physical health scores, as well as anxiety, depression and anxiety-depression scores.
Cone et al., 2008[79]	Case-control	Veterans attending various ambulatory care clinics (n=69)	Ambulatory care via pharmacist-managed clinics. Various specialisations including	• Pharmacist-managed clinics provided cost saving compared to doctors.

			MH and clozapine management.	• Fifteen out of 17 MH clinics allowed their pharmacists to prescribe.
Gentry et al., 2018[80]	Cohort (conference abstract)	Veterans with complex diseases in rural areas (n: N/A)	CP-led home-based care via telehealth/video link for veterans with complex diseases, including mental illness.	• Key outcome measures were to be tracked on each disease state (i.e. glycosylated haemoglobin, blood pressure, and percent time in anticoagulation therapeutic range), types of clinical interventions and the number of patient encounters by the CPs.
Gisev et al., 2010[82]	Descriptive study	Community MH outpatients (n=48)	48 comprehensive medication reviews conducted by 5 pharmacists across 5 MH clinics were evaluated by an expert panel of a psychiatrist, general practitioner, MH pharmacist and medication review pharmacist	• Reviews found 209 MRPs and made 208 recommendations. • Consensus between the panellists indicated 37 reviews (77%) were deemed potentially to have a positive clinical impact.

Harms et al., 2017[83]	Cohort	Adult patient with depression, anxiety, PTSD or alcohol use disorder (n=50)	Medication management by a CP within a primary care MH integration team, treating physical and MH conditions.	• CP-led medication management was associated with improvement in several MH disorder rating scales.
Levine et al. 2021[84]	Retrospective analysis	Patients aged 65+ living at home, with dementia, depression or delirium (n=105)	Home visit and medication reconciliation by advanced nurse, medication review by CP (but no home visit)	• CP identified MRPs, especially those worsening cognition, and made recommendations to address them.
Lyon, et al., 2017[85]	Naturalistic evaluation	Child and adolescent community MH patients (n: N/A)	Primarily medication expenditure cost-saving initiatives and clinical tasks	• Pharmacist-led substantial cost-savings via reduction in medication expenditure.
Pauly et al., 2018[86]	Cohort	Homeless MH patients. Usually followed up by psychiatrist every 8 weeks (n=40)	Identification of medication administration errors, medication adjustment, adherence education, reduction in polypharmacy.	• Improved cost savings from CP clinical interventions, reduced waiting time to see the psychiatrist.
Richardson et al., 2014[81]	Mixed methods	Surveys and semi-structured interviews of MH CPs ($n_{surveys}$=47; $n_{interviews}$=16)	Number and type of MRPs were collected.	• 56.1% of CP interventions related to psychotropic medication issues. This indicates MH CPs

				also contribute the medication safety of physical health medications.
Rubio-Valera et al., 2014[87]	Narrative review	Various groups of MH patients (n: N/A)	CP-delivered MH services, e.g. participation in MDTs, medication reviews, improving medication adherence and antipsychotic polypharmacy.	• Although pharmacists have skills in improving medication management, medication adherence and medication reviews, many published studies have not used controlled designs.
Stuhec et al., 2019[88]	Cohort	Elderly patients with MH problems (n=24)	CP-led interventions in a nursing home.	• Decreased MRPs, potential drug-drug interactions, PIMs and polypharmacy. Improved quality of life.
References from grey literature				
Haste, 2015[89]	Business case	Patients attending a community MH clinic (n: N/A)	CP integration in MDT, assisting with optimising therapy (e.g. monitoring clozapine levels) and medication cost-saving.	• Improved patient experience, minimised costs, potentially reduced admissions.

Abbreviations:

CP: clinical pharmacist

ED: emergency department

HiTH: Hospital-in-the-Home

HMR: home medicines review

MDT: multidisciplinary team

MH: mental health

MRP: medication-related problem

PIM: potentially inappropriate medication

2.2.6 Discussion

This scoping review confirmed that there is a paucity of literature discussing the role of a CP in MH services that are specifically conducted at home, and more especially in MH-HiTH programs. The few studies that were identified provided preliminary evidence that CPs can contribute to the MH-HiTH MDTs[34,35,79,83] in improving patient care. Literature surrounding the roles of pharmacists in general home care services and in other non-dispensing roles are more developed. The benefits of combining the CP tasks from non-MH setting – as shown in Table 2.3 – that may translate to the MH-HiTH setting include the improvement in medication safety, medication adherence, patient medication information, patient satisfaction, patient outcomes, cost savings, polypharmacy, PIMs and MRPs. The benefits of medication reconciliation by pharmacists during transition of care are especially highlighted as important by other members of the MDT. The most important defining feature of the role appears to be the CP's home visit, where the patient directly benefits from the pharmacist's assistance with medication management; provision of oral and written medication information; encouragement of medication adherence and arrangement of any dosage administration aids, where appropriate.

2.2.6.1 The role of a CP in the MH-HiTH setting

One of the key findings of this review is that the MH-HiTH CP is an integral member of the MH-HiTH MDT, working closely with other members of the MDT to ensure the patient's medication safety throughout the MH-HiTH admission and during transitions of care (admission and discharge). While most of the references described this role in other HiTH settings, it is possible to extrapolate this finding to MH-HiTH programs, especially given the frequent references to CP integration in MH MDTs in general. Furthermore, the identified HiTH guidelines described that the MDT relies on their CP to communicate an accurate medication list with a medication management plan (e.g. planned duration, dosage adjustments, monitoring) to other clinicians post-discharge from HiTH, such as GPs and community pharmacists.[35,37] The opening of communication channels between pharmacists in all settings with the MDT is supported by a recommendation from The Royal Pharmaceutical Society in the United Kingdom.[90] It also reduces the potential of preventable medication errors during transition of care, especially as many lead to medication-related harm and hospital readmission.[15]

This review also found that an important role for the MH-HiTH CP is considering both the physical and mental health of a patient.[32,34,35,78,83] Of particular note, Richardson et al. found that approximately 44% of MH CPs' clinical interventions focused on optimising physical health-care needs of MH inpatients.[81] This role was also described by Rubio-Valera et al. in a review of new roles for pharmacists in community MH care.[87] MH MDTs were demonstrated to highly value CPs' prompting, monitoring and advising appropriate GP referrals for their patients' physical health issues.[81] Ensuring the physical health issues of MH patients are well treated and monitored is very important, given the complex interrelationships between physical and mental health. Moreover, patients with severe mental illness may neglect their own physical healthcare, particularly during an acute exacerbation of their mental illness. The need for better strategies to avoid physical healthcare neglect in patients with mental illness was highlighted by the Stokes Review, a 2012 review of the quality of healthcare provided to patients with mental illness in WA.[91] The role of CPs in prompting the treating team to screen for, or identify, treat and monitor these patients' physical health conditions provides further evidence of the value of the role to the overall care of patients with mental illness.

2.2.6.2 The benefits and limitations of the MH-HiTH CP tasks

Overall, the findings from this scoping review describe and clarify a comprehensive clinical service provided by MH-HiTH CPs that combines tasks within 4 key aspects of pharmacy practice, as illustrated in Fig. 2.2. These aspects are clinical pharmacy, mental healthcare, HMR and facilitation of care transition. When these tasks are combined within a specialist MH-HiTH program, preliminary evidence indicates this role is unique in providing a number of benefits to the patient and the MH-HiTH MDT. This preliminary literature shows potential for this relatively novel CP role to improve patient outcomes. This scoping review may, therefore, be useful to inform the implementation of future services, as well as to identify gaps in the literature where further evaluation may be warranted. For example, while HMRs seem to be highly valued as part of the MH-HiTH CP role, the time required for travel has been a significant barrier to being able to offer this service to all patients.[34] In light of identified limitations related to pharmacists' time, availability and workload, future studies should investigate innovative models of service delivery which can address these issues, including the potential role for pharmacy technicians working in MH-HiTH setting. In addition, future studies should describe the interactions of the CP with members of the MH-HiTH MDT in delivering the outcomes outlined in this review. Care provision in this setting may lack consistency between health service providers due to the absence of a defined optimal patient case load for an MH-HiTH CP. As this review identified such a paucity of literature, more research is needed to address these issues and confirm the findings in relation to patient outcomes.

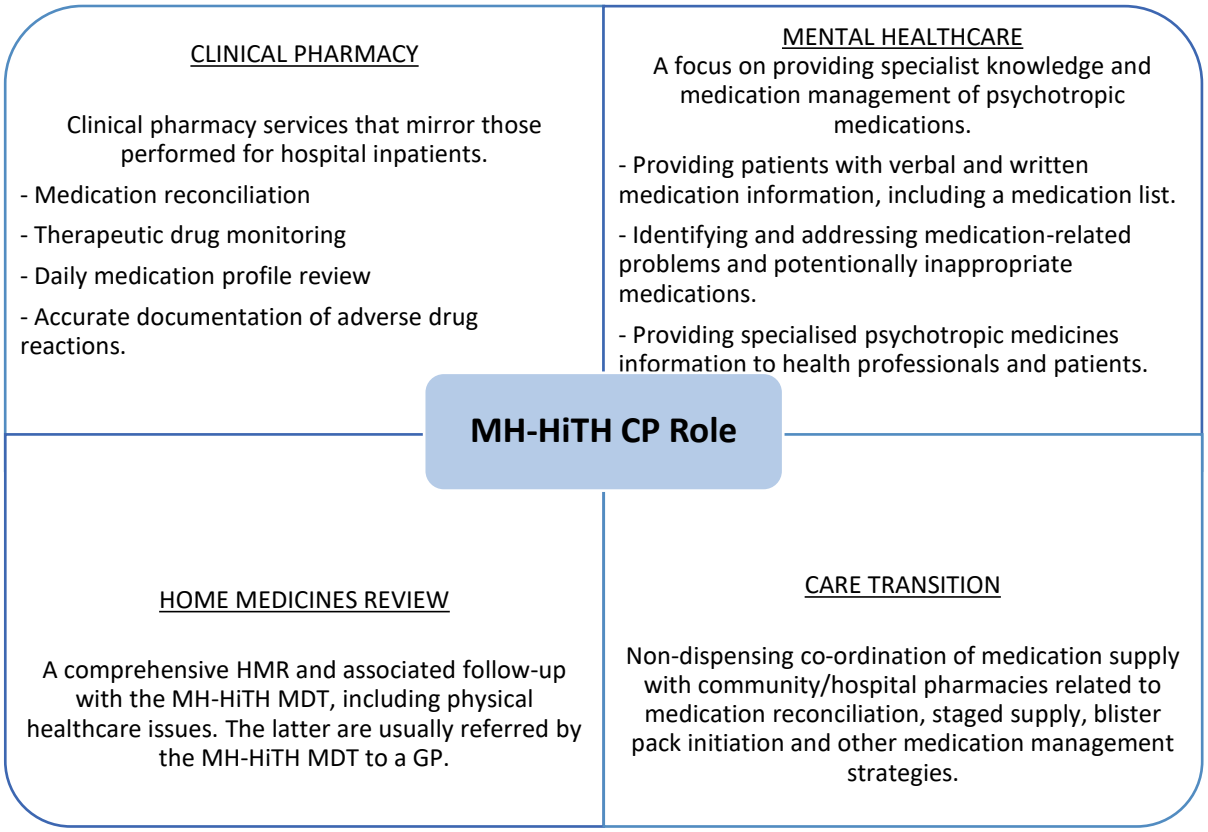

Figure 2.2 The aspects of pharmacy practice tasks combined in the role of a mental health Hospital-in-the-Home clinical pharmacist (MH-HiTH CP)

2.2.6.3 Strengths and limitations of this scoping review

To the best of our knowledge at the time of writing, this is the first scoping review to explore the role of the MH-HiTH CP. As such, it complements the recently published evidence regarding the benefits of pharmacist-led interventions for patients with mental illness in other health settings.[17] Various sources were used to gather relevant grey literature (such as official guidelines), adding to the literature obtained from electronic databases to permit synthesis of all available information on the topic. Furthermore, the tasks performed by MH-HiTH CPs described in references from electronic databases provide some evidence to support the MH-HiTH CP role integrated in the MH-HiTH treatment framework in official guidelines.[35,37] With increased recognition of the benefits of MH-HiTH and plans to utilise such programs further in the coming years,[92] this review provides a baseline that future literature can build upon.

Limitations of this review include the diverse nature of study designs and resulting data, unclear definitions of interventions performed and various methodological limitations in those studies. These differences precluded any robust analysis of the studies in this review. Additionally, this scoping review may have missed potentially relevant articles published in languages other than English. Some relevant studies may have been missed due to the inconsistency of terminology describing the HiTH service in different countries, although the use of a variety of related terms (as shown in Table 2.1) may have minimised this issue.

2.2.7 Conclusion

Although current evidence is scarce and diverse, preliminary studies show that incorporation of a comprehensive CP service into an MDT MH-HiTH program improves medication management, detects and addresses MRPs, and may contribute to reduced medication-related hospitalisations, shorter LoS and minimisation of readmissions. The MH-HiTH CP adds value to the MDT by performing a range of tasks to support the delivery of safe and effective pharmacotherapy, including medication reviews, TDM, medication information support to MDT members, and home visits where patients are provided pharmacoeducation and medication adherence strategies. Studies from similar home-based practice settings support the CPs' ability to improve patient outcomes; however, in some MH-HiTH settings, the contribution of CPs was limited by inadequate time allocations, heavy caseloads and insufficient personnel. Further research in the MH-HiTH CP model is required to optimise the efficiency of service delivery, and allow comprehensive evaluation of clinical outcomes.

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2.2.9 Ethical approval

Not applicable.

2.2.10 Declaration of competing interest

The first author (M. Farag) is employed as a clinical pharmacist in the North Metropolitan Health Service – Mental Health, Public Health and Dental Services (NMHS-MHPHDS) Adult Hospital-in-the-Home program. All the other authors have no known competing interests.

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Chapter 3: Establishment and evolution of a clinical pharmacy mental health hospital-in-the-home service: An autoethnography

FARAG Mechaiel[1,2], HOTI Kreshnik[3], HUGHES Jeff[1], CHALMERS Leanne[1]

Affiliations:

[1] Curtin Medical School, Faculty of Health Sciences, Curtin University, Kent Street, Bentley, Western Australia, 6102, Australia

[2] North Metropolitan Health Service – Mental Health Pharmacy, Graylands Hospital, Brockway Road, Mount Claremont, Western Australia, 6010, Australia

[3] Faculty of Medicine, Division of Pharmacy, University of Prishtina, Pristina, Republic of Kosovo

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The publisher's statement permitting use of the published article is in Appendix 3.8.

Attribution Statement for Thesis Chapter 3

	Conception and Design	Acquisition of Data and Method	Data Conditioning and Manipulation	Analysis and Statistical Method	Interpretation and Discussion
Co-Author 1 (Kreshnik Hoti)	✓	✓	✓	✓	✓
Co-Author 1 Acknowledgment: I acknowledge that these represent my contribution to the above research output and I have approved the final version. Signed:					
Co-Author 2 (Jeff Hughes)	✓	✓	✓	✓	✓
Co-Author 2 Acknowledgment: I acknowledge that these represent my contribution to the above research output and I have approved the final version. Signed:					
Co-Author 3 (Leanne Chalmers)	✓	✓	✓	✓	✓
Co-Author 3 Acknowledgment: I acknowledge that these represent my contribution to the above research output and I have approved the final version. Signed:					

3.1 Introduction to the manuscript

The aim of the autoethnography was to produce a narrative of how the MH-HiTH service has matured into the service that currently exists. As discussed previously, the literature review presented in Chapter 2 did not identify any similar published work to inform practitioners looking to implement an MH-HiTH CP service. This autoethnographic study provides a factual description of events involved in the development of the service and the circumstances surrounding the development process. The autoethnography provides the context in which the decisions that resulted in the evolution of the service were made. The study defines and specifies the role of the CP in the first MH-HiTH MDT service in WA, as background for the study presented in Chapter 4 that investigated the medication safety focus of the role.

The MH-HiTH Pharmacy Department model of service that was used at the time of establishment of the first MDT MH-HiTH service in WA is in Appendix 3.1. As the service was reviewed, the most recent model of service (at the time of writing) is in Appendix 3.2. The Medication Management Plan (MMP) that was used for medication reconciliation at the time of service establishment is in Appendix 3.3 (paper version) and Appendix 3.4 (electronic version). The time allocated to the MH-HiTH CP for various tasks is presented in Appendix 3.5. A table showing the evolution of these tasks is in Appendix 3.6. Finally, a step-by-step list of MH-HiTH CP daily tasks is in Appendix 3.7.

3.2 Publication

3.2.1 Abstract

Background

Hospital-in-the-Home (HiTH) services provide “inpatient-style” care for patients at home. While relatively well known in non-psychiatric settings, little is known about mental health (MH)-HiTH services, with even less known about the role of a clinical pharmacist (CP) within an MH-HiTH multidisciplinary team (MDT).

Objective

The aim of this paper is to describe the evolution of the first MH-HiTH MDT in Western Australia and the various facets of the CP’s role integrated within the service.

Methods

The integration of a CP into a non-traditional practice setting represents a cultural change in the pharmacy profession. Hence, this paper utilised a descriptive-realistic style of the autoethnographic method, with the narrative written in the first-person point of view of the first author (M.F.). It specifically focused on the tasks performed by the team's CP. A narrative analysis approach was used to reflect on the reason these tasks are performed, the potential benefits and limitations of integrating a CP into the team and subsequent cultural influence on the pharmacy profession.

Findings

The service commenced in 2014, consisting of an MDT of a consultant psychiatrist, a psychiatric registrar, clinical nurses, an occupational therapist, a social worker and a CP. Starting with 4 then 8 "virtual beds", it was gradually increased to 16 virtual beds. The MH-HiTH CP combined hospital clinical tasks – e.g. medication reconciliation and therapeutic drug monitoring – with home medication reviews as part of the MH-HiTH MDT. Lessons learnt include proactively integrating and flexibly adapting into a novel practice setting.

Conclusion

There is scope to embed a CP within an MH-HiTH MDT; the major advantage is the inclusion of a comprehensive medication management service. While this is a promising new area where the pharmacy profession is becoming engaged, more studies are needed to quantify and confirm the stated benefits of such service.

3.2.2 Keywords

Clinical pharmacist, Hospital-in-the-Home, mental health, autoethnography, service evolution, HiTH

3.2.3 Introduction

This paper is written in the first-person point of view of the first author (M.F.).

Hospital-in-the-Home (HiTH) services provide healthcare to patients by hospital staff, as if the patient were physically in the hospital, yet the patient is physically in their own home.[1] HiTH services are utilised across a variety of medical specialties, most commonly infectious diseases (ID), some cardiac and some respiratory conditions.[1,2] While HiTH services were initially nurse-led, they evolved to integrate medical and nursing staff, with allied health staff – such as social workers (SWs), occupational therapists (OTs) and pharmacists – later being incorporated to form multidisciplinary teams (MDTs).[1] In many HiTH services, particularly for ID HiTH services, the pharmacist's role had been limited mainly to medication provision via aseptic dispensing.[3] This has evolved to more ID HiTH programs having clinical input from an Antimicrobial Stewardship Pharmacist during HiTH team meetings.[3] The benefits have been improved medication management and medication safety in the HiTH services that incorporate a pharmacist within their MDT.[3]

In parallel with increased clinical involvement of pharmacists in other HiTH services, Mental Health HiTH (MH-HiTH) started to evolve, with comprehensive clinical pharmacy services being integrated with the MH-HiTH MDT from its inception in Western Australia (WA).[4,5] MH-HiTH is an emulation of an inpatient hospital admission, with treatment by hospital staff but in a "virtual bed", i.e. the patient's home, instead of a physical hospital bed (see Fig. 3.1). Accordingly, a comprehensive clinical pharmacy service incorporates tasks performed by inpatient hospital clinical pharmacists (CPs)[6]: medication reconciliation on admission and discharge, daily follow-up with the MH-HiTH MDT based at the hospital concerning medication optimisation and therapeutic drug monitoring (TDM)[7]; together with the clinical tasks performed by accredited pharmacists[8]: home medication review and co-ordination of medication supply in the community. In the absence of a wealth of literature regarding MH-HiTHs, and more particularly CP services within MH-HiTHs, there is value in describing the evolution of such services and the adaptation of existing CP roles to meet the needs of this vulnerable patient group, such that my experience may inform others involved in the establishment of similar services.

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In the absence of a wealth of literature regarding MH-HiTHs, and more particularly CP services within MH-HiTHs, there is value in describing the evolution of such services and the adaptation of existing CP roles to meet the needs of this vulnerable patient group, such that my experience may inform others involved in the establishment of similar services.

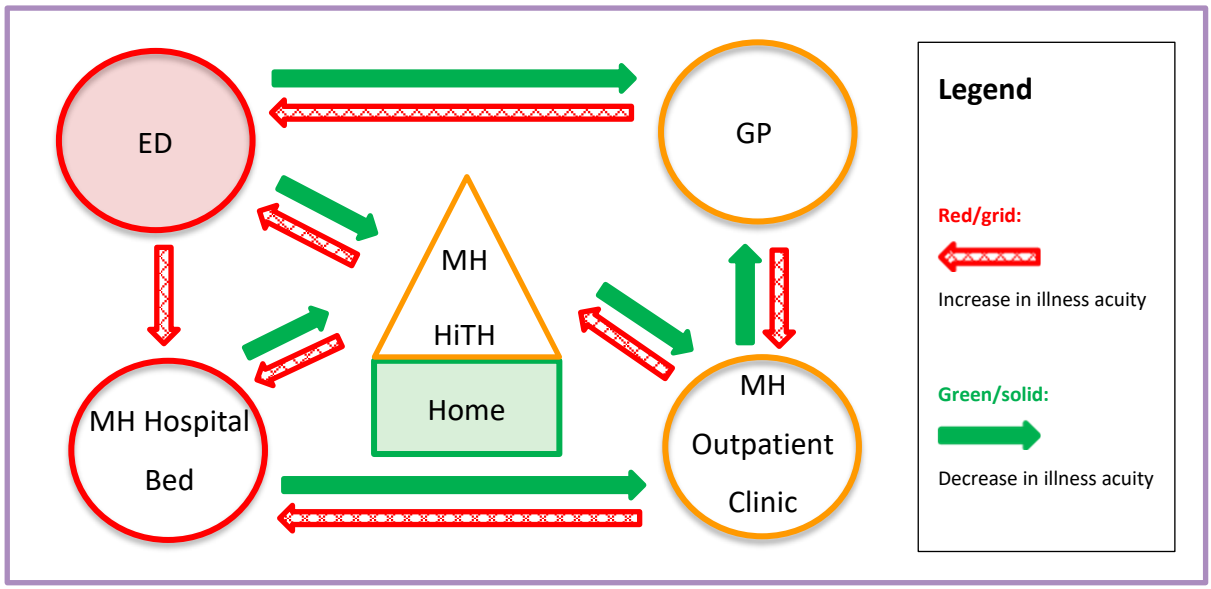

Figure 3.1 A representation of the transitions of care relating to MH-HiTH services showing patient entry and exit pathways

ED: emergency department, GP: general practitioner, MH: mental health, HiTH: Hospital-in-the-Home.

3.2.3 Objective

The aim of this paper is to describe the evolution of the MH-HiTH service in WA and the significance of the CP's role therein. This includes discussion of the rationale behind several key decisions and how these decisions were implemented to refine the MH-HiTH CP's role and procedures as the MH-HiTH program itself was evolving.

3.2.4 Methods

Ethics approval was obtained from the North Metropolitan Area Mental Health Services Human Research Ethics Committee (EC00273) and Curtin University (HRE2017-0498).

This study used a descriptive-realistic[9] autoethnographic approach. Autoethnography is a qualitative research methodology where the researcher narrates their own experience and discusses how this narrative relates to the wider understanding and culture.[9,10] In this case, the culture in question is the pharmacy profession. My integration into the MH-HiTH program represented a cultural change with the movement of a pharmacist into a non-traditional practice setting. Guidance in performing this narrative evaluation was sought from published instructional papers[9–16] and notable examples,[17,18] while focusing on relevance to contemporary pharmacy practice.[19,20]

My narrative position is unique in that I was the first CP to be integrated into the first MDT MH-HiTH program in WA, which was inaugurated in a WA hospital in 2014. Having been involved with the program since its inception and by participating in preparatory planning meetings with hospital administrators, executives and other hospital department heads, I gained an insight into the clinical, political and fiscal contexts within which this program was commenced. Although much planning and collaboration with various hospital disciplines were invested into the MH-HiTH program's creation, the literature provided limited direction to describe the role of a pharmacist in such a unique position. While frustrating, this situation inspired me to use the autoethnography method: to provide an account of the events leading up to the maturation of the MH-HiTH program.

I was initially concerned that such a subjective description could stray from the scientific method. Research rigour was ensured[21] by making every effort to include a reference from the literature to support or further explain the matter. Furthermore, data that had been collected by the North Metropolitan Health Service – Mental Health (NMHS-MH) Pharmacy Department at the time of the MH-HiTH program inception[22–24] and subsequent review[5] were utilised in this autoethnography to maintain accuracy of the narrative I described from my perspective as a researcher and member of the MH-HiTH team. Additionally, this paper was reviewed and edited by all authors, as well as several colleagues. Correspondingly, this paper utilised the descriptive-realistic autoethnographic writing style,[9] allowing description of people, places and events as accurately as possible. Concurrently, the use of narrative analysis,[9,11,21] which

intersperses the narrative, which provides meaning to events,[25] was used to share with the reader an interpretation of how the events may lead to cultural changes in the pharmacy profession. While widely used in other research disciplines, this approach has recently been advocated as a new form of qualitative research in medical education[9] and reflective practice,[26] as well as pharmacy education and practice.[19]

This autoethnography commences by narrating the development of the first MDT MH-HiTH program in WA. This is followed by a description of the establishment of the clinical pharmacy service to this program, especially the opportunities afforded by the adoption of an electronic medical record. The account concludes by describing the ongoing evaluation of the service and its evolution to the present day, and reflecting on the implications for practice.

3.2.5 Findings

3.2.5.1 Establishment of MH-HiTH programs in WA

This is where the WA MH-HiTH history starts.

Prior to 2013, there were commendable, individual efforts to pilot a nurse-led MH home-visiting service, yet they did not have access to an MDT, sufficient financial nor human resources to formalise it as a HiTH service. In 2013, planning began to establish a formally funded MH-HiTH MDT service in WA. Its main aim was admission avoidance, but it also accepted referrals to facilitate early discharge of inpatients, with flow-on effects to reduce bed pressure at MH inpatient units and bed block in emergency departments.

Accordingly, the earliest form of MH-HiTH MDT in WA commenced on Monday 7th April 2014.[5] With experienced MH clinicians forming the MDT, it was in a well-suited position to establish an MH-HiTH service, gaining formal recognition as the first MH-HiTH MDT providing admitted care in WA.[5] The service commenced with a small number of beds, which progressively increased until it reached 16 “virtual beds”. It was staffed by an MDT consisting of a consultant psychiatrist, a psychiatric registrar, clinical MH nurses, an occupational therapist (OT), a social worker (SW) and a CP. Fig. 3.2 presents a simplified timeline of the evolution of this MH-HiTH program.

3.2.5.1.1 Developing clinical pharmacy services in MH-HiTH

From late 2013 until its opening day on 7th April 2014, I attended the regular preparatory meetings that shaped the way the MH-HiTH service would operate. In consultation with the Chief Pharmacist, NMHS-MH Pharmacy, I was involved in outlining the clinical, dispensing and administrative services that were to be provided by the MH-HiTH CP.[5] This consultation process ensured compliance with legislative requirements as well as the local hospital's policies – all in a pragmatic way.

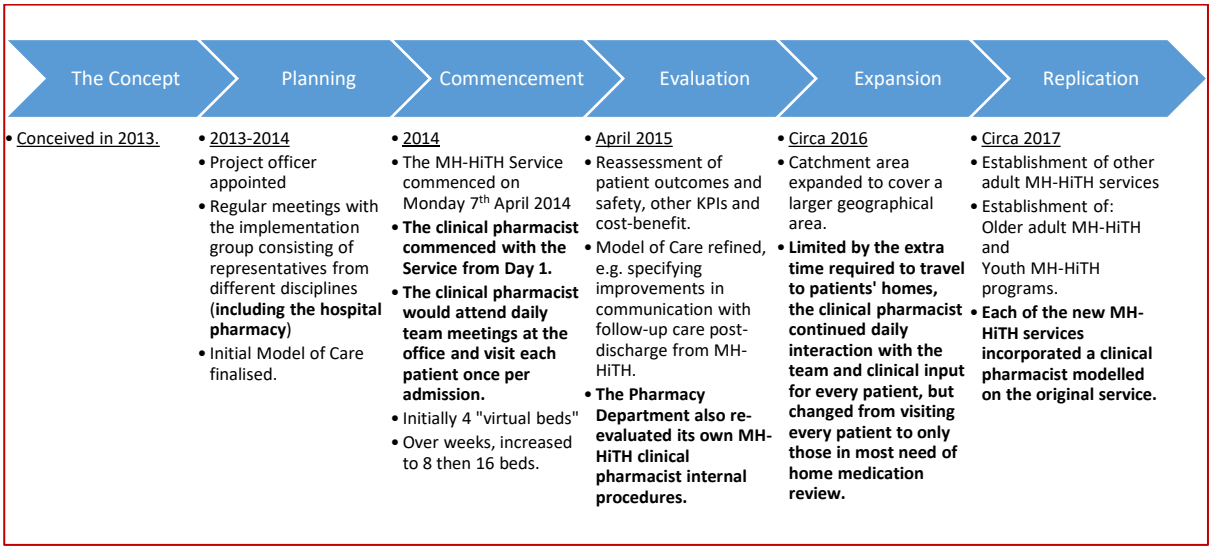

Figure 3.2 A timeline of the evolution of MH-HiTH Services in WA. Matters related to the pharmacy service are in bold type

KPI: key performance indicator, MH: mental health, HiTH: Hospital-in-the-Home.

3.2.5.2 The challenge of defining the role of an MH-HiTH CP

Feeling an honour and privilege I will always value for being the inaugural CP within such a novel area of pharmacy practice, I felt a responsibility to perform the duties of this position to the best possible quality. It was certainly well known that there is high risk of medication errors at the point of patient transfer from 1 service to another,[27] such as the time of admission to MH-HiTH and discharge from MH-HiTH. This prompted me to ensure medication reconciliation at those 2 times was bolstered in the MH-HiTH CP's role. I also referred to the activities

stipulated in the Pharmaceutical Review Policy.[28] These include monitoring patient medication therapy, TDM and the steps required in conducting a medication review in the patient's home. My only dilemma was that I could not find, at the time, any literature directly describing the role of an MH-HiTH CP.

The culture of the pharmacy profession is traditionally very conservative and risk averse.[29] To practise in a new environment I felt I needed guidance from the literature. Yet, despite my own literature search, plus that of other pharmacists and the hospital librarian, no relevant information was found. This experience taught me that I needed to adapt to a new environment – a personal learning experience for me and perhaps a change in perspective for the pharmacy profession.

3.2.5.2.1 Constructing the framework

As I could not find any guidance specifically relating to the role of the MH-HiTH CP role, I consulted references relating to similar pharmacy services. For example, the Australian Association of Consultant Pharmacy (AACP) accreditation process[30] trains a pharmacist to look at a snapshot of the patient's medication therapy then optimise it. Adopting a similar approach, I assessed the patient's medication therapy on admission to MH-HiTH, then followed up the patient's progress daily throughout the MH-HiTH admission, closely monitoring any medication-related events and promptly addressing any issues with the MH-HiTH MDT.

As described previously, the MH-HiTH CP role could be considered a combination of inpatient CP tasks performed at the MH-HiTH office, together with a medication management review conducted at the patient's home. Such an overlap in CP roles, as outlined in Table 3.1, was useful to consider while defining then developing the MH-HiTH CP role. The paucity of literature to support MH-HiTH CP tasks is somewhat compensated by considering the literature supporting similar tasks performed by these other CP models. For example, there is evidence that inpatient CP interventions improve medication safety and contribute to improved patient care.[6] This is well complemented by an overview of systematic reviews by Jokanovic et al. finding that pharmacist-led home medication reviews contribute to an MDT's improvement in patient care.[31]

Yet, the lack of literature regarding the value specifically of a CP within an MH-HiTH MDT was frustrating. This provided enough impetus to motivate me to start my own formal research. I

felt it was best done under the guidance of more experienced researchers through undertaking a Doctor of Philosophy (PhD) degree that includes hospital and university ethics and governance approvals. This allowed me to feel the research would be more reliable as it went through a much more rigorous review process.

Accordingly, I utilised the framework instituted by the Chief Pharmacist[18] as a baseline level of service, then added to it other services as outlined below. When the new MH-HiTH program was established, the opportunity was taken to include a comprehensive clinical pharmacy service. It consisted of medication reconciliation on admission and discharge, daily medication profile review, regular attendance of the MDT meeting, co-ordination of medication supply with the hospital or community pharmacy, patient counselling and home medication review.[5,8] All but the last task mirror the services provided to inpatients in the same hospital. The home medication review is an initiative in the MH-HiTH setting where the MH-HiTH CP conducts a home medication review during a home visit once during the patient's admission to MH-HiTH. One advantage is that medication reconciliation can be done more accurately when a pharmacist visits the patient.[32] Another important feature of the home medication review in this setting is that the CP can discuss any medication-related problems (MRPs) with the MH-HiTH MDT and continue to follow them up during the MH-HiTH admission.

I was, however, concerned that there were no official benchmarks for the standards and key performance indicators (KPIs) that appropriately applied to the MH-HiTH CP type of service. For example, Society of Hospital Pharmacists of Australia (SHPA) Standards provide an allocation of the number of beds per 1.0 full-time equivalent pharmacist, depending on the level of acuity, complexity and setting.[33] Unfortunately, the SHPA Standards of Practice for MH Pharmacy[34] (at the time) did not contain any guidance for MH-HiTH service delivery, prompting me to gather data to evaluate this.

The lesson I learned here is to be part of the solution by trying to gather data with the view to contribute to the literature that could support a new practice setting for pharmacists. So, I started to collect data related to the types of clinical and other activities I undertook during the first 20 weeks of operation of MH-HiTH. This information was collected for the records of the NMHS-MH Pharmacy Department and its self-evaluation purposes.

I arranged the data by the number of occasions each activity was done each day. The activities were: daily medication profile review (42% of all MH-HiTH CP activities per day), provision of

information/staff education (11%), documentation (7%), meeting attendance and participation (6%), medication reconciliation (6%), case note review (6%), Best Practice Prescribing Software® (BPS) administration/support (5%), co-ordination of medication supply (5%), TDM (4%), home visit/ telephone patient counselling (3%), entry of the medication list in discharge summaries (3%), interventions (2%) and medication profile clarifications (<1%).

I felt these data demonstrated the time burden of administrative meeting attendance. This created a challenge for me in balancing contribution to the new service set-up with continuing provision of a quality clinical pharmacy service. This experience, however, was a lesson for me in learning to adapt to a new environment where my learning would be fairly independent.

The diversity of tasks performed by myself as the MH-HiTH CP is therefore apparent. In consultation with the Chief Pharmacist, I presented this information to the NMHS-MH Pharmacy Department to gain their feedback on the type, amount and location of tasks performed. The feedback was valuable in that it provided good ideas that helped improve my efficiency. Then, together with the Chief Pharmacist, this information was presented at a national SHPA conference.[22]

3.2.5.2.2 Time allocation

Each task had its own time requirements. For example, each patient's medication profile was reviewed daily; whereas, home visits were usually done on 1 day of the week. This inspired the next self-evaluation exercise where I undertook a time and motion study daily for 1 week to quantify the amount of time spent on MH-HiTH CP activities. This was an informal study with broad categories. It had potential inaccuracy due to self-recording bias, although Negaard et al. suggested that self-recording could actually be more precise than an observer as pharmacists often multi-task and only the individual pharmacist knows the time spent on thoughts and mental processes.[35] This study was still useful to gauge the relative time allocation, reveal any inefficiencies and potentially consider the activities with best value to patient care relative to time spent on them.

I found that of the time I was given to allocate to MH-HiTH: 22% of that time was spent on clinical activities, 19% on home medication reviews, 33% on co-ordination of medication supply and 26% on implementing BPS, which is described in more detail below. After implementation was complete, I continued to provide ongoing BPS training and support to the team. I felt this

taught me that helping to define the CP role needed to start with an informal study. With some baseline knowledge, a formal time and motion or cost-benefit study could be performed at a later time. Therefore, in order to define the MH-HiTH CP role, given that I could not find any guiding literature, I adopted the proactive attitude of learning how to gather such evidence.

Table 3.1 Overlap of MH-HiTH CP roles with other CP roles

Task/Setting	**MH-HiTH CP**	**AACP Accredited Pharmacist (for HMRs/RMMRs[8])**	**Hospital Inpatient CP**
Medication reconciliation	Yes, on admission and on discharge from MH-HiTH	Yes, during the medication review process	Yes, on admission and discharge
Medication review in the home setting	Yes, this completes the medication reconciliation. Any issues identified are relayed to the MH-HiTH team and followed up.	Yes	No
Regular medication profile review	Yes, usually daily	Not usually	Yes, usually daily
Provision of verbal and written medication information	Yes	Yes	Yes

Task/Setting	MH-HiTH CP	AACP Accredited Pharmacist (for HMRs/RMMRs[8])	Hospital Inpatient CP
Interaction with the multidisciplinary treating team.	Yes	Usually just the referring doctor (for HMRs). Possible interaction with other health professionals (for RMMRs).	Yes
Therapeutic Drug Monitoring (TDM)	Yes	Yes. In the past, the accredited pharmacist only saw the patient once, so they could not follow up on any recommended TDM. More recently, it has become possible through the 7th Community Pharmacy Agreement negotiating provision for accredited pharmacists to conduct up to 2 follow-up medication reviews after the initial HMR/RMMR.	Yes
Co-ordination of medication supply (usually by liaising with the dispensing pharmacist, e.g. for commencing blister-packing).	Yes	Yes	Yes

Task/Setting	MH-HiTH CP	AACP Accredited Pharmacist (for HMRs/RMMRs[8])	Hospital Inpatient CP
Post-discharge follow-up if necessary (e.g. gradual dose adjustments)	Yes, if a medication-related issue is not resolved during the MH-HiTH admission, the CP writes suggested management strategies in the discharge summary. If necessary, and in consultation with MH-HiTH doctors, the CP may also directly communicate with the doctor who will take over patient care post-discharge from MH-HiTH.	Possibly, but often the accredited pharmacist does not have access to the medical records to find out the necessary information. Although the 7th Community Pharmacy Agreement recently negotiated a provision for accredited pharmacists to conduct up to 2 follow-up medication reviews after the initial HMR/RMMR.	No

AACP: Australian Association of Consultant Pharmacy, CP: clinical pharmacist, HiTH: Hospital-in-the-Home, HMR: home medicines review, MH: mental health, RMMR: residential medication management review (a government-funded medication review in residential care facilities, e.g. nursing homes).

3.2.5.3 Completely electronic medical record

When it was decided this new MH-HiTH service would be completely paperless, the next decision was to choose the software to use. I was able to use my previous experience in rolling out BPS to 5 NMHS-MH community (outpatient) clinics to demonstrate to the executive implementation group how BPS could be used for completely paperless MH-HiTH patient records. Because all the NMHS-MH adult community (outpatient) clinics were using BPS as their prescribing software, the group agreed that it was appropriate to also use it in MH-HiTH. This had several benefits:

- If the referrer was from an NMHS-MH clinic, they could see – in real time – the progress of their patients via the notes section and any medication changes via the medication section of BPS; and
- Psychiatric registrars rotate between health services every 6 months. If they had previously used this software at a clinic, it would make it easier for them to adopt its use in MH-HiTH, and vice versa.

Hence, the BPS system was used as prescribing software for medical staff, with a notes entry section for non-medical staff. It was also decided by the MH-HiTH program implementation committee that, based on my familiarity with the software, I would be the software administrator for BPS for MH-HiTH.

It was also considered that I would be the best placed person (in terms of knowledge and convenience) to train the MH-HiTH staff and provide ongoing software support – all in addition to my CP duties. The skills I had were unique in that they were a combination of computer software/hardware and clinical pharmacy knowledge and experience – all relating to the specific use of BPS within the MH-HiTH setting. MH-HiTH staff found I was easily accessible at any time (in person, by mobile phone or email) and more understanding of their software queries than a generic IT officer – particularly when the query related to a clinical issue. This notion extended to all disciplines of staff: medical, nursing, OT, SW and (later) other MH-HiTH pharmacists.

3.2.5.3.1 How BPS software was used

BPS is made by a proprietary company and it was designed to be used by GPs so it is quick and intuitively user-friendly. All relevant patient information can be entered into the software:

demographics, medical history, current medications and visit notes (patient clinical notes) by the user. All staff had access to writing notes and read-only access to the rest of the profile. In addition to writing notes, doctors had access to the prescribing function and could print computer-generated prescriptions, pathology request forms, medical certificates and other relevant documents using pre-set templates.

As a patient is admitted to the MH-HiTH service, I perform medication reconciliation using BPS. If a patient is already in the BPS database, I (in consultation with the medical staff) update the medication profile. This involves deleting previously ceased medications and adding any missing medications to the profile. The doctors are very pleased with this situation because they do not need to write a new medication chart (as it is superseded by an electronic medication profile) and they do not feel the pharmacist is encroaching on their professional territory as I am not prescribing – simply updating the medication profile in the same fashion I would annotate a prescription or paper medication chart after consulting the prescriber.

Medication reconciliation was initially documented in the Medication Management Plan (MMP), as per usual practice for all hospital in-patients in WA. This was then scanned and uploaded to BPS. Within about 6 months of the inception of the MH-HiTH program, an electronic form (eMMP) was developed by the NMHS-MH Pharmacy Drug Information and Research Senior Pharmacist. I was the first CP to be asked to trial the pilot version of the eMMP by completing and uploading it to BPS. The eMMP was fully integrated with the hospital Clinical Pharmacy Management Software, saving time in avoiding duplication of data entry in the MMP and the clinical software, and making it easier to "Print to PDF" so it could easily be uploaded to BPS.

The concept of having a complete electronic health record was very topical at the time, occurring before the implementation of My Health Record, the electronic medical record now rolled out across all Australian health settings. It attracted much attention due to its innovative nature, leading to its acceptance for scientific poster presentation at the 2014 SHPA annual federal conference.[23]

That was a very productive year for NMHS-MH Pharmacy in that we presented several conference papers at 2 conferences. In addition to the aforementioned, at the same conference, the Chief Pharmacist and I co-presented an oral presentation describing the establishment of the CP service to an MH-HiTH program.[22] Because of the interest in the

eMMP, another related abstract was accepted and presented as an oral presentation at the HiTH Society of Australasia 2014 annual conference.[36]

3.2.5.3.2 The benefits found from transitioning to electronic medical records

As it is a requirement by the Pharmaceutical Review Policy[28] that each admitted patient must have a complete and current medication profile, the electronic system was much easier to use, compared to the paper medication chart-based system. Each time the prescriber made a change to a medication and printed a prescription, BPS would automatically log the medication profile update with a date and time stamp. However, if the doctor did not print a prescription, they often forgot to change the electronic medication profile after giving the patient a verbal instruction to change the dose, for example. In such cases, as the MH-HiTH CP, I would remind the doctor to update the medication profile so it remained accurate.

Another advantage is that the medication reconciliation was done promptly and accurately by the pharmacist and contemporaneously updated in the electronic medical record (BPS), thus avoiding the lag time where paper medication chart would wait until the doctor next saw it to update it.

BPS is used both by the MH-HiTH and all adult community (outpatient) MH clinics throughout the whole of NMHS. All patient information is recorded on 1 database, so the community clinic doctors are able to see in real time the notes and medication entered for each of their patients who were referred to MH-HiTH. This was especially important so that if there was ever a delay in the completion of the HiTH discharge summary, the clinic doctor already has access to their patient's electronic MH records on BPS.

3.2.5.3.3 From IT support to prescribing collaboration

From the time of MH-HiTH inception, I as the MH-HiTH CP, had an additional level of access in being able to add/edit/delete medications from each patient's profile to ensure that the reconciled medication list was accurately recorded in BPS. The medical staff would be subsequently asked to review the list and make any necessary adjustment.

At the time, this process seems controversial as some pharmacists thought it may have had elements of prescribing. But the MH-HiTH CP would never print a prescription, i.e. never prescribe. Instead, the CP could annotate or adjust the medication list after consultation with a doctor – in the same way a hospital inpatient CP would do with a paper medication chart. In later years, this concern was allayed, with non-dispensing pharmacists at General Practice (GP) Clinics doing this exact same task in their respective GP clinics, as supported by the Pharmaceutical Society of Australia (PSA) Guidelines.[37] Additionally, I provided a de-facto information technology (IT) support role in supporting HiTH staff to use BPS. This extended from advising on ordering a suitable printer and suitable prescription paper, to training all levels of staff on how to use the software. It followed that I could also assist with trouble-shooting minor software and hardware issues related to BPS. I was pleased with the BPS support role because it often meant the doctor would request that I be present while the doctor wrote any prescription so I could assist from a software perspective. This also afforded me the opportunity to discuss with the doctor other aspects of the prescription before/during its writing. The discussion, for example, could relate to the medication's place in therapy, formulary status, Pharmaceutical Benefits Scheme (PBS) status, cost, any dose adjustment, quantity prescribed, any staged supply requirements and any drug interactions.

This was a significant step forward for a pharmacist to be proactively involved in this aspect of medication management, especially being physically present to co-operate with the doctor at the time of prescribing. This is in contrast to the some of the non-HiTH settings where a pharmacist receives a prescription or reviews a medication chart, and if there is need, telephones the prescribing doctor to discuss any issues therein – a retrospective approach. I felt this unique MH-HiTH process saves the doctor time by avoiding interruption from an enquiring dispensing pharmacist, and saves the dispensing pharmacist time from enquiring about the prescription when they receive it in their dispensary. The doctors gave feedback that they were happy with this arrangement, as did the patient benefit from shortened waiting times due to

streamlining of the process. This was confirmed using an anonymous survey of the doctors involved in the MH-HiTH service.[22]

On a global level, i.e. relating to the pharmacy profession at large, I felt that such an improved collaboration between doctors and pharmacists would raise the profile of the pharmacy profession. With a humble start in 1 program within 1 hospital, this collaboration could cause an institutional cultural shift toward a synergistic doctor-pharmacist medication safety alliance. This was done with the hopeful plan that future MH-HiTH programs could replicate such synergism – first, by changing the pharmacy profession's culture of mainly contacting doctors to rectify prescribing errors, into the attitude of proactive discussions with doctors; and second, by changing some doctors' perception that pharmacists only speak to them about prescribing problems.

3.2.5.4 The importance of appreciating practice change

The Pharmacy profession demonstrated its embrace of technology by utilising computers in community pharmacies since 1970s and 1980s.[38,39] In a similar trailblazing manner, this hospital's CPs have been performing discharge medication reconciliation by filling in the medication section of the electronic discharge summary program. This commenced after a NMHS-MH Pharmacy audit revealed that there were significantly less medication discrepancies in the pharmacist arm versus the doctor arm of the audit. This process was endorsed by the policy committees and approved by the executives. It has become established procedure at the hospital since approximately 2011.[40] These examples are important as they demonstrate that the pharmacy profession can implement practice changes that lead to major efficiency gains (in the case of computers)[41] and significant improvements in medication safety (by having more accurate discharge summary medication lists).

In a similar way, I applied this concept to medication reconciliation on admission of patients to MH-HiTH using BPS and the (then newly-developed) eMMP – another initiative produced to suit the MH-HiTH paperless strategy. This streamlined medication reconciliation on discharge in that the medication profile was automatically kept up-to-date during the admission, so there was minimal medication or dose uncertainty at discharge (when compared with the old paper-based discharge summary medication lists).

3.2.5.5 Service evaluation and evolution

In April 2015, the NMHS-MH organisation performed an MH-HiTH service evaluation, including reassessment of patient outcomes and safety, other KPIs and cost-benefit analysis. The Model of Care (MOC) was refined, e.g. specifying strategies to improve communication with follow-up care post-discharge from MH-HiTH.

Concurrently, NMHS-MH Pharmacy found it timely to review our own MH-HiTH CP role. At that time (and at later evaluations), I started to use the references in Table 3.2 as they were published in order to further review and refine the CP role. This process added to my own learning that any service, process or procedure needs periodic review as more information becomes available and the environment itself (MH-HiTH in this case) evolves with time. It appeared to me that the cultural changes in the pharmacy profession would eventually correspondingly evolve.

Table 3.2 Sources consulted and respective aspects considered relevant to include in the MH-HiTH CP role

Source Consulted	Description of Task(s)	Relevance to Establishing MH-HiTH CP Role
Maroney, 2015[42]	This is a conference poster abstract that describes the positive impact of a psychiatric pharmacist providing a clinical pharmacy service to patients before they are discharged from an inpatient unit to an Integrated Health Home, who is available to do home visits to organise current medications and remove extraneous ones.	This reference describes a similar MH-HiTH CP role within a similar MH-HiTH service in New Jersey, USA. Unfortunately, being a conference abstract, it provided limited detail.
Batagol, 2020[43]	Description of the history and evolution of hospital pharmacy in Australia in the 21st century.	This article mirrors the presented description of the MH-HiTH Clinical Pharmacy service history & evolution.
SHPA 2016 Clinical Pharmacy Standards[44]	Describes the main clinical pharmacy activities in detail.	An authoritative source; relevant to CPs and may be adapted/applied in most settings.
PSA Guidelines for comprehensive medication management reviews[45]	Step-by-step recommendations for the medication review process and related tasks, including an MMP and a pharmacist follow-up review, if required.	Many relevant processes are described in his document, including medication reconciliation, identifying and addressing MRPs, consideration to deprescribing, MMP, communication with the prescriber and follow-up.

Australian Association of Consultant Pharmacy (AACP) accreditation process[30]	Describes the training required to be an accredited home medicines review (HMR) or residential medication management review (RMMR) pharmacist.	Provides a framework describing the tasks to perform during the home visits and the structure of the report back to the GP.
Tenni & Hughes, 2016[6]	List all activities deemed to be clinical pharmacy services.	Helpful article in that it provided reassurance that the tasks performed in the MH-HiTH had clinical relevance.
Pre-admission Clinic Pharmacist Service[46]	Medication reconciliation and patient counselling	Helps gain an insight into the successful parts of medication reconciliation on *admission* to MH-HiTH.
Discharge medication reconciliation[47]	Pharmacist-driven medication reconciliation at discharge	Useful in considering the process of medication reconciliation on *discharge* from MH-HiTH.
HiTH Guidelines from different Australian States[48-50]	Minimal information about pharmacy services. The NSW Guideline only mentions dispensing pharmacists.[48] Flinders Medical Centre's MH Hospital @ Home (SA) does not mention pharmacists at all.[49]	Interestingly, the QLD Guideline[50] discourages HiTH in the MH setting, but states a pharmacist should perform medication reconciliation on admission and discharge from HiTH, providing a reconciled medication list to the GP at discharge. It also recommends pharmacists perform TDM and inform the HiTH MDT about high-risk medications.

CP: clinical pharmacist, HiTH: Hospital-in-the-Home, MMP: medication management plan, MH: mental health, MRPs: medication-related problems, PSA: Pharmaceutical Society of Australia, SHPA: Society of Hospital Pharmacists of Australia.

3.2.5.6 Expansion of MH-HiTH services

In 2016, the MH-HiTH program's catchment area expanded to cover a larger geographical area. Limited by the extra time required to travel to patients' homes, I, as the MH-HiTH CP, continued daily interaction with the team and clinical input for every patient, but I changed from visiting every patient to only those in most need of a home medication review. This was another lesson in adaptability. I learned I needed to further integrate my practice into the MDT. For example, I increased my interaction with nursing staff, asking them to take with them a patient medication information leaflet when they next saw a patient, if my time did not allow me to complete a home-visit for that patient.

In 2016–2017, other MH-HiTH programs were established: Youth, Adult and Older Adult MH-HiTH programs within the wider organisation. One of the programs initially did not include an MH-HiTH CP. After an audit comparing this index MH-HiTH with the other MH-HiTH showed the former performed better in various medication safety KPIs,[24] it was deduced that a CP was needed to ensure that all MH-HiTH programs were afforded the same standard of medication safety.

3.2.5.6.1 SHPA standards for the roles of a CP

Many of the aforementioned CP tasks were modelled on the WA Pharmaceutical Review Policy.[28] As the service evolved, I continually worked on improving my approach to the clinical tasks, as informed by the literature. These tasks now reflect the SHPA Clinical Pharmacy Standards, as is concisely listed in the following excerpt from a recent article by Batagol[43]:

"The following summarises the clinical pharmacy activities, as described in the SHPA 2016 Clinical Pharmacy Standards:

Medication reconciliation, assessment and review, including providing medicines information, clinical review and documentation of interventions, including TDM and ADRs [adverse drug reaction], facilitating continuity of medication management on transition to external healthcare settings and to ongoing community care, prioritising clinical pharmacy services, including training and education, participation in research, and improving the quality of clinical pharmacy services and peer review."

3.2.5.7 Practice implications

3.2.5.7.1 Strengths of the MH-HiTH CP role

NMHS-MH Pharmacy have been developing the MOC document for the MH-HiTH CP service since its inception in 2014. The most recent version, which was endorsed by management in 2019,[51] details the role of the CP interspersed among the role of the other members of the MH-HiTH MDT. This has evolved since the earlier versions,[5] where the section pertaining to pharmacy services was only an appendix in the MOC document. I suspect this is reflective of the traditional roles of pharmacists in hospitals, where pharmacists were seen as mainly involved in supply services, but have gradually over time become more integrated within MDTs and more involved in patient care through greater interaction and communication with the treating team.

I was very pleased to see that this integration was gaining recognition in an official document such as the MOC – even if it was initially in a subtle way. In fact, I am glad to see the change occur gradually as this is a cultural change for pharmacy profession; that is, for a hospital pharmacist to venture outside of the hospital ward and continue their clinical service in the next setting. MacAulay et al.[52] demonstrated this concept can benefit patients by reducing MRPs as the HiTH CP collaborates with a hospital-based home care team. I feel this is progress: rather than waiting for the opportunity to come to you, pursue a potential opportunity that may allow you to progress to better patient care.

There are additional advantages of having a CP integrated in the team. First, as part of TDM, I can quickly and easily access patient blood results during team meetings using my laptop. This feature expedites the decision-making process because the information is available at the time it is needed, rather than having to search for it after the meeting. Second, working in MH care, I observed that MH-HiTH psychiatrists routinely refer any non-psychiatric medical issue to a GP in the community. While this is considered good clinical practice, if the patient does not see the GP, their physical healthcare could be inadvertently overlooked. From a medication perspective, some psychiatrists and psychiatric nurses completely ignore any physical health (non-psychotropic) medications the patient is taking – being thought of as general practice or other medical specialty work. As a CP, one of my important roles is to document the patient's complete medication profile as part of medication reconciliation – as there may be drug-drug or drug-disease interactions affecting the patient's mental state. This is in addition to the obvious matter of any potential issues relating to those physical health medications (or the conditions

they are treating). Thus, I think that my key role is to ensure that patient is achieving the best possible outcomes from their medications, which includes both those for the MH issues and for their other conditions. Here, I have a responsibility to resolve MRPs, and as a CP with knowledge beyond MH this is something that I could assist the team with. I found that discussing medication issues with the patients and their families face-to-face during a home visit was a major advantage in providing patient-centred care – an advantage not always afforded to CPs in the hospital ward setting.

Accordingly, I felt I became more useful in prescribing support for psychiatrists. I often assisted by (after consulting the team and getting permission from the team's consultant) writing letters, typing emails or telephone calling GPs to advise them of MRPs I had identified that they may not have been aware of, such as benzodiazepine doctor shopping; seeing a private psychiatrist and being prescribed dexamfetamine by them, yet this was not known to the GP; or the patient taking a different levothyroxine dose than the GP is aware of for months resulting in derangement in thyroid function which could be affecting their mental state. Of course, patient confidentiality was always considered. All patients provide voluntary written informed consent on admission to MH-HiTH that they agree to the MH-HiTH team contacting other health providers (e.g. their GP, private psychiatrist, community pharmacy) for the sake of providing the MH-HiTH service.

3.2.5.7.2 Cultural changes in the pharmacy profession

In amalgamating the best value-adding roles of inpatient hospital CP and accredited medication review pharmacist, with specialist MH knowledge and experience, this unique union gave me the privilege to utilise this multi-faceted role to offer a comprehensive clinical pharmacy service to MH-HiTH patients and staff. Trying to institute such a role carried with it responsibility, I felt, to present to our interdisciplinary colleagues and our patients the underutilised capabilities of the pharmacy profession. I am grateful to have had certain IT skills that I was able to leverage to help me firmly establish the CP role in MH-HiTH as an integral one. With genuine collaborative team spirit, I worked hard to gain the respect and trust of my MH-HiTH colleagues.

Hence, I saw the opportunity to bring to the attention of my pharmacist colleagues and profession the potential benefits of changing our deeply ingrained culture of viewing practice change as fraught with danger due to perceived barriers.[53] In my case, I found myself wanting

to do what every pharmacist is trained to do: find a procedure and follow it without any deviation from its details. When I could not find one, and neither could any colleague or specialist librarian (i.e. the hospital librarian and the university faculty librarian), I felt I best seize this opportunity to integrate the pharmacy profession within such a novel setting at its infancy stage, otherwise it may be very difficult to attempt such a feat once the MH-HiTH program is well established without a CP.

3.2.5.7.3 Challenges for the MH-HiTH pharmacist

Like other CPs involved in home-based care, I face various challenges in performing the MH-HiTH CP role. First, the time lost during travel between the MH-HiTH office (located in the hospital) and the patient's residence makes it difficult to make up the time to complete the other allocated work tasks. I try to take my work laptop with me and when another MH-HiTH colleague is driving (we usually do home visits in pairs for staff safety), I work on the laptop during the travel time. Of course, this strategy has its limitations in that sometimes the colleague prefers not to drive, so I drive instead. Also, not everyone could be expected to use a laptop in a moving car, as some people may get motion sickness or headaches.

A challenge I faced at the beginning was not having any specific training to prepare me for such a specialised service. In order to provide the best quality service, I felt that the pharmacist in this role needs to have significant hospital inpatient clinical pharmacy experience in the specialty, as well as some training in medication management reviews in the home setting. When I undertook the accredited pharmacist training by AACP (see the description in **Tables 1** and **2**), I found the training helped me adapt the knowledge and skills taught in that course to the MH-HiTH setting.

3.2.6 Potential future developments and research

While this study is a single first-person account of the events that transpired during the establishment and evolution of the MH-HiTH CP service, it is a strongly evidence-based account that utilised conventional and grey literature. Furthermore, the account has been reviewed and corroborated by senior hospital staff who were also involved in the events described – most important of whom is the first consultant psychiatrist to clinically lead this MH-HiTH service.

There remain, however, gaps in the literature that future studies could address in relation to establishment of an MH-HiTH CP service. These include exploring the facilitators and barriers to

the introduction of the service. Another study could examine the ideal patient to pharmacist ratio in the MH-HiTH setting. The next study could explore how an MH-HiTH CP can demonstrate value and is therefore a vital member of the MDT. A study that examines the level of education or qualification are optimally needed for this role may be next, as could a study to develop specific KPIs for benchmarking. With such evidence obtained by research, a pharmacoeconomic study could then be undertaken to evaluate the cost-benefit of such a pharmacy service.

3.2.7 Conclusion

The process of starting a new service is challenging when there is little guidance from the literature about how to approach it. Drawing parallels to other similar pharmacy services helped in developing this MH-HiTH CP role, culminating in a combination of inpatient CP services with home medication reviews. Combining such strategies has been helpful in instituting a new service and monitoring/auditing its performance over time.

As the MH-HiTH program evolved, so did the MH-HiTH CP role, along with my own learning experiences in learning to be proactive and learning to adapt to a new practice setting. Defining such a new pharmacist role was certainly challenging, but the experience was positive in increasing the role's integration into the MDT as the team itself evolved. Difficulty in finding guidance in the literature was a lesson in becoming part of the solution by filling the evidence void. In being part of this service evolution, I have observed the change in the culture of the pharmacy profession in adapting pharmacy practice to novel practice settings, such as MH-HiTH.

By sharing my experience in evolving with this new service, I believe this paper presents relevant background to any CP embarking on such a new role. It is hoped the experiences shared in this paper will stimulate interest to further the development and research in MH-HiTH Clinical Pharmacy services.

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3.2.9 Ethical approval

Ethics approval was obtained from the North Metropolitan Area Mental Health Services Human Research Ethics Committee (EC00273) and Curtin University (HRE2017-0498).

3.2.10 Declaration of competing interest

The first author (M. Farag) is employed as a clinical pharmacist in the North Metropolitan Health Service – Mental Health, Public Health and Dental Services (NMHS-MHPHDS) Adult Hospital-in-the-Home program.

All the other authors have no known competing interests.

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Chapter 4: Impact of a clinical pharmacist on medication safety in mental health hospital-in-the-home: A retrospective analysis

FARAG Mechaiel[1,2], HOTI Kreshnik[3], HUGHES Jeff[1], CHALMERS Leanne[1]

Affiliations:

[1] Curtin Medical School, Faculty of Health Sciences, Curtin University, Kent Street, Bentley, Western Australia, 6102, Australia

[2] North Metropolitan Health Service – Mental Health Pharmacy, Graylands Hospital, Brockway Road, Mount Claremont, Western Australia, 6010, Australia

[3] Faculty of Medicine, Division of Pharmacy, University of Prishtina, Pristina, Republic of Kosovo

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The publisher's statement permitting use of the published article is in Appendix 4.2.

Attribution Statement for Thesis Chapter 4

	Conception and Design	Acquisition of Data and Method	Data Conditioning and Manipulation	Analysis and Statistical Method	Interpretation and Discussion
Co-Author 1 (Kreshnik Hoti)	✓	✓	✓	✓	✓
Co-Author 1 Acknowledgment: I acknowledge that these represent my contribution to the above research output and I have approved the final version. Signed:					
Co-Author 2 (Jeff Hughes)	✓	✓	✓	✓	✓
Co-Author 2 Acknowledgment: I acknowledge that these represent my contribution to the above research output and I have approved the final version. Signed:					
Co-Author 3 (Leanne Chalmers)		✓	✓	✓	✓
Co-Author 3 Acknowledgment: I acknowledge that these represent my contribution to the above research output and I have approved the final version. Signed:					

4.1 Introduction to the manuscript

This chapter provides a quantitative evaluation of the key performance indicators (KPIs) relating to medication safety in the MH-HiTH setting. Two comparable MH-HiTH sites were chosen, one with a CP and one without, in order to test the hypothesis that the presence of a CP improved medication safety KPIs.

The in-text citations used in this chapter are in the format specified by the International Journal of Clinical Pharmacy, where this study was published. This citation style uses brackets for in-text citations, rather than the superscripts used for in-text citations in the remainder of this thesis. The bracket in-text citations were used in this chapter to reflect the way it was published in the journal.

The International Journal of Clinical Pharmacy specifies that numbers less than ten are to be written in Arabic numerals, rather than the convention of writing them in words. Accordingly, the article presented in this chapter conformed to this requirement in the published version and in this thesis chapter.

The data collection instrument that was used in this study is in Appendix 4.1.

4.2 Publication

4.2.1 Abstract

Background Integration of clinical pharmacists into multidisciplinary Mental Health Hospital-in-the-Home teams is increasing but little is known about the medication safety contribution these pharmacists make.

Aim To evaluate whether clinical pharmacist involvement in a Mental Health Hospital-in-the-Home service improved medication safety key performance indicators compared to a similar service without a clinical pharmacist.

Methods Medical records were retrospectively reviewed of all patients admitted to 2 Western Australian Mental Health Hospital-in-the-Home services from September to November 2015. Site 1 was a 16-bed service incorporating a clinical pharmacist as part of its multidisciplinary team. Site 2 offered usual care in a similarly structured 18-bed service but without clinical pharmacist involvement. The primary outcome measure was completion of medication safety

key performance indicators obtained from the Western Australian Government Pharmaceutical Review Policy and mental health-specific best practice guidelines.

Results Key performance indicators from Site 1 (n=75 records), which incorporated a clinical pharmacist, demonstrated significantly ($p<0.001$ for all analyses) higher rates of completion of medication reconciliation [65 (87%) versus 17 (29%)], accurate adverse drug reaction list [73 (97%) versus 34 (58%)], accurate discharge medication list [51 (74%) versus 18 (45%)], accurate medication profile [74 (99%) versus 40 (68%)] and medication chart review [74 (99%) versus 0 (0%)] than Site 2 (n=59).

Conclusion Integrating a clinical pharmacist into a Mental Health Hospital-in-the-Home program significantly improved achievement of medication safety key performance indicators.

4.2.2 Keywords

Clinical pharmacist, Hospital-in-the-Home, hospital-based home care, medication safety, medication reconciliation, mental health

4.2.3 Impact on Practice

- Integration of a clinical pharmacist into a Mental Health Hospital-in-the-Home service better facilitated the achievement of medication safety key performance indicators compared to a service without a pharmacist.
- Further research is required to optimise the clinical pharmacist's role in patient counselling and prescribing support within a Mental Health Hospital-in-the-Home.
- With the rapid increase in implementation of Hospital-in-the-Home service models associated with the COVID-19 pandemic, these findings support integrating a clinical pharmacist in a Mental Health Hospital-in-the-Home program.

4.2.4 Introduction

Hospital-in-the-Home (HiTH) is a care model where a patient is treated by hospital clinicians in the comfort of the patient's home [1]. The HiTH model may also be known by other names, such as home (health)care teams [2] and home hospitalisation [3]. In this setting, as in all care settings, a range of medication-related problems (MRPs), errors and discrepancies can occur. In the specialised area of mental health (MH), MH-HiTH programs support the patient in all

aspects of their treatment, including non-MH medical issues and psychosocial issues [4, 5]. Care is provided by a multidisciplinary team (MDT) consisting of a consultant psychiatrist, a psychiatric medical officer, a clinical nurse, a social worker, an occupational therapist and a clinical pharmacist (CP). An important part of the CP role is to optimise medication use and support patient adherence. Daily medication review, accurate adverse drug reaction (ADR) documentation, patient counselling and therapeutic drug monitoring (TDM) are some of the strategies employed by the CP in the HiTH setting to improve medication safety and contribute to better patient outcomes [6].

Another prominent CP task within the MH-HiTH setting is medication reconciliation on admission and discharge from the MH-HiTH program. HiTH is a critical point of transition of care [7], be it from hospital to home (via MH-HiTH), or from home to MH-HiTH, enabling the patient to be discharged earlier from a physical hospital bed or avoid physical hospitalisation, respectively. Unintentional changes to patients' medication regimens often happen during such transitions of care [8]. Suboptimal communication between health professionals, and patients or care facilities can lead to medication errors and adverse drug events. Transition of care is the point where a large proportion of preventable medication-related adverse outcomes occur. Medication discrepancies, where there are differences between the medications the patient is prescribed and those they are actually taking, are especially common; these have been reported to affect 55.9% of patients [8]. A systematic review by El Morabet et al. found that between 5 and 87% of hospital readmission rates were caused by preventable MRPs [9], and that pharmacists were demonstrated to reduce this harm [10].

The benefits of clinical pharmacists in reducing medication-related harm have been clearly demonstrated across a range of healthcare settings [10–12], although most commonly in the hospital inpatient setting [13–15]. These benefits have included: reducing medication errors during transition of care; detecting and addressing MRPs; providing patients and their families/carers with verbal and written medication information to improve their engagement with, and outcomes of, their treatment; and optimisation of medication therapy in collaboration with the medication prescriber [16, 17], with recent evidence extending to psychiatric settings [18, 19]. As psychotropic medications are recognised as high-risk medications [20], the Australian Commission on Safety and Quality in Health Care has recommended further adaptation of existing clinical pharmacy services to MH settings to

improve medication safety in MH [21]. Although not explicitly defined in this context, medication safety could be defined as optimal use of medications, with appropriate TDM, so as to provide the best benefit, least side-effects and prevent medication-related harm [21].

With the integration of a CP, HiTH can provide important services across a variety of medical specialties, such as infectious diseases, cardiology and respiratory medicine [22–25]. MH-HiTH has evolved in recent times as a "non-traditional" practice setting for CPs. While there has been recent evidence to demonstrate the value of CP home visits on improving patient outcomes [26] and other robust evidence to demonstrate the utility of CP interventions in improving clinical outcomes in patients with severe and persistent mental illness [27], there is still a gap of published evidence relating specifically to the MH-HiTH setting [21], which involves elements of both home visits and other pharmacist interventions in people with mental illness. Hence this study was undertaken to compare achievement of medication safety key performance indicators (KPIs) between 2 similar MH-HiTH programs: 1 incorporating a CP and 1 without.

4.2.5 Aim

This study aimed to evaluate whether CP integration within an MH-HiTH program improved measures of patient safety, by focusing on achievement of medication safety KPIs.

4.2.6 Methods

4.2.6.1 Study design

This retrospective cohort study involved review of patient case notes from comparable, government-subsidised MH-HiTH programs at 2 separate sites. Site 1 was a 16-bed MH-HiTH program which had an integrated CP within its MDT and, for the purposes of this study, was considered the "intervention" arm. Site 2, the "control" arm, was an 18-bed MH-HiTH program that did not have any CP involvement. In each program, the patient was visited at least once daily by an MH-HiTH clinician, including a psychiatrist, psychiatric medical officer or nurse, to monitor their mental state and adjust medications where necessary. Intended length of stay (LoS) was 14 days, with some flexibility according to clinical response and patient choice. Any precipitating psychosocial factors were referred to appropriate services for longer-term follow-up. The 2 sites also had the same governance structure, policies and procedures, KPIs, as well as

similar patient demographics, diagnoses and level of illness acuity, size and clinician-to-patient ratios. At both sites, all patients were between the ages of 18 and 65 years.

In Site 1 only, the CP visited the patient once during their MH-HiTH admission to perform a medication review at the patient's home. The CP had extensive inpatient MH clinical pharmacy experience and clinical pharmacy postgraduate qualifications. During the MH-HiTH admission, the CP also conducted medication reconciliation on admission and discharge, reviewed the medication chart daily, documented any ADRs and provided patient counselling and therapeutic drug monitoring (TDM), as well as prescribing support for doctors and medication information support for other clinicians. All patients had unlimited access to the CP via telephone during their admission.

Based on the assumption that medication reconciliation would be undertaken for 90% of patients receiving care at Site 1 and 40% at Site 2, a sample size calculation estimated that 18 patients in each group would be statistically adequate for 95% power at the 95% confidence level [28].

4.2.6.2 Data collection

Case notes of all patients admitted to each site from 1 September 2015 to 30 November 2015 (n=120 at each site) were requested from the hospitals' medical records departments. This 3-month period was chosen as it was soon after formation of each MH-HiTH program and alignment of their KPIs. The same 3-month period was chosen for both sites to minimise confounding.

Data were collected in August 2017 by tabulating the KPIs listed in Table 4.1 using Microsoft Excel® 2013 (Microsoft Corporation, Redmond, Washington, USA). To minimise bias, 2 experienced MH CPs simultaneously collected the data, with 1 CP being independent of direct service provision. Patient characteristics, including gender, LoS and source of admission were recorded, and activities were recorded as having occurred (Yes) or not (No). Records were reviewed chronologically at each site. If the complete patient paper record (commonly known as patient case notes) was missing or unavailable at the time of data collection, it was excluded. If the patient paper record was present but incomplete, hospital electronic records were used to obtain relevant information wherever possible.

4.2.6.3 Outcome measures

The primary outcome measure was achievement of medication safety KPIs, as detailed in the 2007 WA Health Pharmaceutical Review Policy [29], which was current at the time of admission of patients to this study. These KPIs remain relevant as, when the 2007 Policy was updated, the same KPIs were incorporated into its replacement, the 2019 WA Medication Review Policy [16]. These KPIs were supported in the literature as surrogate outcomes for medication safety. For example, it is well-established in the literature that medication reconciliation reduces MRPs and, therefore, improves medication safety [30]. These KPIs are defined in Table 4.1. MH-specific KPIs were also evaluated; these included prevalence of psychotropic polypharmacy and high-dose psychotropic prescribing, as increasing prevalence of these is associated with increasing adverse effects, and clinically appropriate minimisation is recognised as part of medication optimisation [31].

Table 4.1 Medication safety key performance indicators

KPI[a] type	KPI name	Definition
Pharmaceutical Review Policy	1. Medication reconciliation on admission	Presence of documentation to demonstrate the performance of medication reconciliation on admission/transfer to the MH-HiTH[b] program.
	2. Medication reconciliation using more than 1 source	Presence of documentation demonstrating more than 1 source was consulted during medication reconciliation (e.g. GP[c] list and community pharmacy history).
	3. Current medication profile documented	Presence of documentation demonstrating an accurate medication profile was kept current for the patient during their MH-HiTH admission.
	4. Daily medication chart review	Presence of documentation demonstrating the medication profile was reviewed daily.

	5. Provision of patient medication information	Presence of documentation demonstrating the patient was provided verbal and/or written medication information.
	6. Presence of a medication list in the discharge summary	Presence of a medication list in the discharge summary filed in the notes.
	7. The medication list in the discharge summary matches the discharge script	Absence of discrepancies between the discharge summary medication list and the prescription written on discharge from MH-HiTH.
Mental Health KPIs	8. Discharged on multiple psychotropic medications	The discharge summary indicates the patient was prescribed more than 1 psychotropic medication from any particular class concurrently, e.g. more than 1 antipsychotic[d].
	9. Prescribed high dose psychotropic	The discharge summary indicates the patient was prescribed a psychotropic medication above its maximum licensed dose as listed in MIMS[e].
Patient Safety KPIs	10. Adverse drug reactions list documented	Presence of documentation of the patient's adverse drug reaction list (or that there are no known drug allergies).
	11. Prescribed a medication listed on that patient's adverse drug reaction list	Documentation indicating that during the MH-HiTH admission (or on the discharge prescription), the patient was prescribed a medication listed in their adverse drug reaction list.

[a] KPI: key performance indicator

[b] MH-HiTH: mental health Hospital-in-the-Home

[c] GP: general practitioner

[d] As referred to in the Maudsley Prescribing Guidelines in Psychiatry [31]

[d] MIMS: an Australian official medication information database [32].

4.2.6.4 Data analysis

Data were transferred into IBM SPSS® Statistics Version 27 (IBM Corporation, Armonk, New York, USA) for analysis. Descriptive statistics were reported. Chi-square tests, with 1 degree of freedom, were used to assess the relationship between the integration of a CP in the MH-HiTH MDT and the medication safety KPIs. If chi-square test assumptions were not met, the Fisher's Exact Test was used. A p-value of < 0.05 was considered statistically significant for all analyses.

4.2.7 Results

During the study period, a total of 92 patients were admit ted to Site 1, and 80 to Site 2. Due to missing or incomplete records, 17 records were excluded from Site 1 and 21 from Site 2. This left 75 records eligible for analysis for Site 1 and 59 for Site 2. The patients' characteristics are summarised in Table 4.2. There were no statistically significant differences between the sites in terms of patient gender, LoS and admission source.

Table 4.2 Characteristics of the study patients

Characteristic	*Site 1* [n, (%)] (N=75)	*Site 2* [n, (%)] (N=59)	p-value
Gender			0.49
Male	25 (33%)	24 (41%)	
Female	50 (67%)	35 (59%)	
Median LoS[a] in days (IQR[b])	14.0 (3)	14.0 (4)	0.146
Admission source			0.334
Community	25 (33%)	13 (22%)	
ED[c]	20 (27%)	20 (34%)	

Inpatient	30 (40%)	26 (44%)

[a] LoS: length of stay

[b] IQR: interquartile range

[c] ED: emergency department

Overall, medication safety KPIs were achieved for a high proportion of patients in Site 1, though their completion was highly variable across the different activities for Site 2. There were statistically significant differences between Sites 1 and 2 in relation to documented medication reconciliation on admission (87% versus 29%), medication reconciliation using more than 1 source (83% versus 0%), complete medication profile (99% versus 68%), chart review (99% versus 0%), discharge medication list matching the script (74% versus 45%) and presence of an ADR list (97% versus 58%); all $p<0.001$.

Conversely, Site 2 demonstrated a higher rate than Site 1 in providing patient medication information (63% versus 21%, $p<0.001$), and a lower rate of prescribing high dose psychotropics (7% versus 24%, $p=0.010$). Figure 4.1 illustrates the data collection process, which is followed by the performance of each study site for each KPI as displayed in Table 4.3.

Table 4.3 Summary of the medication safety key performance indicators between the 2 sites

Medication Safety KPI[a]	*Site 1* n (%) (N[b]=75)	*Site 2* n (%) (N[b]=59)	p-value
1. Medication reconciliation on admission	65 (87)	17 (29)	<0.001
2. Medication reconciliation using more than 1 source	62 (83)	0 (0)	<0.001
3. Current medication profile documented	74 (99)	40 (68)	<0.001
4. Daily medication chart review (*Site 2*: N=58[c])	74 (99)	0 (0)	<0.001
5. Provision of patient medication information (*Site 1*: N=73[c])	15 (21)	37 (63)	<0.001
6. Presence of a medication list in the discharge summary	74 (99)	58 (98)	1.000
7. The discharge summary's medication list matches the discharge script (*Site 1*: N=69; *Site 2*: N=40)[d]	51 (74)	18 (45)	<0.001
8. Discharged on multiple psychotropic medications (*Site 1*: N=69; *Site 2*: N=40)[e]	5 (7)	2 (3)	0.735
9. Prescribed high dose psychotropic (*Site 1*: N=74; *Site 2*: N=58)[e]	18 (24)	4 (7)	0.010
10. Adverse drug reactions list documented	73 (97)	34 (58)	<0.001
11. Prescribed a medication listed on that patient's adverse drug reaction list	5 (7)	0 (0)	0.067

[a] KPI: key performance indicator

[b] N: Total patient number for that site unless otherwise stated

[c] Patient(s) not taking any medication while admitted to HiTH so not required

[d] No script given to patient on discharge

[e] No medication-related information available in the case notes

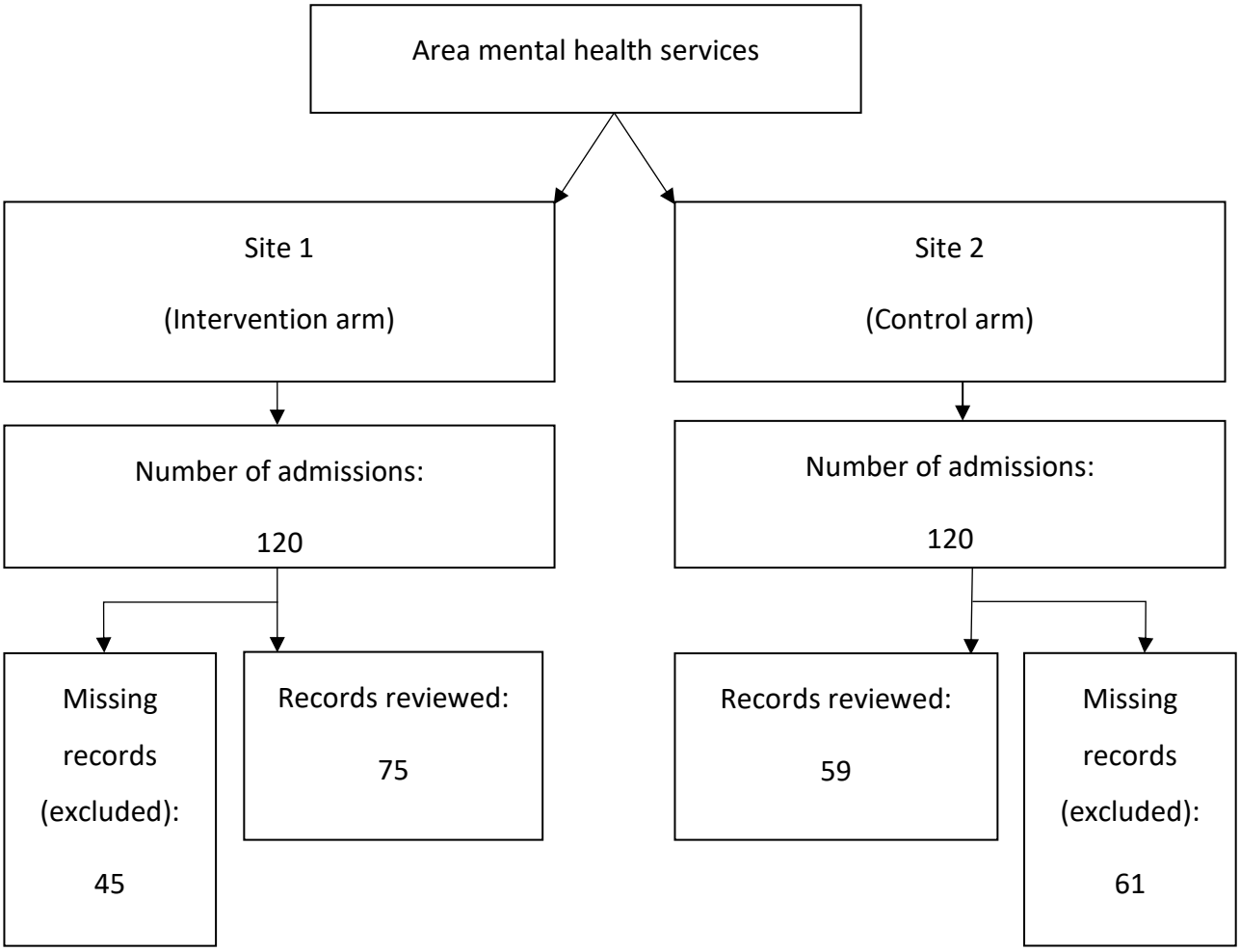

Figure 4.1 Flow chart of the data collection process

4.2.8 Discussion

4.2.8.1 Statement of key findings

To our knowledge, this is the first study to evaluate the contribution of a CP to medication safety within an MH-HiTH program. While CP home visits improve patient outcomes [26] and CP interventions improve outcomes specifically in patients with severe and persistent mental illness [27], there is still no published evidence of the value of the CP in MH-HiTH setting, which involves various pharmacist interventions including home visits. This study found that the MH-HiTH program incorporating a CP had a higher rate of achievement of most medication safety KPIs evaluated than the MH-HiTH program without a CP. The higher rates of completion and documentation of medication safety KPIs in the MH-HiTH including the CP may be explained by the explicit focus of this role on medication management. While other clinicians can undertake medication safety activities, these are not their main clinical priority and they are not necessarily trained to undertake them in a comprehensive, systematic manner [11]. Therefore, inclusion of a CP in the MDT who was trained in the provision of CP services in a hospital setting (and could therefore translate them to this new clinical setting), who was familiar with the use of the medication management plan (MMP) [33], and whose role was solely focused on medicines management, facilitated prioritisation of these activities.

4.2.8.2 Strengths and weaknesses

A strength of this study was that simultaneous data collection by 2 experienced CPs reduced possible bias and ensured comprehensive review of patients' medical records and KPIs. Additionally, the 2 services were very similar in their characteristics (as displayed in Table 4.2), apart from CP integration, imparting confidence that the differences observed were due to the CP's involvement; however, unrecognised differences between the study cohorts cannot be completely discounted. While the study demonstrated strong associations between the presence of a CP on the MH-HiTH MDT and the achievement of medication safety KPIs, causality cannot be proven given the retrospective study design. A further weakness was reliance on documentation in patients' medical records to collect the data, with the risk that certain tasks may have been performed but not documented. Another weakness is that medication safety was not directly assessed; instead, medication safety KPIs were used as

surrogate measures for patient outcomes. While these data originated from 2015, they were collected during a unique time period, in which there was an opportunity to compare 2 similar MH-HiTH programs—one with a CP and the other without a CP. Shortly after the conclusion of this study, a CP was integrated within the Site 2 MDT, where the CP role continues at that site. At the time of publication, both study sites remain largely unchanged in their model of service. Accordingly, this study's data continue to offer important objective evidence of the benefit of a CP in the MDT, which has contributed to CP integration into all MH-HiTH services within the authors' local health services.

4.2.8.3 Interpretation

Importantly, this study highlighted the strong association between the presence of a CP and the achievement of medication safety KPIs at transitions of care, particularly medication reconciliation between the medication list in the discharge summary and the prescription on discharge. Tong et al. [34] showed in a randomised controlled trial (RCT) that integrating a CP within a general medical inpatient treating team, with the responsibility to complete a medication management plan within the discharge summary, reduced medication errors in those discharge summaries. During the study, Site 1 utilised a similar procedure to that in Tong et al.'s study in that the MH-HiTH CP completed the medication sections of the discharge summary; this practice continues at the time of publication. While the level of agreement between the discharge medication list and discharge prescription at Site 1 was 74%, and significantly higher than at Site 2, this was less than expected, potentially due to unplanned patient discharges on weekends, when there was no clinical pharmacy service available. This issue has subsequently been partially addressed by the MH-HiTH CP completing the discharge medication list 2 days before the planned discharge date then rechecking it on the day of discharge (if it is a weekday).

Despite evidence of significantly improved achievement of several medication safety KPIs at Site 1, there were some areas where CP integration did not appear to result in improved performance. For example, Site 2 had a higher rate of provision of patient medication information. This may have reflected a difference in documentation, rather than completion of this activity, due to the presence of a checklist containing a check box for providing patient medication information in Site 2 patient records. Furthermore, the CP's competing work

commitments precluded counselling of every patient during home visits, and provision of written patient medication information by other clinicians was inconsistently documented.

Site 1 also had a significantly higher rate of high-dose psychotropic prescribing compared to Site 2 (24% versus 7%, p=0.010). This may be explained by the higher level of illness severity in Site 1 or differences in the patients' pre-admission medication history, although this was not evaluated in this study. It is recognised that severe, treatment-resistant mental illness may require the use of either high-dose or combination psychotropic therapy [31]. CPs have a potential role in supporting prescribers in the monitoring and potential rationalisation of high dose psychotropic therapy; this requires further investigation in the MH-HiTH setting.

On face value, the rate of prescribing of a medication listed on a patient's ADR list at Site 1 is a concerning finding. Upon further review, it was found that all 5 patients (7%) had no ill effects, as the ADR was of a mild nature, and the patient consented and was able to tolerate the rechallenge. For example, a patient whose ADR list stated "quetiapine causing sedation" agreed to retrial it at lower dose—the retrial was successful and the ADR documentation was revised to "quetiapine previously caused sedation on 25 mg nocte—tolerated rechallenge with 12.5 mg nocte". This case highlights the importance of documenting the nature of the ADR, so if rechallenge is ever considered, it can be done judiciously. This further suggests that the CP actually improved prescribing by rationalising previously suboptimal ADR documentation.

4.2.8.4 Further research

A recent systematic review by Abbott, et al. [26], reviewing RCTs from various settings but none relating to mental health, found no evidence that pharmacist home visits to patients at risk of medication-related problems improved hospital admission or mortality rates; Abbott, et al. remarked that medication-related hospital admissions would have been a more appropriate outcome measure. Yet, a more recent systematic review by Ng et al. [27] found that pharmacist-led interventions improve MH patient outcomes. Even though this systematic review searched for RCTs from all healthcare settings, none from MH-HiTH were presented in it. A future study could, therefore, investigate the effect of CP integration in an MH-HiTH program on patient outcomes, including medication-related hospital readmission rates and ED presentations, utilising the recently developed prescribing safety indicators specific to MH [35]. Werremeyer et al.'s recent review found that the most common factor associated with

improving outcomes for patients with psychiatric and neurological conditions was incorporation of an MH CP into an MDT in predominantly inpatient, outpatient and clinic settings [36]. Future research could explore a novel approach to collect data on how a CP integrates into an MH-HiTH MDT to improve patient care by proactive discussion with MDT members, rather than making retrospective interventions. Given workload pressures, another future study could compare the efficiency of student pharmacists [37] and technicians [38] in conducting the medication reconciliation process.

4.2.9 Conclusion

The MH-HiTH program incorporating a CP had statistically significant improvements in achievement of various medication safety KPIs compared to the program without a CP. Given the paucity of research in this area, this study provides an important contribution to understanding the role of a CP in the setting of MH-HiTH. With the current trend of increasing implementation of MH-HiTH programs, these findings support the value of CP integration as an important medication safety initiative. Future studies are needed to evaluate the impact of CP integration in this setting in improving patient outcomes, including reducing medication-related hospitalisation rates and ED presentations.

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4.2.12 Declarations

4.2.12.1 Conflicts of interest

The first author (M. Farag) is employed by WA Health as a Clinical Pharmacist for the North Metropolitan Health Service – Mental Health, Public Health and Dental Services (NMHS-MHPHDS) Adult HiTH Program (Site 1).

4.2.12.2 Ethics approval

Ethics approval was obtained from the North Metropolitan Health Service—Mental Health, Public Health and Dental Services Human Research Ethics Committee (RGS0000000186) and Curtin University (HRE2017-0498).

4.2.12.3 Open Access

4.2.13 References

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Chapter 5: Embedding a clinical pharmacist in mental health Hospital-in-the-Home: A qualitative evaluation of stakeholders' perceptions

FARAG Mechaiel[1,2], PASCU Viki[3], CHALMERS Leanne[1]

Affiliations:

[1] Curtin Medical School, Faculty of Health Sciences, Curtin University, Kent Street, Bentley, Western Australia, 6102, Australia

[2] North Metropolitan Health Service – Mental Health Pharmacy, Graylands Hospital, Brockway Road, Mount Claremont, Western Australia, 6010, Australia

[3] North Metropolitan Health Service – Mental Health, Public Health and Dental Services, Salvado Road, Subiaco, Western Australia, 6008, Australia

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This chapter is presented in manuscript format but has not been submitted for publication.

Attribution Statement for Thesis Chapter 5

	Conception and Design	Acquisition of Data and Method	Data Conditioning and Manipulation	Analysis and Statistical Method	Interpretation and Discussion
Co-Author 1 (Viki Pascu)			✓	✓	✓
Co-Author 1 Acknowledgment: I acknowledge that these represent my contribution to the above research output and I have approved the final version. Signed:					
Co-Author 2 (Leanne Chalmers)			✓	✓	✓
Co-Author 2 Acknowledgment: I acknowledge that these represent my contribution to the above research output and I have approved the final version. Signed:					

5.1 Introduction to the manuscript

This chapter completes the final step in Arksey and O'Malley's scoping review framework by elucidating stakeholder perspectives on the role of the CP within the MH-HiTH MDT. In this chapter, the clinicians, patients and carers of the MH-HiTH service provided their views relating to services provided by the CP to MH-HiTH.

The participant information sheet for patients is in Appendix 5.1; the one for clinicians is in Appendix 5.2. Participant consent forms for this study are in Appendix 5.3 (for patients) and Appendix 5.4 (for clinicians).

5.2.1 Abstract

Introduction

In the relatively recently developed healthcare setting of mental health (MH) Hospital-in-the-Home (HiTH), patients are treated in their home by hospital clinicians, including a hospital clinical pharmacist (CP) conducting a home medication review. Little is known about stakeholders' perceptions of the CP service.

Aim

To elicit stakeholders' views (patients/carers and clinicians) of an MH-HiTH clinical pharmacy service.

Methods

Semi-structured interviews with 12 patients (and carers) and 12 clinicians. Audio-recorded interviews were transcribed verbatim then analysed thematically utilising an inductive approach using NVivo® software.

Results

Patient/carer and clinician interviews revealed both similarities and differences in their views of the benefits and limitations of, and suggested improvements to the CP MH-HiTH service. There were three patient/carer themes - the CP being a valuable member within the multidisciplinary team (MDT), that the CP bridged the gap to other health services and the value of the CP's medication review during a home visit. Clinicians discussed the breadth of contribution of the CP to the MH-HiTH MDT, and limitations due to the CP's accessibility, availability and flexibility.

Conclusion

MH-HiTH clinicians expressed their appreciation of the benefits of CP integration into their MDT. Patients and carers also spoke about the value of the CP in the MH-HiTH setting, even though some were not fully aware of the full extent of the CP's role in this setting. More research in the MH-HiTH setting may help elicit strategies to better inform the public of the contribution of CPs to best patient care through optimal medication safety and management, and improve collaboration with community-based health providers at the continuum of care.

5.2.2 Keywords

Clinical pharmacist, Hospital-in-the-Home, mental health, qualitative analysis, health stakeholder, HiTH

5.2.3 Introduction

In 2019-20, there were over a quarter of a million overnight admitted mental health-related hospitalisations in Australia, 62.7% of which involved specialised psychiatric care.[1] One strategy to provide timely, cost-effective MH support to Australians has been the establishment of Mental Health Hospital in the Home (MH-HiTH) programs. Without the need for physical hospital beds, MH-HiTH services allow hospital clinicians to utilise the patient's home as a "virtual bed". The general HiTH concept has been reported to be cost-effective from a health funding perspective and significantly improve patient safety and satisfaction,[2] and there is some literature on staff and patient perceptions of non-MH-HiTHs.[3,4] However, it is rare to find published literature describing MH-HiTH services, and in particular, stakeholder views on the service.[5]

Within MH-HiTH programs, medication management and safety may be facilitated by a specialist MH-HiTH clinical pharmacist (CP).[6] It is recognised that discrepancies between the medications that a patient is prescribed on admission and what the patient actually takes at home increase the odds of readmission to an emergency department.[7] It has been previously shown that a HiTH clinical pharmacist is well-suited to identify and resolve such medication-related discrepancies and other medication-related problems (MRPs) in other HiTH settings.[8,9] More recently, we demonstrated the impact of a CP integrated within an MH-HiTH program on the achievement of key medication safety key performance indicators.[6]

The concept of integrating a CP into a non-dispensing health service is relatively new to the pharmacy profession itself, as well as other health professionals and the general public, the key stakeholders of such a service. The Medical Research Council framework for developing and evaluating complex interventions highlights the value of stakeholder involvement in evaluation.[10] It states that evaluation is more than investigating whether an intervention works, as was demonstrated in our medication safety study[6], but involves "a broader range of questions including identifying what other impact it has, theorising how it works, taking account of how it interacts with the context in which it is implemented, how it contributes to system change, and how the evidence can be used to support decision making in the real world."[10] With little guidance from the published literature, exploring stakeholders' perspectives on a new pharmacy service within an MH-HiTH has the potential to inform of its

perceived potential value and limitations, paving the way for service improvement and identifying areas requiring further research.

5.2.4 Aim

The aim of this study was therefore to explore the perceptions of two stakeholder groups, MH-HiTH clinicians and patients/carers, regarding the clinical pharmacy service to an MH-HiTH program. The objectives included exploration of the benefits and limitations of the service, as well as any potential service improvements.

5.2.5 Methods

Ethics approval was obtained from the North Metropolitan Health Service – Mental Health, Public Health and Dental Services Human Research Ethics Committee (NMHS-MHPHDS HREC) (RGS0000000186) and the Curtin University HREC (HRE2017-0498).

A qualitative study involving semi-structured interviews and utilising a phenomenological approach was used to explore the views of stakeholders on receiving a clinical pharmacy service in one MH-HiTH program based in a specialist MH public teaching hospital in Western Australia. As there has not been any prior exploration of stakeholder perspectives of the clinical pharmacy service in an MH-HiTH setting, the study methodology was informed by other studies of pharmacists in novel settings.[11-13] This MH-HiTH program treats adults aged 18 to 65 years, has a 14-day admission timeframe, multi-disciplinary team (MDT) involvement and a comprehensive clinical pharmacy service that has been recently described in detail.[14] The MH-HiTH program, with an integrated CP service, was initiated in April 2014. This qualitative study was undertaken in September 2017.

Stakeholders included current inpatients of the MH-HiTH program, their carers and MH-HiTH clinicians (doctors, nurses and other health professionals, including the only other CP) working within the MDT. Stakeholders were invited to participate (patients in person, and clinicians via email) and those who agreed provided informed consent. Patients were purposively selected[15] to ensure they had been assessed by the treating MDT as unlikely to be distressed by the interview. All MH-HiTH clinicians were invited to participate. Twelve patient and 12 clinician interviews were planned, based on the literature indicating saturation of themes occurs at a

sample size of approximately 24 participants[16] and the researchers' experience of commonality between the perceptions of the two stakeholder groups.

Participation in this study was voluntary. Potential participants were invited to participate in the study, while being informed that neither participation nor non-participation would have any negative consequences for them. All potential participants were provided with a Participant Information Sheet explaining the aims of the study and their role. If a participant agreed, they were asked to provide written informed consent by signing a Participant Consent Form. Participants were free to withdraw from the study at any time.

The interviews were conducted by the PhD candidate (M.F.), an experienced male CP who was also responsible for delivering clinical pharmacy services to the MH-HiTH. Each patient (with their carer, if applicable) was interviewed in their own home. Some were interviewed prior to their scheduled home visit by the CP; others were interviewed after the home visit. The timing of the interview depended on patient and clinician availability and agreement. Each clinician was individually interviewed in a private room within the MH-HiTH office. Interviews were guided by the Interview Guide for patients (in Appendix 5.5) and clinicians (in Appendix 5.6) These were developed informed by the literature[15,17,18] and discussion with the research team, who all had experience in qualitative research. Each participant was interviewed once only. Interviews were of 20–30-minute duration, audio-recorded, transcribed verbatim then coded and analysed thematically utilising an inductive approach[19] using NVivo® 12 Plus qualitative data analysis software (QSR International Pty Ltd, Chadstone, Victoria, Australia).[20] In order to establish qualitative rigour and credibility, the analysis was validated by adopting a consensus among the research team.[15] The researcher analysed the data independently and this was validated by academic and clinical senior colleagues (L.C. and V.P.). The COREQ checklist (see Appendix 5.7) was used to guide the reporting of the methods and results.[21]

5.2.5.1 Patient safety consideration

The safety of all patients' mental state was a paramount consideration. To ensure this study did not adversely affect any patients' mental state, they were first thoroughly assessed by a senior MH clinician using an 8-page assessment document. This is part of the usual admission process so it was not too onerous for the patient. The patient was then seen by a doctor from the MH-HiTH MDT to further assess their mental state and decide on a treatment plan. Before inviting

each patient to participate, the researcher first checked the patient's suitability by asking the patient's specific case manager (who is a clinician, i.e. a doctor, a clinical nurse or an allied health professional). If deemed suitable, the researcher asked the patient's case manager to invite them to participate. When a patient agreed to participate in the study, they gave informed consent. It was impressed upon the patient that agreeing or disagreeing to participate would not affect their MH-HiTH treatment in any way.

Each time the researcher went to a patient's home to interview them, a HiTH clinician accompanied the researcher on the home visit. The HiTH clinician did not participate in the interview. Their presence in the interview room was to reassure the patient and be on standby, in case the patient became distressed and required the clinician's help to manage this distress. The patient was given free choice to terminate the interview at any time. All patients and carers were interviewed during the course of the patient's MH-HiTH admission. Accordingly, after the interview, the clinician briefly spoke to the patient as part of their normal home visit routine.

Patients were given the option whether they wanted their carer to also attend the interviews. If the patient wanted the presence of their carer, the patient was given the choice whether they wanted the carer to participate in the interview or be simply present without participating. With the patient's consent, if the carer chose to participate, they were also asked to give informed consent to be part of the study. Every patient was given these options. No participants declined to participate after their initial agreement.

Due to the vulnerability of the patient participants, transcripts were not returned to the participants for comment and member checking was not undertaken.

5.2.6 Results

5.2.6.1 Patient and carer stakeholders

Twelve patients and one carer completed interviews as planned, with none withdrawing from the study. Saturation of themes was achieved by the end of the twelfth interview. The patient participants' demographics are summarised in Table 5.1. Fig. 5.1 is an illustrative representation of the main themes identified. The themes were the perception of patients and carers that CPs provided a valuable service as part of the MH-HiTH MDT, that CPs were

beneficial in bridging the gap to other health services and that CPs provided a valuable medication review service during their home visit.

Table 5.1 Patient demographics

Patient	Age group (years)	Gender	Profession	Psychiatric Diagnosis	Visited by the HiTH pharmacist before the research interview?
1	45-60	F	Housewife	Depression	No
2	18-30	F	Not stated	Not stated	No
3	30-45	M	Labourer	Borderline personality disorder	No
4	30-45	F	Boat skipper	Bipolar disorder	No
5	30-45	F	Journalist	Bipolar disorder	Yes, during a previous HiTH admission
6	30-45	M	Plumber	Bipolar disorder	Yes
7	>60	F	Housewife	Schizoaffective disorder	Yes
8	45-60	F	Housewife	Schizophrenia	Yes
9	45-60	M	Not stated	Schizophrenia	Yes
10	45-60	F	Secretary	Bipolar disorder	Yes
11	30-45	M	Mine surveyor	Psychosis	Yes
12	45-60	F	Assistant tailor	Schizophrenia	Yes

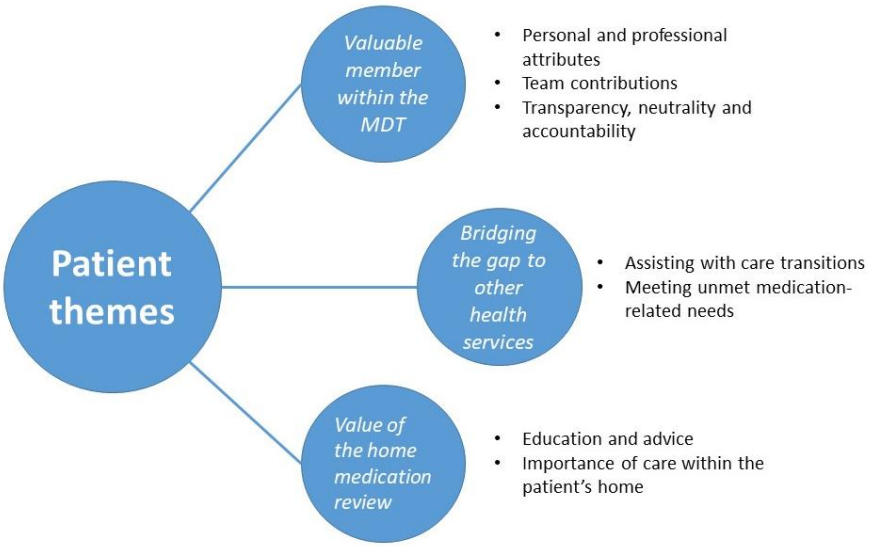

Figure 5.1 Themes describing the CP emerging from patient/carer interviews

5.2.6.1.1 Theme 1: Valuable member within the MDT

The patient participants almost universally reported high levels of satisfaction with the CP within the MH-HiTH. This was aligned with generally positive perceptions of the MH-HiTH service as a whole:

> *"I do recommend HITH because, like I say I have had it with my son and I have had it for myself and I have found them to be really good."* (P1)

Both the *personal and professional attributes* of the pharmacist(s) seem to have contributed significantly to this positive impression, with the pharmacist(s) described as helpful, pleasant, knowledgeable and thorough:

> *"I find them really, really helpful."* (P4)

> *"He was very pleasant. Pleasant yes. I think we got on quite well together."* (P10)

> *"Very knowledgeable in what he was talking about."* (P3)

Patient stakeholders also highlighted positive contributions of the pharmacist to the overall success of the MH-HiTH as a *team*. The multidisciplinary approach, where each member contributed to patient care, rather than practicing in isolation, was perceived as important by patients, and the pharmacist was seen as an essential member of this team:

> *"So that's good to know that people are communicating about my care."* (P5)
>
> *"So you know like people say different things at times, better to have an opinion of many rather than just one."* (P2.1)
>
> *"I think it's a good way to set up a chain of command sort of thing."* (P6)
>
> *"To not have a pharmacist on the team [pause]. I think… I think it's essential [to have one]."* (P1)

The CP role was valued to the point that the need for additional pharmacists was recognised:

> *"I understand there is a lot of patients and limited resources."* (P5)

Given the pivotal role of medicines in the management of mental health disorders, and the pharmacist's role as the 'medicines expert', it was interesting that there were conflicting perceptions among the patient participants on the *transparency, neutrality and accountability* of the pharmacists' role (including in relation to medicines), with implicit comparisons to other members of the MDT. Some participants were very positive about the pharmacist's position within the team:

> *"They are more neutral and I perceive them to be more neutral so it is."* (P5)
>
> *"Very open about what he was doing."* (P3)

One patient, however, questioned the pharmacist's neutrality and accountability, perceiving that they had an agenda to promote the interests of the pharmaceutical industry and simply completed the task of providing the expected information, without any real interest in the patient's welfare:

"I don't think the pharmacist is educated enough in that way. I think they can only go off a brochure that has been issued by the company and at the end of the day I think the pharmacist can recommend whatever they want but I don't think they are ever going to be accountable for anything." (P6)

"I think it is more or less aimed at him discharging his duty to make sure he gives me all the correct information." (P6)

Other patients reported that doctors and nurses were their preferred source of medication-related advice, suggesting that medicines were not seen solely as the pharmacist's remit within the MDT:

"I don't think the pharmacist can actually help me. I think I need to speak to the doctor if I am very concerned about something." (P10)

"If there is any medication that they are going to add on, then I would ask the nursing clinician." (P2.1)

5.2.6.1.2 Theme 2: Bridging the gap to other health services

One of the major perceived benefits of the MH-HTH service was its ability to "bridge the gap" for patients between other health services, and assisting with transitions of care:

"I think there was an essential gap between the hospitals and the mental health clinics and I think that HITH provides [bridges] that gap." (P1)

"You are still caring for us and it's beneficial, so you have to look after us, we won't fall down and you have given us a month to get on our feet." (P12)

Several participants discussed the CP's particular role in *assisting with these transitions*, firstly in facilitating accurate medication provision at discharge, and secondly in the timely and effective transfer of medication-related information to community-based health professionals:

"Good because they got the medicine right." (P1)

"Their role is much important for supplying the medication." (P2.1)

"I guess the whole point of having HITH dispense medications is that you don't have to pay for it and we get it sooner." (P5)

"She is saying like when HiTH stop seeing her and she goes to the GP [general practitioner] and the GP prescribes medication, at least the pharmacists will know about it and what medications Mum is on." (P7)

"He advised me what to do when I go to the pharmacy, to give them the list on the back of the Webster pack." (P10)

Not all patients were aware of, or valued the CP's role in liaising with community pharmacists, however, detailing instances of ongoing confusion despite the CP's liaison activities, and wasted effort in liaising with the patient's non-preferred community pharmacy:

"When I saw the pharmacist yesterday, she was a little bit confused herself about really what was going on and then she sorted everything out, which is two [blister] packs." (P10)

"I don't mind either way I can just go back to the one that the pharmacist mentioned or I will just go back to the pharmacy where I work, as it is more convenient for me on my way to work. And if I go back to work, I will probably get whatever is easier for me." (P8)

"She asked why do we need the communication between the HITH pharmacist and her local pharmacist. She didn't see there was an advantage." (P7)

Patient participants also identified the potential for the *CP to meet medication-related needs that were not currently being met by their community pharmacists*, or meeting these needs in a different or better way. Most reported having a good relationship with their usual community pharmacist, trusting their dispensing accuracy, knowledge and medication-related advice:

"The first thing people do when the doctor has written out the script is to take it to the chemist or pharmacist and we rely on them to get the medication right and if it's not the right thing it's up to the pharmacist to tell the person isn't it." (P1)

"I am on tramadol for that pain but before I was taking the tramadol, I was taking a lot of Nurofen® and I went to them to ask them, how much should I take and they were very helpful in that regard because I was taking way too many and yeah, they were really helpful in that regard." (P4)

"I think it is best to talk to pharmacist where you just go and ask questions and it is more convenient as well." (P8)

"They will frequently ask the question: 'Would you like the original or the alternative?' which must be the cheaper [one]." (P2.1, carer of P2)

Some, however, described perceived deficiencies in their community-pharmacy based care, either in the nature of their interactions with the pharmacists or the care that they had received, that could be remedied by the MH-HiTH CP - because of their high level of mental health knowledge, experience in better ways of working with people with mental health problems, and the non-transactional nature of the patient-CP interaction:

"Yeah, because I was so anxious to quit smoking that I was determined to leave the patch on. And then it just went all crazy and I think the pharmacist should advise people that this could happen." (P10)

"And I am not on a crusade for them to stop talking to me like… It just annoys me and sometimes it can come across as so patronising; you feel like being just as patronising back." (P6)

"I look at pharmacists as having a vested interest in people buying their gear." (P6)

"I look at the pharmacist as the person when you walk into a chemist, it's the person standing behind the desk who… and I give him the script and I say now give me what I want, here's the money." (P6)

5.2.6.1.3 Theme 3: Value of the home medication review

Patient stakeholders recognised the breadth and value of activities undertaken within the home medication review, especially the opportunity for receiving *education and advice:*

"They are used in the correct way so that the medications aren't abused." (P11)

"[The pharmacist suggested trying to [eat more fish or] *take fish oil as opposed to [solely relying on anti-inflammatory medications as it could] help… for arthritis…"* (P3)

"He gave me a brochure explaining the medication." (P6)

While patients recommended few improvements to the CP service, it was notable that when such recommendations were made, the majority related to receiving increased face-to-face medication-related education, highlighting the perceived value of this activity. These recommendations were more frequent from those patients yet to see the pharmacist in their professional capacity.

"I would actually like to see the pharmacist and just talk about the medications." (P4)

"If there is a time when I can cut the medication off. I don't want to rely on it for the rest of my life because I know it's bad to rely on medication." (P2)

"I would like to know how they work." (P4)

"It would be great if he could inform his patients ahead of what happens in the future when the HITH service is finished, it would be great." (P8)

"To ask about side effects and to be able to utilise and to access their expertise." (P5)

The importance of the medication reconciliation was also identified, and in particular, the benefits of this activity occurring *within the patient's home*:

"They asked to see my medication, they asked to see all my medication to do with everything I am taking. They went through it all." (P3)

Benefits of the home visit, as opposed to the pharmacist providing care within a healthcare setting, included the opportunity for face-to-face interaction, the ability to physically dispose of unwanted medication, and the potential involvement of the patient's family and/or carers:

"I would always be grateful to see him myself." (P12)

"It would be much better face-to-face. I get more value out of face-to-face than over the phone." (P4)

"He took away things that were expired and that were not needed anymore, so we didn't have to dispose of them." (P3)

"I found that very beneficial because my partner was able to be involved in as well." (P3)

While the home visit was highly valued, the importance of appropriate facilitation of the pharmacist visit, including preparation of the patient to expect to see a pharmacist in their home, was identified:

"I didn't know he was the pharmacist, I thought he was a nurse." (P6)

"I was not informed [the pharmacist] *was coming. I think that could have been done a bit better. It did not worry me but personally someone else could have been thrown off by it. Someone who is not open to that as what myself and my wife are."* (P3)

5.2.6.2 Clinician stakeholders

Among the 12 clinician participants, all of the disciplines working in the MH-HiTH MDT were represented, except the social worker, who was not available at the time of data collection. As shown in Table 5.2, most were nurses of varying seniority, reflecting the high proportion of MH-HiTH clinicians working in this discipline. The doctors were consultant psychiatrists and psychiatric registrars. The differentiation of rank within the medical and nursing hierarchy was intentionally not specified in these findings to maintain their anonymity. Saturation was achieved after the tenth interview, with an additional two interviews conducted to ensure no further themes emerged. Themes emerging from the clinician interviews are displayed in Fig. 5.2.

Table 5.2 Clinician demographics

Clinician*	Age group	Gender	Position	Years of practice
1	>60	F	Nurse	29
2	30-45	F	Nurse	12
3	30-45	F	Nurse	5
4	18-30	F	Other health professional	5
5	30-45	M	Nurse	13
6	30-45	M	Doctor	15
7	30-45	M	Doctor	14
8	45-60	M	Other health professional	30
9	30-45	M	Nurse	4
10	45-60	F	Nurse	35
11	45-60	F	Doctor	25
12	45-60	F	Nurse	38

* Clinicians 1-12 (nurses, occupational therapists, pharmacists and doctors) were randomly assigned a letter (A-J) when reporting the quotations below to protect their anonymity.

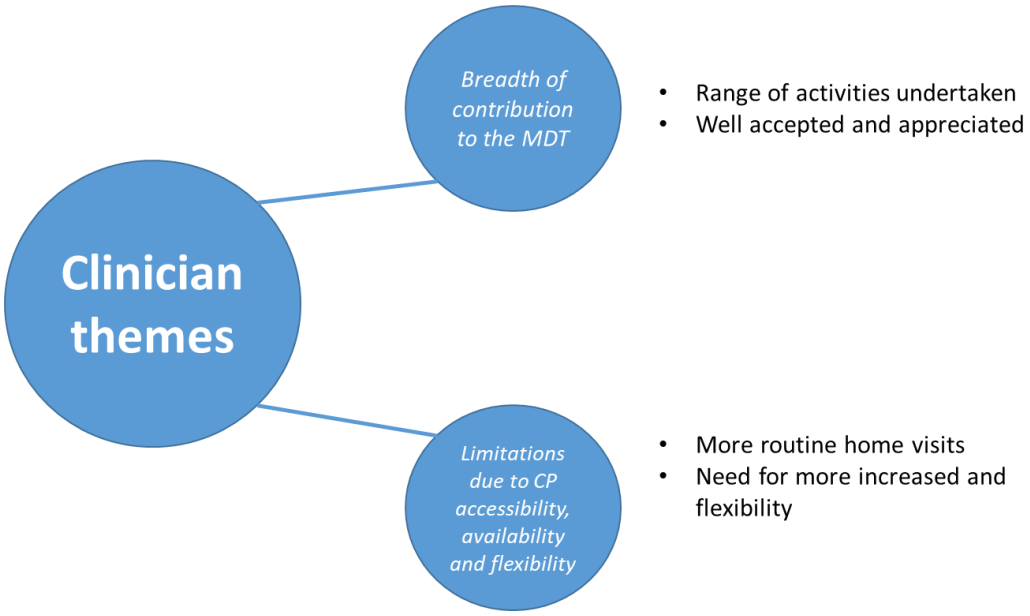

Figure 5.2 Themes describing the CP emerging from clinician interviews

5.2.6.2.1 Theme 1: Breadth of contribution to the MDT

Like the patients, the staff participants recognised a *range of activities undertaken* by the CP that contributed to patient care, although due to their awareness of the CP's "behind the scenes" activities, these were even broader than those identified by the patients, as seen in Table 5.3. These included not only "traditional" clinical pharmacy tasks, such medication reconciliation and review, and patient and staff education, but also less mainstream roles, potentially specific to MH-HiTH services, or this MH-HiTH in particular. These less traditional roles included facilitation of efficient and timely medication supply arrangements, community liaison, and *de facto* information technology (IT) support to the electronic health record. While several staff participants appreciated the CP's IT support role, and one suggested that the CP should largely assume responsibility for medication management within the software, it was not universally agreed that IT support beyond medication management was a pharmacist's role:

> *"I don't think it's the pharmacist's role with the Best Practice® [general software management], [the pharmacist's role is best suited to] just the medication part of it."* (Clinician I, doctor)

"Personally, I wanted them to use this program [name mentioned] *rather than Best Practice® [software], so I was not happy for [the MH-HiTH Clinical Pharmacist] to go off and do those templates because everything was falling over just nicely. To get a different program in now, we have got to wait until things come to a head."* (Clinician H, pharmacist)

Table 5.3 Quotes illustrating the range of the CP's contributions to the MH-HiTH MDT

CP contributions to the MDT	Illustrative quotations
Traditional clinical pharmacy roles	
Medication reconciliation and review	*"I have no concerns. What I found is they reconcile medications quite completely."* (Clinician B, doctor) *"They often pick things up that we missed."* (Clinician C, nurse)
Patient education	*"Patients have access to the pharmacist as well. If there's a patient that's interested in discussing medications, I know that the pharmacist is accessible to them, and eager to come and get involved."* (Clinician F, nurse) *"I think it would beneficial if they could be seen. I think it does actually help a lot with their education. I think the importance of the medication to their patient makes them more aware too."* (Clinician D, nurse)
Staff education	*"They're [providers of] information for us, when we're needing more information about certain kinds of*

	medications, or we don't really understand something." (Clinician F, nurse)
Less traditional clinical pharmacy roles	
Facilitation of medication supply via liaising with, or dispensing at, the hospital dispensary	*"The afterhours [procedure] is set up for us in case we need a script so that is well organised now from the pharmacy we go to; we don't have to pay; just pick up."* (Clinician D, nurse) *"For our patients, I understand that the medication is paid for by us."* (Clinician C, nurse) *"It would be less organised if you don't have a pharmacy here [on-site]."* (Clinician B, doctor) *"It's really good because we get instant… we've got an instant pharmacy [service], and the pharmacy's fantastic because I can take a script up and say: 'Look I'm going out to see someone,' and they'll do it now."* (Clinician E, nurse)
Community liaison	*"[The MH-HiTH Clinical Pharmacist] has been quite helpful in organising blister packs and, you know, liaising with the community pharmacy to make sure what we've got and what they've got is the same thing."* (Clinician J, nurse)
Information technology support role	*"Well yeah, on and off, I guess he is available and he is really good and it's sorted out almost instantly whereas if it was an IT issue you could be on the phone with HIN [IT department] for hours, you have to put in an EMPAC [work order]. It could be days before they do anything. It*

	would a lot more difficult." (Clinician A, occupational therapist) *"He's really supported me when I came here, in terms of getting on to Best Practice®, and helping us out."* (Clinician F, nurse) *"I think they would take a lot of time and is not easily approachable – ordinary IT people. That's what my experience."* (Clinician L, nurse) *"I think ideally, on admission, [the MH-HiTH Clinical Pharmacist] he should do it, okay and he should take charge of Best Practice®, and you know being a doctor this is a responsibility to inform him every time. Okay [the MH-HiTH Clinical Pharmacist], this patient, this medication I have changed it, okay, so just have a look."* (Clinician K, doctor)

Overall, the staff participants reported that the CP role was very *well accepted and appreciated* by staff and patients:

> *"Pharmacy services in HiTH is fantastic."* (Clinician D, nurse)
>
> *"The patients that I've asked that [the MH-HiTH Clinical Pharmacist] or [the other MH-HiTH Clinical Pharmacist] visited have been really appreciative."* (Clinician E, nurse)
>
> *"I feel more comfortable with having a pharmacist speak to patients about medications."* (Clinician J, nurse)

Staff stakeholders commonly reported valuing the CP's discipline-specific knowledge:

"They are so knowledgeable and very experienced." (Clinician A, occupational therapist)

"I think they have a very specific role and no-one can substitute them." (Clinician K, doctor)

Equally highly valued, however, were the non-technical skills that stakeholders identified that the CP brought to the MDT, including relatability, neutrality and collegiality:

"They just discuss things with them in a way patients can understand." (Clinician E, nurse)

"I think the pharmacists are seen as completely neutral." (Clinician C, nurse)

"It's always good because they can suggest [to] the medical staff, and I think the medical staff are more than happy to take their suggestion on board and write a prescription." (Clinician L, nurse)

5.2.6.2.2 Theme 2: Limitations due to CP accessibility, availability and flexibility

Given the almost universal support for the CP's role with the MH-HiTH, especially the activities undertaken as part of the home visit, it was unsurprising that the major limitations identified relating to the role related to the limited accessibility, availability and flexibility of the CP role. Participants reported a preference for *more routine home visits* for every patient. It was recognised that the CP sometimes simply did not have time within their workload allocation to undertake patient visits, and that this situation was compounded by the CP only being available during normal business hours, with no flexibility to undertake after-hours home visits:

"They try and go out and visit the patient's home when they can to, you know, have a chat to them about their medication, side effects, what they are on and adjust it accordingly but obviously not as much as they would like to and it's not a routine thing either." (Clinician A, occupational therapist)

"They have no direct contact to the patient most of the time, so it creates a lot of confusion and, almost every day." (Clinician K, doctor)

"I think lack of time to visit patients is one." (Clinician H, pharmacist)

"They're not able to do much, because they're busy in somewhere else, and in some other wards." (Clinician K, doctor)

"Their hours are only 9 to 5, and they're really quite flexible but if we go and see someone in the evening and it depends, you know and as we have a lot of difficulty organising visits." (Clinician E, nurse)

Some participants reported that the limited CP availability had led to them disregarding the potential of CP involvement, to the point that patients were also unaware that the MDT even included a CP:

*"We don't rely on them so much; I stopped thinking about the pharmacy – I don't. It's interesting I've stopped thinking about 'will I get [the MH-HiTH CP] out' or '*will I get *[the MH-HiTH CP] to come out' or 'will I try to get [the other MH-HiTH CP] to come out'."* (Clinician E, nurse)

"A lot of patients are not necessarily aware that they do have a pharmacist in the team who can go out even though they have been advised that you know it's a multidisciplinary team and that we've got everyone in the team." (Clinician A, occupational therapist)

A number of subsequent suggestions for improvement of the CP service related to *increased availability* of the CP and/or other pharmacists, with more *flexibility* to address after-hours medication-related needs:

"Come out with us more." (Clinician E, nurse)

"Well, one thing I mentioned is maybe being a little bit more proactive and doing one visit and try to see each patient. Maybe that's one possibility they can look at." (Clinician B, doctor)

"I think definitely for a team, if there was one full-time pharmacist allocated, I think it would be great." (Clinician I, doctor)

"It would be good if we had access to the pharmacy or a pharmacist to be able to ask these questions after-hours because we work until 10pm we don't have that." (Clinician C, nurse)

"It would be helpful if there's an on-call pharmacist or pharmacists, not assistants kind of much." (Clinician L, nurse)

There was one suggestion that patients are sometimes overwhelmed by visits from multiple health professionals, suggesting that better coordination of the CP home visit with that of another health professional would improve the experience for patients:

"I would prefer to see every patient but there are some where it's not applicable so in psychiatry you quite often have a patient who is under stress, they are not coping particularly well and they are getting pretty sick of telling the same story to everyone, if the pharmacist goes in there [and] wants to meet them and discuss their medication it's often too much of an added burden to the patient. So it's better to keep away and wait until they are better before you go and see them and certainly that's the case with inpatients here, it's much the same with [MH] HiTH patients as well." (Clinician H, pharmacist)

Beyond increased capacity to undertake home visits, the other recommendation for an increased focus of the CP role was staff education:

"I guess for me probably from a local level I would like to see more training and [the MH-HiTH Clinical Pharmacist] is aware of this because I had a conversation with him about this and just to kind of educate us about obviously the different drugs that we see on a day-to-day level. And also we know that the industry is not stagnant, so there is always new drugs coming out." (Clinician G, nurse)

5.2.7 Discussion

The findings of this study contribute significant insights into a CP's integration into, and contributions to an MH-HiTH MDT. The integration of a CP into the MH-HiTH MDT was well accepted by both patient/carer and clinician stakeholders. This acceptance appeared to be driven by the perceived value of the CP's professional activities, and also their personal attributes contributing to the overall culture of the team. Both interviewee groups identified the patient education role and facilitation of care transition as important benefits of the CP role; clinicians were more aware of the breadth of activities undertaken by the CP. The benefits of home visits were commonly reported. Few limitations of the CP service were identified. The main limitation was that clinicians wanted more access to the CP and increased flexibility and availability of this CP service.

The role of the CP was reported by participants to be well integrated within the MDT. This is an important benefit given the number of pharmacy services that have been implemented outside of an MDT, and potentially not met their full potential until this integration occurred.[22-24] A major facilitator of this integration of the CP when establishing the new MH-HiTH service[25] was the pre-existing collaborative working relationship between the hospital pharmacy department and other disciplines of hospital clinicians. In a similar way, Baker et al[12] found collaboration between pharmacists and GPs facilitated the establishment of the non-dispensing GP practice pharmacist.

Clinicians appeared to prioritise patient-facing activities, including facilitation of timely medication provision and patient education, while patients did not seem to be aware of the full range of CP activities. Previous research has also found that many patients are not fully aware of the role of the pharmacist beyond dispensing medication in a community pharmacy; for example, Crump et al. came to the same conclusion, specifically from an MH focus.[26] A possible solution to inform patients may be to educate the public as was trialled by Bairagdar's marketing campaign.[27] A similar campaign to raise awareness of the full potential of the MH-HiTH CP's may also assist in addressing some of the negative perceptions voiced by one of the patient participants. Clinicians did not mention the CP's role in therapeutic drug monitoring, especially regarding high-risk medications (such as clozapine and lithium); nor the opportunistic extra benefits on total medication management – not just psychotropic medications. A barrier that commonly arises whenever introducing a pharmacy service to a new setting is the lack of

awareness of the benefits pharmacists are able to provide to such a service.[27] Failure of the clinician participants to identify these less visible CP roles suggests that this barrier was also present in the MH-HiTH setting, despite the integration of the CP into the service. Future research focusing on the mechanisms by which the CP collaborates with the other members of MDT may inform strategies to increase awareness of the full scope of practice of the CP. Other potential extensions of this work include qualitative research involving community-based health providers, such as general practitioners, accredited pharmacists and community pharmacists, to identify and address any unseen gaps in the current MH-HiTH service, and to explore ways to foster working relationships to improve the hospital-to-home continuity of care process. This could particularly focus on communication of medication changes on patient transfer to follow-up clinicians, and how the MH-HiTH CP could add value to the information provided within the discharge summary.

Clinicians highly valued the home-based CP service, incorporating a medication review performed at the patient's home with follow-up of medication-related matters with the patient's MH-HiTH MDT and/or external healthcare providers, such as community pharmacists. The home visit part of the service was so appreciated by MH-HITH clinicians that they expressed their support for an increase in the CP's involvement in this way. Previous authors have also highlighted that 24/7 clinical pharmacy services may contribute to improving the perceived value of the CP service.[28] One of the benefits of the medication review during a home visit recognised by both participant groups was its ability to bridge healthcare gaps between hospital-based and primary care. While a mixed methods study by Hattingh et al. previously identified the benefits pharmacists can confer on medication management for people with mental illness in the community pharmacy setting,[29] another study has produced conflicting results as to whether the needs of MH patients are currently being met by the community pharmacy sector.[30] Within the current study, most patient participants reported good relationships with their community pharmacist, although some identified areas of suboptimal care. The MH-HiTH CP role may have particular advantages in meeting any potentially unmet needs.

5.2.7.1 Strengths and limitations

To our knowledge, this study presents the first qualitative evaluation of a CP role in the MH-HiTH. Having previously identified benefits in relation to completion of medication safety KPIs,[6] and co-incidentally encountering anecdotal evidence of the more subtle benefits of CP for patients, carers and clinicians, this study has provided a more comprehensive exploration of these perceived benefits. One limitation of this study is that the researcher was also one of the CPs providing the service to the MH-HiTH program. This had the potential to generate social desirability bias, although some clinicians provided very robust feedback. Every effort was made to reduce any bias this may have produced, including thorough review by experienced academics and clinicians who had previous experience with this study methodology. Few of the participants identified limitations to the pharmacy service. At the time of the research interview, some patients had not yet received a CP home visit. This may have limited their ability to comment on the full CP service. However, this study was intentionally designed to interview both groups of patients, those who had received a CP home visit and those who had not – for the very reason of elucidating the difference in patient awareness of the role of a CP within healthcare in general, and MH-HiTH in particular.

5.2.8 Conclusion

This study showed that MH-HiTH clinicians were appreciative of the benefits of integrating a CP in the team. Some were, however, disappointed by the lack of resources that limited the time allocated to the CP in their MH-HiTH program. Conversely, most patients/carers were not fully aware of the role of the CP within their healthcare team. Those patients who had experienced the home-based medication review by the MH-HiTH CP appreciated the provision of medication information and assistance with medication management, but were not aware of other aspects of the role. Increased funding for the CP role could allow greater visibility and utility of the CP by allowing more frequent home visits. More research in the MH-HiTH setting may help elicit strategies to better inform the public of the contribution of CPs to optimal medication safety and management, and improve collaboration with community-based health providers at the continuum of care.

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5.2.10 Conflict of Interest

The researcher (M.F.) is employed as the main MH-HiTH Clinical Pharmacist for the service involved in this study.

5.2.11 References

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Chapter 6: Discussion

6.1 Introduction to the chapter

The research presented in this thesis represents, to our knowledge, the first comprehensive, multifaceted evaluation of a CP in the MH-HiTH setting and has therefore contributed significantly to the understanding of the role of a CP in the MH-HiTH setting in WA. The key findings described in this discussion chapter relate to the four studies that form each of Chapters 2 to 5 of this thesis. As discussed previously, the four studies addressed core elements of an evaluation of a complex intervention, as recommended by the MRC.[1] The conclusions are intended to inform future strategies in improving medication safety in the MH-HiTH setting, with a specific focus on the role of a CP in facilitating quality use of medicines in this setting. This chapter considers the strengths and limitations of the studies that were undertaken and leads onto the implications for future practice and research that are discussed in the next chapter (Chapter 7: Conclusion and Recommendations). The findings of the four studies presented in this thesis fall into four main concepts, aligned with the components of clinical pharmacy services provided in MH-HiTH as identified in the scoping review, and presented in Table 6.1. This discussion will explore the findings of the four studies under these main "themes".

PhD STUDY	KEY FINDINGS			
Scoping review (Chapter 2)	HMR	Clinical pharmacy	Care transition	Mental healthcare focus within MDT
Autoethnography (Chapter 3)	Home visit	Transition in care setting for CP (hospital to home)		MDT integration (including IT role)
Retrospective audit of KPIs (Chapter 4)			Medication safety, especially at care transitions	
Qualitative analysis with stakeholders (Chapter 5)	Value of home medication review	Discussion of varied contributions to medication management	Bridging the gap to other health services	Valued role in MDT/breadth of role; Limitations due to capacity

Table 6.1 An overview of the key findings in this PhD thesis

HMR: home medication review, MDT: multidisciplinary team, CP: clinical pharmacist, IT: information technology, KPI: key performance indicator

6.2 Medication reviews in the home setting

The value of the medication review in the home setting was demonstrated in the scoping review, autoethnography, and qualitative stakeholder perspective study of this thesis. It was found that a medication review at a patient's home by a CP specialising in MH was able to detect and address MRPs, including those related to physical healthcare issues – the latter

being sometimes inadvertently neglected during psychiatric admissions. Patients would benefit from the CP following up any identified MRPs with the MH-HiTH MDT, with any physical healthcare issues usually referred to a GP.

The scoping review identified that pharmacist home visits also allowed for patient education in the home, improving patient knowledge about their medications' role in treating their health conditions. The literature indicates pharmacists have demonstrated they can facilitate improvement of patients' health literacy.[2] There is evidence to indicate that improved patient education and health literacy lead to improved quality of life (QoL), which is an important indicator of wellbeing as QoL can reflect a patient's overall health situation by measuring four dimensions: physical health, physiological health, social health and mental health.[3] This is particularly relevant in the patients with mental illness as their QoL depends primarily on improvement to mental health, with interlinked improvements in social health and subsequent physical health and physiological health.[4] Improved health literacy in patients with mental illness can reduce duration of untreated mental illness and enhance recovery.[4] Evidence indicates pharmacist-delivered patient education can improve health outcomes in people with mental illness by improving mental health parameters such as anxiety and depression scores,[5] as well as physical health scores[5] along with physical health outcome measures such as glycosylated haemoglobin, blood pressure and percent time in therapeutic range in patients taking anticoagulants.[6]

Against this background of accepted home visit services by CPs, some with evidence of benefit to patients, the PhD candidate described in the autoethnography how the Australian HMR model was informative of, and integrated into, the framework of the MH-HiTH CP service from its establishment. There were challenges (e.g. time and workload), which were also identified in the scoping review, however the HMR model proved very useful in translating CP services in the hospital to the HiTH. A strong focus on the home visit and medication review aspects of the CP service have remained to this day.

Additionally, pharmacist-delivered medication education is one of the aspects of the CP service that was identified as valuable by both patients and clinicians in the qualitative study (Chapter 5). When patients made suggestions on how to improve the CP service, they typically related to the provision of more face-to-face medication-related education in the patients' homes.

Similarly, clinicians reported wanting more routine home visits for every patient, highlighting the perceived value of this important patient-facing activity.

6.3 Benefits of clinical pharmacy services in home-based care settings

Before conducting this PhD research, there was a dearth of literature about CP services in the HITH setting, with the literature even more scarce in the MH-HiTH setting. The research presented in this thesis has contributed to the emerging literature in this area since that time. As discussed, use of the scoping review methodology allowed clear identification of four main facets to the role of the MH-HiTH CP – clinical pharmacy, home medication review, medication reconciliation during care transition and the integration of the CP into the MDT. Preliminary evidence demonstrated that the CP can positively contribute to patients' healthcare in the MH-HiTH setting by identifying and resolving MRPs and improving medication adherence.

These findings align with other authors' conclusions about the value of the pharmacist across an expanding range of practice settings,[7] including MH-HiTH. In the UK, the Royal Pharmaceutical Society has outlined how the pharmacy profession can contribute to MH care, stating primary and community-based pharmacist medication management skills potentially have the greatest underutilised impact on supporting people with mental illness.[8] This focus on mental healthcare in the community setting highlights the importance of the MH-HiTH CP performing the tasks related to inpatient clinical pharmacy (medication reconciliation on admission and discharge, identifying and rectifying MRPs and conducting TDM) while patients are being treated at home, in addition to providing a medication review in the patient's home.

The value of CP services to MH patients was demonstrated by Ng et al., in their recent systematic review of the literature.[9] This review examined published studies exploring pharmacist-led interventions in any setting for people with severe and persistent mental illness. In the 37 studies examined, it was found that more than half of the pharmacist interventions were multifaceted. The most common components of these complex interventions were patient education, provision of recommendations to healthcare professionals and conducting medication reviews. Although this review did not find any studies from in the MH-HiTH setting, the multi-faceted nature of the pharmacist interventions in the studies it reviewed were similar to the ones reported in the studies of this thesis. The similarities in the main pharmacist activities included patient education, recommendation to healthcare professionals, medication

review, as well as clinical assessments and monitoring. The systematic review found that pharmacist interventions are associated with significant improvements across a broad range of health outcomes, including medication adherence, QoL, reduced disease progression, reduced symptoms, reduced hospitalisations and reduced antipsychotic polypharmacy.[9] Given the similar focus in activities, we can hypothesise that the MH-HiTH CP service may result in similarly improved outcomes, although a direct assessment of clinical outcomes was outside the scope of this work.

El-Den et al.[10] also described the role of the pharmacist in mental healthcare. They reported an important benefit of the pharmacist in mental healthcare is being an accessible and trusted health professional who could support patients with their medication management. Chapter 5's qualitative study found that patients, carers and clinicians also reported on multiple ways by which the CP contributed to medication management.

The findings of the scoping review were also aligned with the recent description of the evolving responsibilities of the pharmacist in the broader HiTH setting – albeit from an OPAT perspective – by Docherty et al.[11] In their paper, Docherty et al. stated that the role of the HiTH pharmacist is evolving from being involved primarily with dose preparation and supply of medications to the provision of clinical services. Relating to the same concept described by Docherty et al., the autoethnography (Chapter 3) described how the expertise of a HiTH CP in medication management ensures that they are an integral member of the HiTH MDT. The CP's role ensures the safe and quality use of medicines, particularly across transitions of care. As was stated in Chapter 5, the CP takes on the roles of educator and consultant to patients and health professional colleagues.

Further evidence of the benefits of MH-HiTH services has also recently been published. Towicz et al.'s 2021 review described the utility of the MH-HiTH model of care delivery.[12] Although Towicz et al. did not mention the presence of a CP in MH-HiTH, they reported themes that are concordant with the findings uncovered in this thesis, including evidence indicating patient, carer and staff satisfaction with the MH-HiTH treatment modality.

6.3.1 Comparison of service models incorporating a non-dispensing pharmacist

There are a number of commonalities between the scoping review findings and other emerging non-traditional roles for clinical pharmacists, including non-dispensing general practice clinic

pharmacists, medication review pharmacists and hospital-based discharge liaison pharmacists. This concept also aligns with the autoethnography's discussion of the translation of CP services to different health settings in that some of the roles are not home-based.

6.3.1.1 Non-dispensing general practice clinic pharmacists

This new service model is gaining momentum as its benefits are being realised.[13,14] It has been shown to improve the timeliness and completion rate of pharmacist medication reviews.[15] An important strength of the medication review process is conducting medication reconciliation, providing the GP with a current and accurate medication list as they start the consult. This avoids wasting the GP's time in enquiring about medication changes post-hospital discharge, for example. This activity is concordant with clinicians' perceived value of the benefit of the medication reconciliation role discussed in Chapter 5.

6.3.1.2 HMR/RMMR pharmacists

One of the major focuses of the HMR or RMMR model[16] is the use of a pharmacist-conducted medication review, based in the patient's residence, to detect medication issues. One of the objectives is to inform the GP of any MRPs at the residential level. A difficulty with this model, however, is that the feedback loop between pharmacist and GP may not be optimised to allow two-way communication.[17] The MH-HiTH pharmacist, however, has an advantage in being integrated within the HiTH team, facilitating attendance of daily MH-HiTH MDT meetings, following-up any medication issues, ensuring urgent ones are not forgotten and less urgent ones are planned to be monitored or addressed in a clinically appropriate time frame.

6.3.1.3 Hospital-based discharge liaison pharmacists

These appear to perform some tasks[18,19] that are similar to the step-down, early discharge HiTH pharmacist but they are not involved in admission avoidance (unlike the MH-HiTH pharmacist). These tasks include medication reconciliation on discharge, identification and addressing any MRPS and communication between with the community care providers, such as the community pharmacy, to support continuity of medication supply once the patient is discharged. This is especially important for medications with additional recording and monitoring requirements, such as clozapine, methadone or buprenorphine.

Such services are not routinely integrated into a team like HiTH nor do they routinely do home visits. The advantage of the MH-HiTH CP who is integrated into the MH-HiTH MDT is that they follow-up all these issues, ensuring they are satisfactorily completed, whether an inpatient hospital pharmacist had done such liaison tasks or not. This is of particular importance for high-risk medications such as clozapine, lithium and opioids.[20]

6.4 Importance of medication safety during transitions of care

The benefit of CP services during transitions of care is well established,[21] particularly relating to the HiTH setting.[22] CP activities including medication reconciliation during transitions of care have been shown to improve patient care.[23] The retrospective audit described in Chapter 4 demonstrated the benefits conferred by the involvement of a CP within an MH-HiTH MDT in terms of improving medication safety KPIs, validating the CP's strong focus on medication reconciliation. In the qualitative study, one of the main themes raised by patient stakeholders related to bridging the gap to other health services, particularly during transitions of care. They provided valuable insights describing the value of the CP in ensuring that medications were accurately provided at discharge, and in the transfer of medication-related information to community-based health professionals, such as GPs and community pharmacists. Clinician stakeholders also perceived value of the CP's facilitation of medication supply, and community liaison role. The CP was seen to meet patients' medication-related needs at transitions of care that could not be met by other health professionals, including, in some cases, other pharmacists.

6.5 The significance of including a CP in the MDT

CP interventions improve outcomes specifically in patients with severe and persistent mental illness.[9] Yet, prior to the publication of the study in Chapter 4, to our knowledge, there was no published evidence of the value of the CP in MH-HiTH setting. Some of the results of this study depended on the care provided by other members of the MDT team – not just the CP. The improvement in medication safety parameters was likely a culmination of the combined contribution of the members of the MDT. The importance of interdisciplinary communication and cooperation was highlighted in a randomised, controlled study by Gurwitz et al.,[25] who found a multifaceted CP outpatient intervention, including an in-home assessment, did not

make a significant difference in the rates of clinically important medication errors or adverse drug-related incidents. The authors postulated this was because the patient's GP was not part of this trial. The medication safety study in this thesis (Chapter 4) demonstrated that medication safety key performance indicators were improved within the MH-HiTH MDT that incorporated a CP, in comparison to another MH-HiTH MDT without a CP. Although the findings of this study indicate the presence of a CP improved medication safety KPIs, the contribution of other members of the MDT, and the fact that the CP was so effectively integrated into the MDT, was likely synergistic in the improvement of medication safety. This acceptance of the CP and their important role within the MDT was further highlighted by the clinicians' recognition of the pharmacists' clinical, technical and collegial contributions to the team, as described in the qualitative analysis (Chapter 5).

6.6 Strengths and limitations of this research

6.6.1 Strengths of this research

One of the strengths of this PhD was the use of a mix of traditional and emerging methodologies in pharmacy practice research. The scoping review collected information from a diverse variety of sources to explore the extent to which clinical pharmacy service in the MH-HiTH setting were known or documented in the traditional peer-reviewed literature. Because no randomised controlled trials were found, the scoping review method was utilised for its advantage of allowing the researcher to include various sources of information beyond the traditional peer-reviewed published literature, namely grey literature such as hospital guidelines and models of care, within a structured and methodical framework that is well established in the literature.[27] Although not published in peer-reviewed journals, the grey literature proved to be informative in terms of the pragmatic aspects of MH-HiTH practice. Assessing grey literature was useful to detect all relevant references relating to the current role of an MH-HiTH CP in various hospitals or health services.

Another strength of this thesis was the use of the autoethnographic research method to describe the establishment and evolution of an MH-HiTH CP service. The autoethnographic method was useful in providing a record of a clinical pharmacy service in a setting that was, to our knowledge, previously unknown to the literature. After the publication of this thesis'

autoethnography article, the importance of the autoethnographic method in pharmaceutical learning and teaching started to become more apparent, with more publications utilising this methodology in promoting cultural and humanistic competences for the purposes of patient-centred care, via its critical and reflective features.[28] PhD student autoethnographic research reflective writing is also starting to emerge in the literature.[29]

The major strength of Chapter 4's medication safety KPI study was its objectivity, which complemented the qualitative analyses performed in the autoethnography (Chapter 3) and stakeholder interviews (Chapter 5). It provided evidence against well-accepted KPIs within the health service – KPIs that would be especially meaningful to hospital administrator stakeholders in supporting the value of the CP service. It also took advantage of a unique window in time when there were two closely located MH-HiTH sites that were very similar in their characteristics, apart from CP involvement, reducing potential confounding factors that could have affected medication safety KPI completion.

The stakeholder consultation study in Chapter 5 had strengths in being, to our knowledge, the first qualitative evaluation of a CP role in the MH-HiTH setting. The literature indicates that qualitative interview research methods provide an in-depth understanding of participants' experiences and perceptions.[26] The study provided a comprehensive exploration of the perceptions of important MH-HiTH stakeholders – namely patients, carers and clinicians. Another strength of this study is that it reported these stakeholders' perceptions of the benefits and limitations of the MH-HiTH CP role. A particularly important strength of this study was the consultation of a peer support group during the design of this study in order to obtain optimal benefit of research findings that could be translated to improved patient care, while ensuring the interviews performed in the study did not compromise the mental health of the patients and carers who agreed to be involved.

6.6.2 Limitations of this research

A limitation of the research presented in this thesis is that it did not contain any RCT evidence to support the inclusion of a CP within MH-HiTH. While this means the level of evidence is low according to the National Health and Medical Research Council evidence hierarchy (level III-2),[30] it provides a starting point on which future research could built. While the retrospective quantitative analysis demonstrated objective evidence of improvement of KPIs related to

medication safety the CP service, neither it, nor any of the research presented in this thesis, directly measured the impact of the MH-HiTH CP on patient outcomes. Future studies should aim to study more direct outcome measures, such as medication-related adverse events and medication-related rehospitalisation rates.

Although the scoping review did not convene an expert panel to gather more ideas about the topic, as suggested by Arksey and O'Malley,[27] this deficiency was compensated for in the qualitative study, where semi-structured interviews were used to gain stakeholder consultation and benefit from their views. This is important because such a new service may not necessarily have "experts" yet, so the stakeholders' (patients and clinicians') views became most important in providing feedback to administrators and clinicians alike.

A recognised limitation of the autoethnography was that it was presented a first-person point of view relating to the establishment and evolution of one MH-HITH CP service. While every effort was made to eliminate any bias by utilising a *descriptive-realistic*[31] autoethnographic writing style, it was still a subjective narrative. This setting was limited to one MH-HiTH CP service in the state of WA in Australia, which was also true for the subsequent two studies (the quantitative and qualitative analyses). Healthcare practices may differ elsewhere so the findings may not be translatable to other settings. Future studies in other MH-HiTH settings are needed to confirm and extend the findings of this thesis.

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Chapter 7: Conclusion and Recommendations

7.1 Conclusion

This thesis has identified that there was benefit in embedding a CP into the MH-HiTH setting through both quantitative and qualitative analyses. Preliminary evidence demonstrated the incorporation of a comprehensive CP service into an MDT MH-HiTH program improves medication management, and detects and addresses MRPs. It suggested the MH-HiTH CP role supports the delivery of safe and effective pharmacotherapy, by conducting medication reconciliation at care transfer, TDM, providing medication information support to MDT members, and a home visit focused on medication review, pharmacoeducation and medication adherence support. Given the limited literature available to inform the MH-HiTH CP role, its establishment proved challenging, but the CP successfully integrated into the MDT, translating knowledge and experiences of in-hospital CP services, as well as CP services provided in the home medication review setting, into the novel MH-HiTH practice setting. Integrating the CP service within the MH-HiTH MDT approach has evolved to now be conventional practice in WA. The value of CP integration as an important medication safety initiative was confirmed, through significantly improved medication safety KPIs when compared to another MH-HiTH service with no CP. Finally, the integration of the CP into the MDT was appreciated by MH-HiTH clinicians, albeit with disappointment at the lack of time resources allocated to the CP in their team. The patients who had experienced the home-based medication review by the MH-HiTH CP appreciated the provision of medication information and assistance with medication management, but were often not aware of other aspects of the CP's role. Other patients and carers were mostly unaware of the role of the CP within their healthcare team.

7.2 Recommendations for future clinical pharmacy practice in MH-HiTH

It is hoped the learnings acquired from the research presented in this thesis will provide useful information for a hospital administrator who is considering establishing an MH-HiTH CP service, as well as informing a CP who has not previously worked in MH-HiTH. The benefits of incorporating a CP in an MH-HiTH MDT (or similar MH and home-based services) as demonstrated within the scoping review, as well as the findings of the medication safety quantitative study support the provisional recommendation that embedding CP services into

MH-HiTH become standard practice, pending future investigation of the clinical outcomes of a CP service. This recommendation was further supported by the stakeholder's perceptions of the value of the service as reported in the qualitative study.

In addition, the feedback provided by clinician stakeholders clearly supports a recommendation that future MH-HiTH CP services should aim to reflect the round-the-clock nature of HiTH to optimise the availability of, and accessibility to the CP. Should resource limitations require prioritisation of particular CP activities, however, this research has provided evidence that the most valuable activities are those that facilitate care safe care transition and timely access to medication; together with the CP-conducted medication review at the patient's home, which was especially valued as an opportunity for pharmacoeducation.

7.3 Recommendations for future research directions

Finally, it is hoped that, as this thesis exposed some of the gaps in the literature, coupled with the limitations of the studies presented herein, future researchers would see this as an opportunity to conduct further research in a range of related areas.

7.3.1 Integration of CPs within MH-HiTH MDTs

Since the integration of CPs in MH-HiTH programs is a relatively new concept, there is limited literature describing the CP role in MH-HiTH. More research is needed to understand the role of the MH-HiTH CP interstate and internationally. It is promising that a recent article published in the *Medical Journal of Australia* stated that the Australian Medical Association is calling for integration of pharmacists in general practice.[1] This signals closer co-operation between the medical and pharmacy professions in the community (i.e. for outpatients). Recent studies have also illustrated the benefits of such a practice model.[2] It is hoped that this collaborative approach will extend to broader integration of CPs in MH-HiTH MDTs.

Future research focusing on the mechanisms by which the CP collaborates with the other members of MDT may inform strategies to increase awareness of the full scope of practice of the CP. Other potential extensions of this work include qualitative research involving community-based health providers, such as GPs, accredited pharmacists and community pharmacists, to identify and address any unseen gaps in the current MH-HiTH service, and to explore ways to foster working relationships to improve the hospital-to-home continuity of care

process. This could particularly focus on communication of medication changes on patient transfer to follow-up clinicians, and how the MH-HiTH CP could add value to the information provided within the discharge summary.

Integrating a CP in an MH-HiTH setting could be a useful method to improve medication adherence in patients with mental illness. A future study could assess the medication adherence in this patient population using a validated medication adherence tool, such as the ones used by Witry et al.[3] or Moon et al.[4] The rate of medication non-adherence in the MH population is known to be a barrier to optimal pharmacotherapy,[5] and patient education provided by a CP can improve medication adherence.[6] Identification of the reasons for non-adherence may be beneficial in reducing this rate. Another direction may be to develop and validate such tools that are more culturally sensitive to First Nations Australians.

Pharmacists can contribute the improvement of patient healthcare. More research is needed to evaluate the role of the CP in supporting the MH-HiTH MDT in optimising the physical health of MH patients, e.g. via appropriate referrals to GPs or other healthcare providers. CPs may assist the MH-HiTH MDT by prompting, monitoring and advising appropriate GP referral for their patients' physical health conditions. As there is often a complex inter-relationship between physical and mental health, supporting MH patients in attending to their physical health needs is vital.

7.3.2 Evaluation of the utility of medication reconciliation by a CP in MH-HiTH

More research is required to demonstrate the utility, and associated clinical outcomes of the CP in communicating an accurate reconciled medication list with a medication management plan (e.g. planned duration, dosage adjustments, monitoring) to MH-HiTH MDT personnel as well as other clinicians post-discharge from HiTH, such as GPs and community pharmacists.

7.3.3 Improving medication safety in MH-HiTH

This thesis demonstrated an MH-HiTH service with a CP as part of the team had improved medication safety KPIs. An exploration of how the CP could reduce preventable medication errors especially during transitions of care would provide an insight into how medication safety processes could be improved. A recent systematic review by Ng et al.[7] found that pharmacist-led interventions improve MH patient outcomes. Even though this systematic review searched

for RCTs from all healthcare settings, none were presented from MH-HiTH settings. A future study could, therefore, investigate the effect of CP integration in an MH-HiTH program on patient outcomes, including medication-related hospital readmission rates and ED presentations, utilising the prescribing safety indicators specific to MH recently developed by Khawagi et al.[8]

A RCT could examine whether the incorporation of a CP in an MH-HiTH MDT could contribute to reduced medication-related hospitalisations, shorter LoS and minimisation of medication-related readmissions. Studies from similar home-based practice settings support the CPs' ability to improve patient outcomes,[9,10] however in some MH-HiTH settings, the contribution of CPs was limited by inadequate time allocations, heavy caseloads and insufficient personnel. Further research in the MH-HiTH CP model is required to optimise the efficiency of service delivery, and allow comprehensive evaluation of clinical outcomes.

7.3.4 Pharmacoeconomic evaluation

The time required for travel to conduct a medication review during a home visit has been identified as a barrier to implementing MH-HiTH CP services. A pharmacoeconomic evaluation may be useful in providing a comparison of the benefit afforded by this service with the financial burden associated with CP travel time, with telehealth being another option that could be evaluated. Bugeja et al. recently evaluated the cost and benefit of incorporating a pharmacist into a Maltese OPAT service.[11] Given the similarity of OPAT and HiTH services, Bugeja's research method could be adjusted to suit the MH-HiTH setting in Australia. Dooley et al. evaluated an actual figure of cost savings to eight Australian government hospitals as a direct result of inpatient hospital CP interventions.[12] Al-Qudah et al. also evaluated the cost-benefit of CP interventions but in the outpatient setting, involving an HMR.[13] Either study design may be utilised in the MH-HiTH setting, to test the hypothesis that CP integration in MH-HiTH directly provides cost savings to the hospital, and to inform a formal *bed-to-full time equivalent* CP allocation to MH-HiTHs, as is seen for other specialties, including general HiTH.[14]

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Appendices

Appendix 1 Approvals related to this thesis

Appendix 1.1 NMHS-MH Human Research Ethics Committee (HREC) approval

Government of Western Australia
North Metropolitan Health Service
Mental Health

North Metropolitan Area Mental Health Services Human Research Ethics Committee
Brockway Road
MOUNT CLAREMONT WA 6010

03 May 2017

Mr Mechaiel Farag
Pharmacy Department, Brockway Road
MOUNT CLAREMONT WA 6010

Dear Mr Farag

PRN: RGS0000000186
Project Title: Clinical Pharmacist Involvement in Mental Health Hospital in the Home
Protocol Number: 13042017-ver2

Thank you for submitting the above research project for ethical review. This project was considered by the North Metropolitan Area Mental Health Services Human Research Ethics Committee at its meeting held on 03 May 2017.

I am pleased to advise you that the North Metropolitan Area Mental Health Services Human Research Ethics Committee has granted ethical approval of this research project.

The nominated participating site(s) in this project is/are:

Graylands Hospital, Sir Charles Gairdner Hospital Mental Health Unit

[Note: If additional sites are recruited prior to the commencement of, or during the research project, the Coordinating Principal Investigator is required to notify the Human Research Ethics Committee (HREC). Notification of withdrawn sites should also be provided to the HREC in a timely fashion.]

The approved documents include:

Document	Version	Version Date
6 WA_Health_Research_Protocol - MF --- ver8 13 04 2017 Tracked changes	2.00	13/04/2017
Ethics Investigator Response Letter 26 04 2017	1.00	26/04/2017

Ethical approval of this project from North Metropolitan Area Mental Health Services Human Research Ethics Committee is valid from 03 May 2017 to 03 May 2021 subject to compliance with the 'Conditions of Ethics Approval for a Research Project' (Appendix A).

The following project specific conditions must also be met:

The Committee recommends that the carers can attend the interview without participating in the

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Appendix 1.2 NMHS-MH HREC approval extension

Farag, Mechaiel

From: donotreply@rgs.health.wa.gov.au
Sent: Monday, 15 February 2021 11:09 AM
To: Farag, Mechaiel
Subject: RGS: Monitoring Validation Completed for Ethics (Automated Message - Please do not reply)

Dear Mr Mechaiel Farag

PRN: RGS0000000186
Project Title: Clinical Pharmacist Involvement in Mental Health Hospital in the Home
Protocol Number: 13042017-ver2

Only you have received this email as you made the submission for validation. If you require another project member to perform an action please contact them.

Your submission for the above project has been validated on 15/02/2021.

This link will take you to the project's Monitoring tab. A summary of the validation assessment can be viewed below:

Form or Document Name	Version	Validation Assessment	Validation Comments
Amendment Form 12/02/2021	1.0	Valid	

Should you require any further information, please contact the ethics office using the details below. This will be your only correspondence on this matter, please take appropriate action if required.

Thank you

Ethics Executive Officer
North Metropolitan Health Service Mental Health
NMAHSMHREGO@health.wa.gov.au
9347 6502

This is an automated email. Please DO NOT REPLY to this email.

1

Appendix 1.3 Curtin University HREC approval

Curtin University

Office of Research and Development

GPO Box U1987
Perth Western Australia 6845

Telephone +61 8 9266 7863
Facsimile +61 8 9266 3793
Web research.curtin.edu.au

31-Jul-2017

Name: Jeff Hughes
Department/School: School of Pharmacy
Email: J.D.Hughes@curtin.edu.au

Dear Jeff Hughes

RE: Reciprocal ethics approval
Approval number: HRE2017-0498

Thank you for your application submitted to the Human Research Ethics Office for the project Clinical Pharmacist Involvement in Mental Health Hospital in the Home (CLIN-PHARM-IN-HITH).

Your application has been approved by the Curtin University Human Research Ethics Committee (HREC) through a reciprocal approval process with the lead HREC.

The lead HREC for this project has been identified as North Metropolitan Area Mental Health Services Human Research Ethics Committee.

Approval number from the lead HREC is noted as RGS0000000186.

The Curtin University Human Research Ethics Office approval number for this project is **HRE2017-0498**. Please use this number in all correspondence with the Curtin University Ethics Office regarding this project.

Approval is granted for a period of one year from **31-Jul-2017** to **03-May-2021**. Continuation of approval will be granted on an annual basis following submission of an annual report.

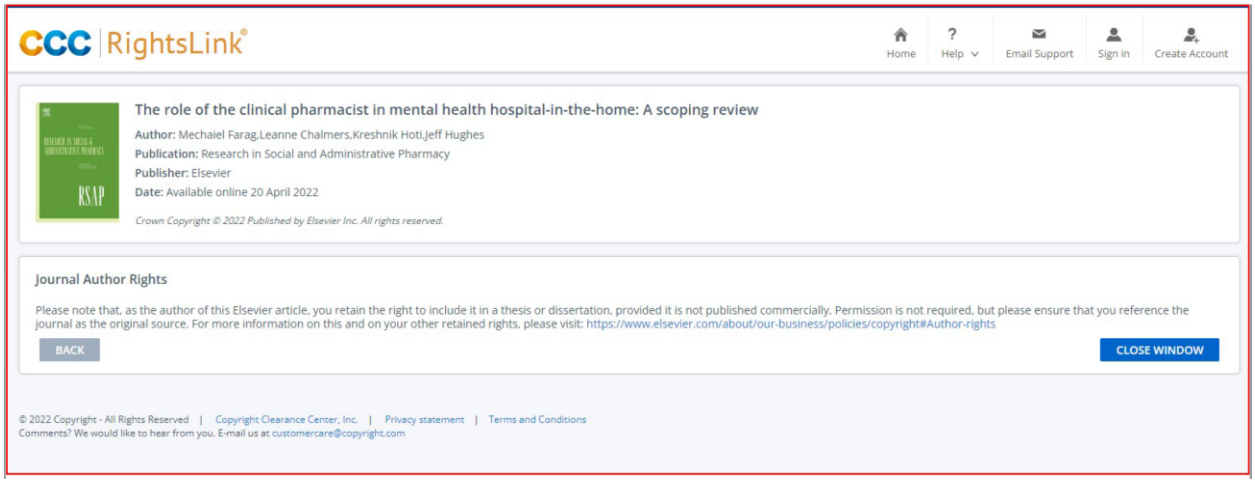
Personnel authorised to work on this project:

Name	Role
Farag, Mechaiel	Student
Hughes, Jeff	CI
Hoti, Kreshnik	Supervisor

You must comply with the lead HREC's reporting requirements and conditions of approval. You must also:

- Keep the Curtin University Ethics Office informed of submissions to the lead HREC, and of the review outcomes for those submissions
- Conduct your research according to the approved proposal
- Report to the lead HREC anything that might warrant review of the ethics approval for the project

Appendix 2 Scoping review – Publisher statement permitting use of the published article in the thesis



Appendix 3 Autoethnography-related documents

Appendix 3.1 Initial MH-HiTH Pharmacy Department model of service

This was the initial model of care instituted at the time of the establishment of the Graylands Hospital MH-HiTH service in April 2014.*

Appendix 4: NMHS MH Pharmacy Department Model of Service

Clinical Services

Patients will be provided with clinical pharmaceutical review services including:

Medication reconciliation on admission

- Home visit to assess medications in the home;
- Patient interview;
- Reconciliation with prescribing and supply sources e.g. GP, clinic, hospital data, community pharmacy;
- Liaise with the Stirling HITH team on medication management requirements e.g. blisterpack, self-medication.

Medication review

- Review of prescribing and patient notes via Best Practice Software;
- Facilitation of medication supply;
- Liaison with Stirling HITH team on prescribing and medication management;
- Attendance at Stirling HITH multidisciplinary meetings.

Medication education

- Home visit to patient;
- Provision of written and verbal medication information;
- Liaison with family members and carers.

Medication reconciliation on discharge

- Preparation of medication list in electronic discharge summary software;
- Provision of medication summary to patient and identified carer.

Admissions will be identified from the patient movement sheet by the Stirling HITH team Pharmacist. The Pharmacist will accompany the Stirling HITH team doctor or nurse on a scheduled visit to the patient's home, ideally within 48 hours of admission. The Pharmacist will review the medications on hand and may remove unwanted or expired medication from the patients' home for destruction.

The Stirling HITH team Pharmacist will aim to meet with the patient weekly during the admission, with a minimum of two visits occurring. The pharmacist will accompany the Stirling HITH team doctor or nurse on a scheduled visit to the patient's home or will meet with the patient during a visit to the hospital.

(Continued next page)

Provision of Medication

Stirling HITH patients will use their own medication as far as possible.

The patient's current medication will be entered into Best Practice clinical management software by the treating doctor, or by the Stirling HITH team Pharmacist, in consultation with the doctor.

Where a patient requires medication to be prescribed the prescription will be generated from the Best Practice software. Prescriptions will be Pharmaceutical Benefits Scheme (PBS) compliant where possible. Prescriptions may be dispensed by Graylands Hospital Pharmacy or the patient's usual community pharmacy as appropriate. Stirling HITH will pay the patient co-payment via a voucher for any medication prescribed by Stirling HITH but not for the patient's usual medication.

Where medication is administered by the Stirling HITH nursing staff it will be blisterpacked.

- Blisterpacks will be provided by the NMHS MH Pharmacy;
- Blisterpacks may be retained by the Stirling HITH nursing staff and stored according to policy. Alternatively, it may be kept at the Patient's home, if appropriate;
- Blisterpacked medication is exempt from the S4R storage, recording and reporting requirements;
- Nursing staff may observe self-medication practices where there are concerns regarding compliance;
- Medication can be provided in tear-off blisterpacks for patients who are in transition to managing their own medication and can be left with one or more days' supply.

Where HITH patients are able to manage their own medication and use blisterpacks the clinical pharmacist will liaise with the patient's usual pharmacy for any changes in medication. Any member of the HITH team is able to support, prompt and monitor the patient's self-medication.

When a Patient requires urgent additional medication, eg. PRN psychotropics, the HITH doctor should write a prescription and voucher, using Best Practice Software. This may be dispensed by a community pharmacy or the NMHS MH Pharmacy Department. If this happens after hours, HITH clinicians should contact the duty doctor, and ask them to write a prescription that may be dispensed at one of the pharmacies listed in Graylands Policy CLIN57: Pharmacy- requirements after hours policy.

Other Services

Information and Education

- Psychotropic Drug Information Service;
- Staff education sessions by arrangement.

Reporting

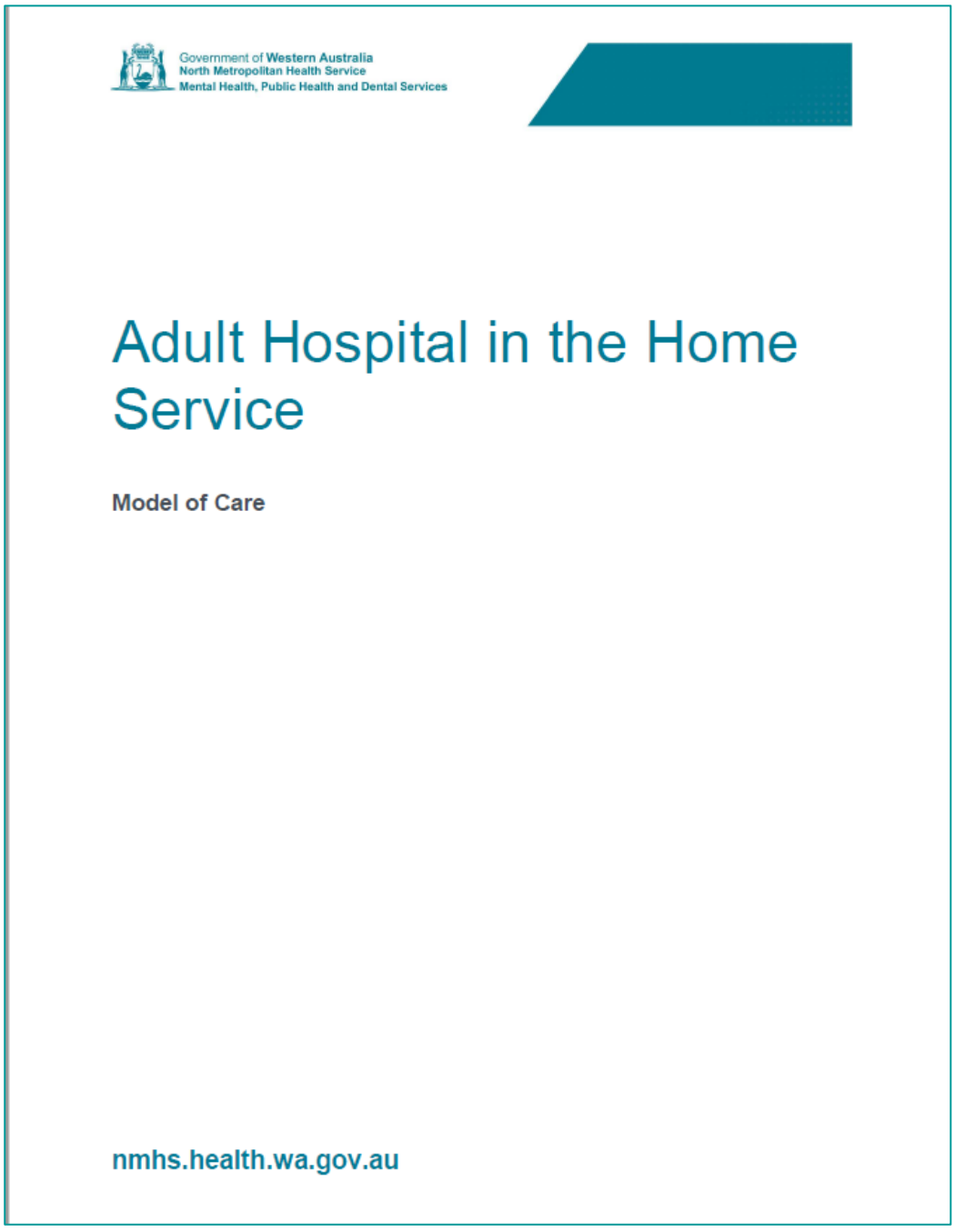
- Provision of regular reports on prescribing and workload as identified by the team.

(End)

* Source: Western Australian Department of Health. Hospital in the home clinical governance Graylands Hospital: Model of care v1.2. Mount Claremont, Western Australia: Western Australian Government; 2015.

Appendix 3.2. Latest MH-HiTH clinical pharmacist model of service

This is the latest version of the model of care, revised at the time of amalgamation of the Graylands HiTH and Sir Charles Gairdner Hospital MH-HiTH programs in 2019.* The combined program was named “NMHS MHPHDS Adult HiTH Service”. This document demonstrates the integration of pharmacy services within the model of care document, compared to the initial pharmacy model of service being placed in the appendix of the initial MH-HiTH service model (see Appendix 3.1).



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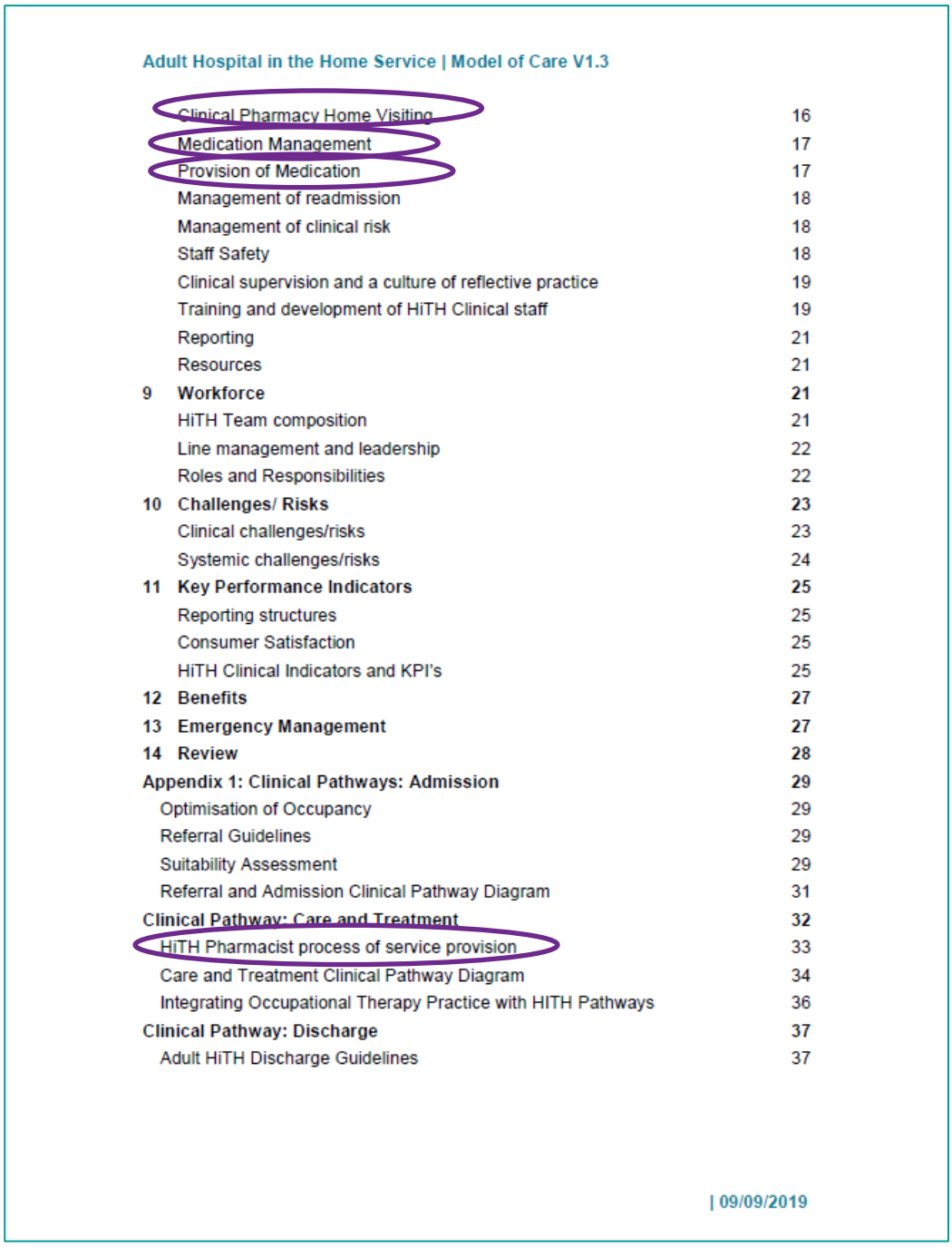
Contents



Adult Hospital in the Home Service | Model of Care V1.3

| 09/09/2019

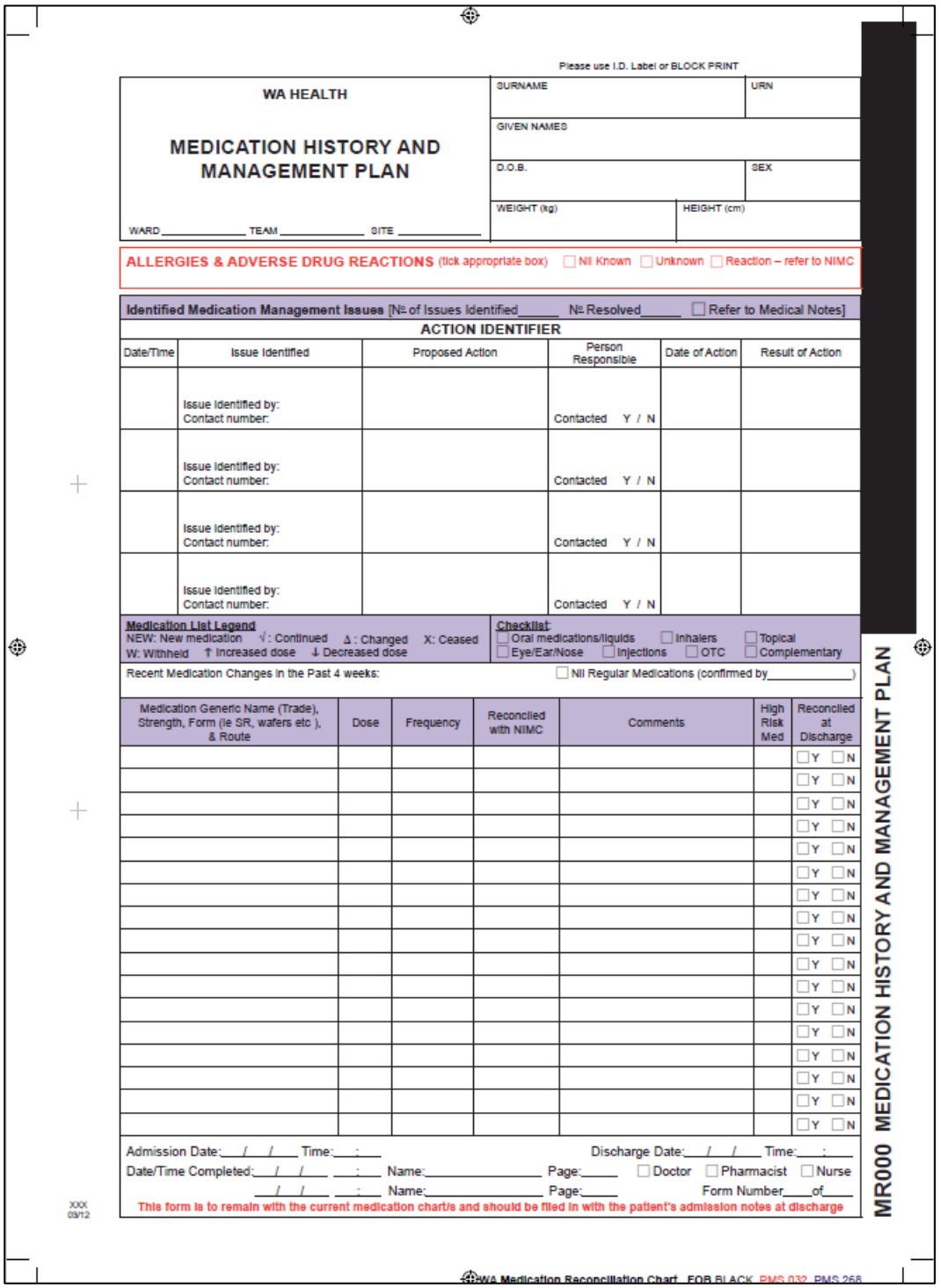
(End)

* Source: North Metropolitan Health Service - Mental Health Public Health and Dental Services. Adult hospital in the home service: Model of care v1.3. Mount Claremont, Western Australia: Government of Western Australia; 2019.

Appendix 3.3 The Medication Management Plan (MMP)

This is the 2012 handwritten version of this document,* which has been revised several times since then.

Handwritten form (front page)



Please use I.D. Label or BLOCK PRINT

WA HEALTH

MEDICATION HISTORY AND MANAGEMENT PLAN

WARD _____ TEAM _____ SITE _____

SURNAME | URN

GIVEN NAMES

D.O.B. | SEX

WEIGHT (kg) | HEIGHT (cm)

ALLERGIES & ADVERSE DRUG REACTIONS (tick appropriate box) ☐ Nil Known ☐ Unknown ☐ Reaction – refer to NIMC

Identified Medication Management Issues [№ of Issues Identified_____ № Resolved_____ ☐ Refer to Medical Notes]

ACTION IDENTIFIER

Date/Time	Issue Identified	Proposed Action	Person Responsible	Date of Action	Result of Action
	Issue identified by: Contact number:		Contacted Y / N		
	Issue identified by: Contact number:		Contacted Y / N		
	Issue identified by: Contact number:		Contacted Y / N		
	Issue identified by: Contact number:		Contacted Y / N		

Medication List Legend
NEW: New medication √: Continued Δ: Changed X: Ceased
W: Withheld ↑ Increased dose ↓ Decreased dose

Checklist:
☐ Oral medications/liquids ☐ Inhalers ☐ Topical
☐ Eye/Ear/Nose ☐ Injections ☐ OTC ☐ Complementary

Recent Medication Changes in the Past 4 weeks: ☐ Nil Regular Medications (confirmed by_____)

Medication Generic Name (Trade), Strength, Form (ie SR, wafers etc), & Route	Dose	Frequency	Reconciled with NIMC	Comments	High Risk Med	Reconciled at Discharge
						☐Y ☐N
						☐Y ☐N
						☐Y ☐N
						☐Y ☐N
						☐Y ☐N
						☐Y ☐N
						☐Y ☐N
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						☐Y ☐N
						☐Y ☐N
						☐Y ☐N
						☐Y ☐N
						☐Y ☐N

Admission Date:__/__/__ Time:__:__ Discharge Date:__/__/__ Time:__:__
Date/Time Completed:__/__/__ __:__ Name:_____ Page:____ ☐ Doctor ☐ Pharmacist ☐ Nurse
__/__/__ __:__ Name:_____ Page:____ Form Number____of____

This form is to remain with the current medication chart/s and should be filed in with the patient's admission notes at discharge

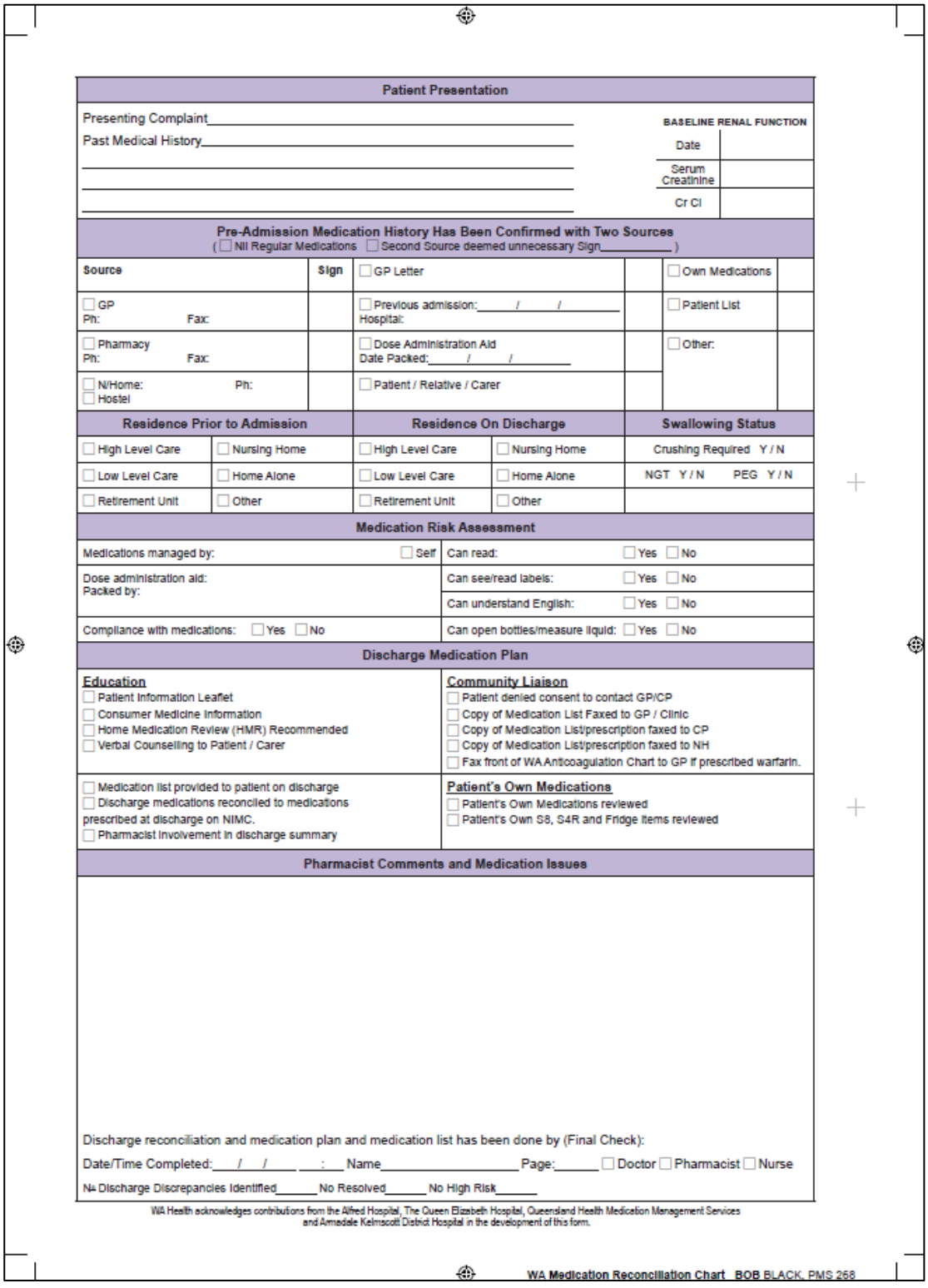
XXX 03/12

MR000 MEDICATION HISTORY AND MANAGEMENT PLAN

WA Medication Reconciliation Chart FOB BLACK PMS 032 PMS 268

(Continued next page)

Handwritten form (overleaf)



Patient Presentation

Presenting Complaint_____

Past Medical History_____

BASELINE RENAL FUNCTION

Date	
Serum Creatinine	
Cr Cl	

Pre-Admission Medication History Has Been Confirmed with Two Sources

(☐ Nil Regular Medications ☐ Second Source deemed unnecessary Sign_____)

Source	Sign				
		☐ GP Letter		☐ Own Medications	
☐ GP Ph: Fax:		☐ Previous admission: __/__/__ Hospital:		☐ Patient List	
☐ Pharmacy Ph: Fax:		☐ Dose Administration Aid Date Packed: __/__/__		☐ Other:	
☐ N/Home: Ph: ☐ Hostel		☐ Patient / Relative / Carer			

Residence Prior to Admission		Residence On Discharge		Swallowing Status
☐ High Level Care	☐ Nursing Home	☐ High Level Care	☐ Nursing Home	Crushing Required Y / N
☐ Low Level Care	☐ Home Alone	☐ Low Level Care	☐ Home Alone	NGT Y / N PEG Y / N
☐ Retirement Unit	☐ Other	☐ Retirement Unit	☐ Other	

Medication Risk Assessment

Medications managed by: ☐ Self	Can read: ☐ Yes ☐ No
Dose administration aid: Packed by:	Can see/read labels: ☐ Yes ☐ No
	Can understand English: ☐ Yes ☐ No
Compliance with medications: ☐ Yes ☐ No	Can open bottles/measure liquid: ☐ Yes ☐ No

Discharge Medication Plan

Education
- ☐ Patient Information Leaflet
- ☐ Consumer Medicine Information
- ☐ Home Medication Review (HMR) Recommended
- ☐ Verbal Counselling to Patient / Carer

Community Liaison
- ☐ Patient denied consent to contact GP/CP
- ☐ Copy of Medication List Faxed to GP / Clinic
- ☐ Copy of Medication List/prescription faxed to CP
- ☐ Copy of Medication List/prescription faxed to NH
- ☐ Fax front of WA Anticoagulation Chart to GP if prescribed warfarin.

- ☐ Medication list provided to patient on discharge
- ☐ Discharge medications reconciled to medications prescribed at discharge on NIMC.
- ☐ Pharmacist involvement in discharge summary

Patient's Own Medications
- ☐ Patient's Own Medications reviewed
- ☐ Patient's Own S8, S4R and Fridge Items reviewed

Pharmacist Comments and Medication Issues

Discharge reconciliation and medication plan and medication list has been done by (Final Check):

Date/Time Completed:__/__/__ __:__ Name_____ Page:_____ ☐ Doctor ☐ Pharmacist ☐ Nurse

No Discharge Discrepancies Identified_____ No Resolved_____ No High Risk_____

WA Health acknowledges contributions from the Alfred Hospital, The Queen Elizabeth Hospital, Queensland Health Medication Management Services and Armadale Kelmscott District Hospital in the development of this form.

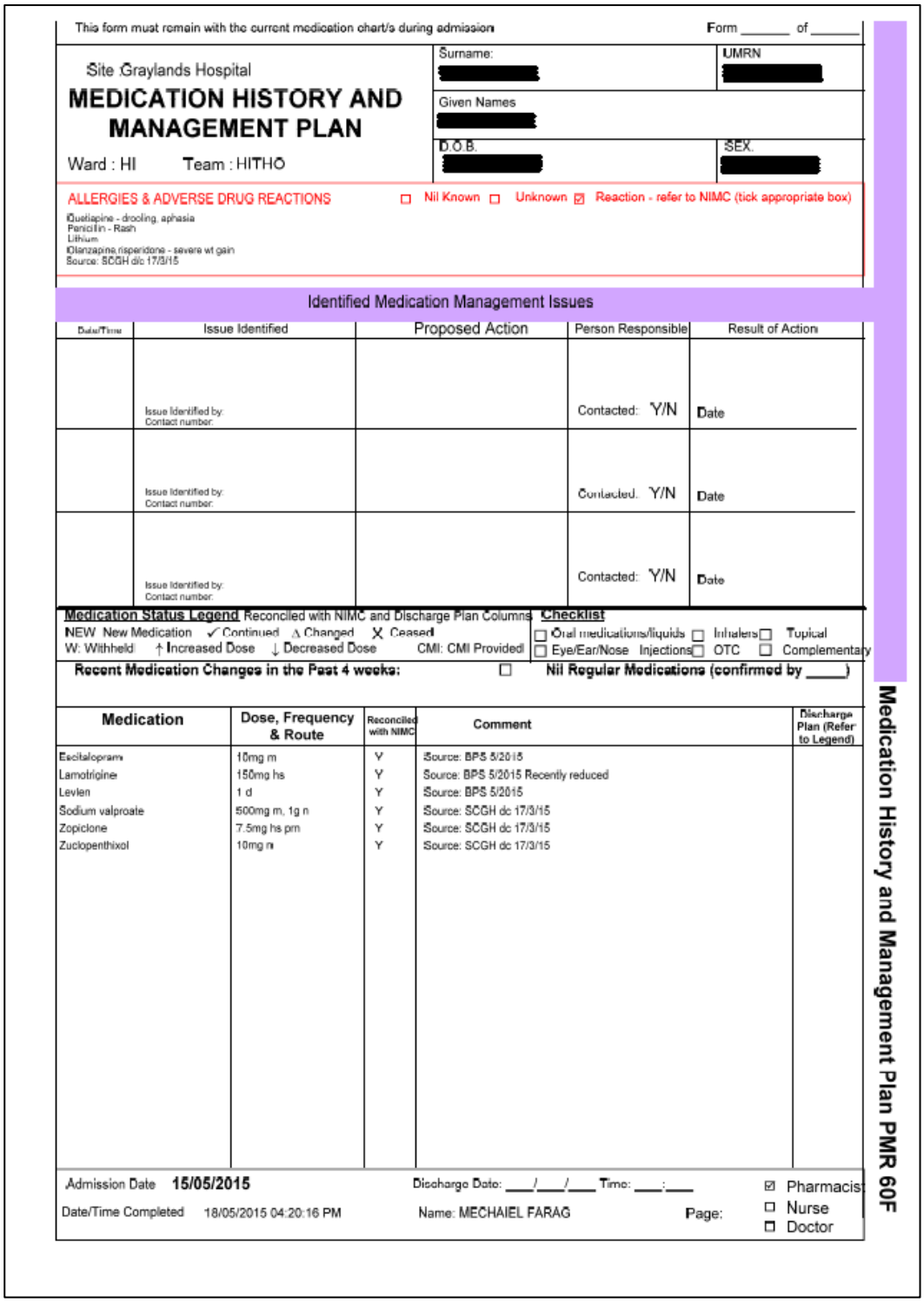
WA Medication Reconciliation Chart BOB BLACK, PMS 268

(End)

* Source: WA Department of Health. Medication history and management plan. Mount Claremont, Western Australia: North Metropolitan Health Service - Mental Health; 2012.

Appendix 3.4 The electronic Medication Management Plan (eMMP)

This is a copy of the electronic form* of the MMP; this is the form currently used in MH-HiTH services in WA.



This form must remain with the current medication chart/s during admission. Form _____ of _____

Site :Graylands Hospital

MEDICATION HISTORY AND MANAGEMENT PLAN

Ward : HI Team : HITHO

Surname: [redacted] UMRN [redacted]

Given Names [redacted]

D.O.B. [redacted] SEX. [redacted]

ALLERGIES & ADVERSE DRUG REACTIONS ☐ Nil Known ☐ Unknown ☑ Reaction - refer to NIMC (tick appropriate box)

Quetiapine - drooling, aphasia
Penicillin - Rash
Lithium
Olanzapine,risperidone - severe wt gain
Source: SCGH dlc 17/3/15

Identified Medication Management Issues

Date/Time	Issue Identified	Proposed Action	Person Responsible	Result of Action
	Issue Identified by: Contact number:		Contacted: Y/N	Date
	Issue Identified by: Contact number:		Contacted: Y/N	Date
	Issue Identified by: Contact number:		Contacted: Y/N	Date

Medication Status Legend Reconciled with NIMC and Discharge Plan Columns **Checklist**

NEW New Medication ✓Continued △Changed X Ceased
W: Withheld ↑Increased Dose ↓Decreased Dose CMI: CMI Provided

☐ Oral medications/liquids ☐ Inhalers ☐ Topical
☐ Eye/Ear/Nose Injections ☐ OTC ☐ Complementary

Recent Medication Changes in the Past 4 weeks: ☐ **Nil Regular Medications (confirmed by _____)**

Medication	Dose, Frequency & Route	Reconciled with NIMC	Comment	Discharge Plan (Refer to Legend)
Escitalopram	10mg m	Y	Source: BPS 5/2015	
Lamotrigine	150mg hs	Y	Source: BPS 5/2015 Recently reduced	
Levlen	1 d	Y	Source: BPS 5/2015	
Sodium valproate	500mg m, 1g n	Y	Source: SCGH dc 17/3/15	
Zopiclone	7.5mg hs prn	Y	Source: SCGH dc 17/3/15	
Zuclopenthixol	10mg m	Y	Source: SCGH dc 17/3/15	

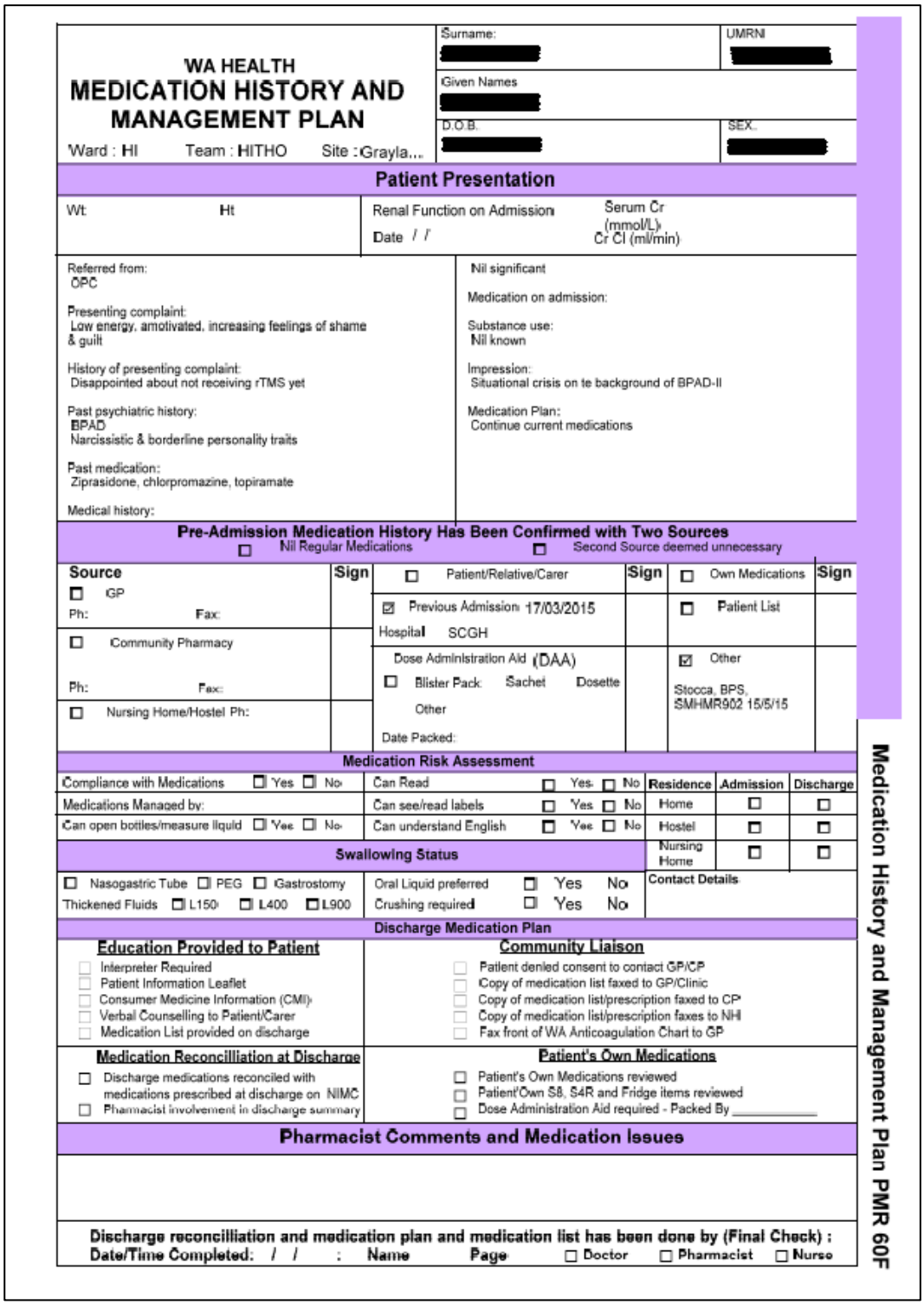
Admission Date **15/05/2015** Discharge Date: ___/___/___ Time: ___:___

☑ Pharmacist
☐ Nurse
☐ Doctor

Date/Time Completed 18/05/2015 04:20:16 PM Name: MECHAIEL FARAG Page:

Medication History and Management Plan PMR 60F

(Continued next page)



WA HEALTH

MEDICATION HISTORY AND MANAGEMENT PLAN

Ward : HI Team : HITHO Site : Grayla...

Surname: [redacted] UMRN [redacted]

Given Names [redacted]

D.O.B. [redacted] SEX. [redacted]

Patient Presentation

Wt: Ht

Renal Function on Admission Date / / Serum Cr (mmol/L) Cr Cl (ml/min)

Referred from: OPC

Presenting complaint: Low energy, amotivated, increasing feelings of shame & guilt

History of presenting complaint: Disappointed about not receiving rTMS yet

Past psychiatric history: BPAD Narcissistic & borderline personality traits

Past medication: Ziprasidone, chlorpromazine, topiramate

Medical history:

Nil significant

Medication on admission:

Substance use: Nil known

Impression: Situational crisis on te background of BPAD-II

Medication Plan: Continue current medications

Pre-Admission Medication History Has Been Confirmed with Two Sources

☐ Nil Regular Medications ☐ Second Source deemed unnecessary

Source	Sign		Sign		Sign
☐ GP Ph: Fax:		☐ Patient/Relative/Carer		☐ Own Medications	
☐ Community Pharmacy Ph: Fax:		☑ Previous Admission 17/03/2015 Hospital SCGH		☐ Patient List	
☐ Nursing Home/Hostel Ph:		Dose Administration Aid (DAA) ☐ Blister Pack: Sachet Dosette Other Date Packed:		☑ Other Stocca, BPS, SMHMR902 15/5/15	

Medication Risk Assessment

Compliance with Medications ☐ Yes ☐ No	Can Read ☐ Yes ☐ No	Residence	Admission	Discharge
Medications Managed by:	Can see/read labels ☐ Yes ☐ No	Home	☐	☐
Can open bottles/measure liquid ☐ Yes ☐ No	Can understand English ☐ Yes ☐ No	Hostel	☐	☐
		Nursing Home	☐	☐

Swallowing Status

☐ Nasogastric Tube ☐ PEG ☐ Gastrostomy

Thickened Fluids ☐ L150 ☐ L400 ☐ L900

Oral Liquid preferred ☐ Yes No

Crushing required ☐ Yes No

Contact Details

Discharge Medication Plan

Education Provided to Patient

- ☐ Interpreter Required
- ☐ Patient Information Leaflet
- ☐ Consumer Medicine Information (CMI)
- ☐ Verbal Counselling to Patient/Carer
- ☐ Medication List provided on discharge

Community Liaison

- ☐ Patient denied consent to contact GP/CP
- ☐ Copy of medication list faxed to GP/Clinic
- ☐ Copy of medication list/prescription faxed to CP
- ☐ Copy of medication list/prescription faxes to NH
- ☐ Fax front of WA Anticoagulation Chart to GP

Medication Reconcilliation at Discharge

- ☐ Discharge medications reconciled with medications prescribed at discharge on NIMC
- ☐ Pharmacist involvement in discharge summary

Patient's Own Medications

- ☐ Patient's Own Medications reviewed
- ☐ Patient'Own S8, S4R and Fridge items reviewed
- ☐ Dose Administration Aid required - Packed By _____

Pharmacist Comments and Medication Issues

Discharge reconcilliation and medication plan and medication list has been done by (Final Check) :
Date/Time Completed: / / : Name Page ☐ Doctor ☐ Pharmacist ☐ Nurse

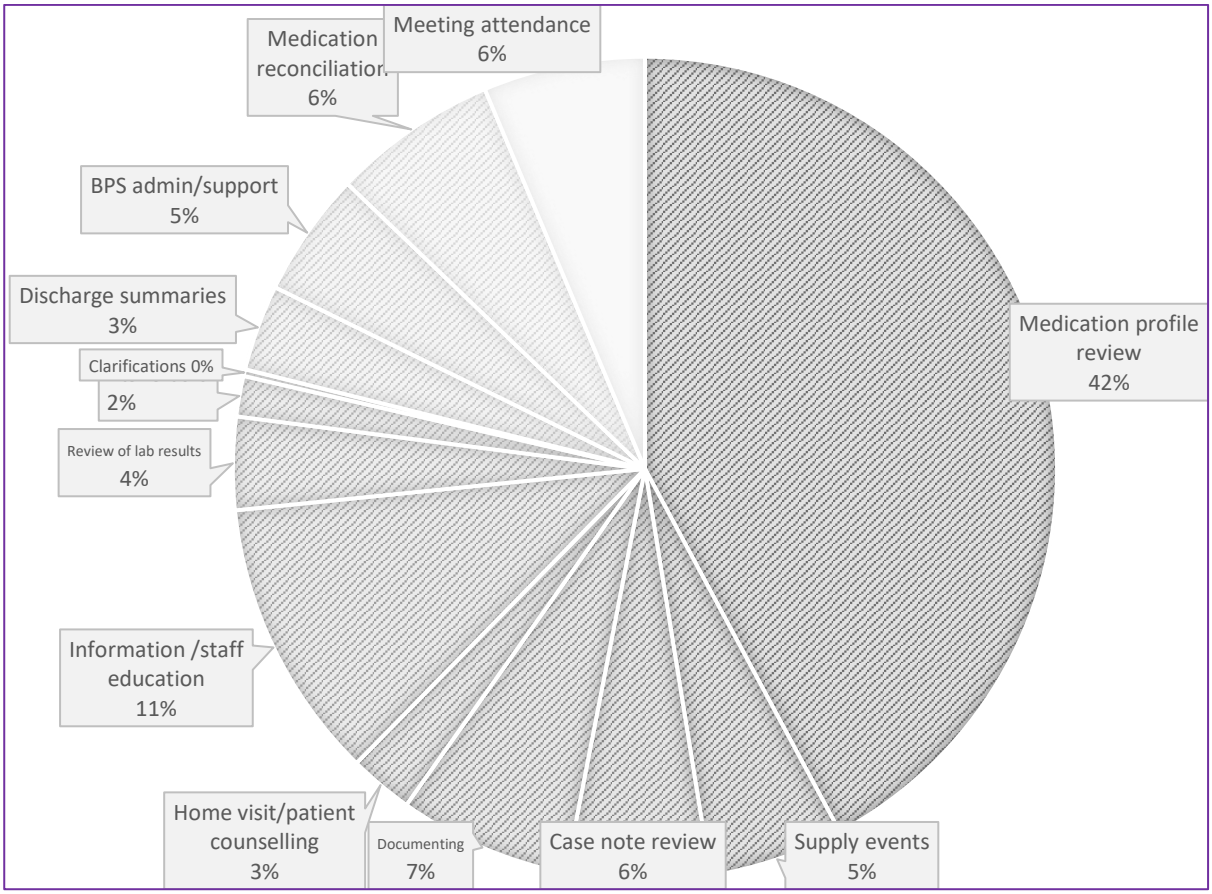
Medication History and Management Plan PMR 60F

(End)

* Source: WA Department of Health. Electronic medication history and management plan. Mount Claremont, Western Australia: North Metropolitan Health Service - Mental Health; 2015.

Appendix 3.5 MH-HiTH clinical pharmacist task time allocation

This figure illustrates the percentage of time spent by the CP on MH-HiTH tasks during the first 20 weeks of operation of the MH-HiTH service at Graylands Hospital.



Appendix 3.6 MH-HiTH clinical pharmacist evolution of tasks

This displays the percentage of time the MH-HiTH pharmacist spent on each activity during weeks following the inauguration of the Graylands MH-HiTH program.

	Weeks 1-4		**Weeks 1-20**	
Activity	Total time spent on activity (hrs)	% of time spent on each activity	Total time spent on activity (hrs)	% of time spent on each activity
Administrative meetings	15.5	45%	51.0	26%
Clinical work	5.5	16%	64.5	33%
BPS support	6.0	17%	21.5	11%
Supply issue	0.5	1%	14.3	7%
Home visit	7.0	20%	33.0	17%
TOTAL	34.5	100%	191.3	100%

Appendix 3.7 MH-HiTH clinical pharmacist step-by-step daily tasks (adapted from NMHS-MH Pharmacy Department Procedure Manual):

Chronologically, a typical day as the MH-HiTH CP involves providing a comprehensive clinical pharmacy service, including:

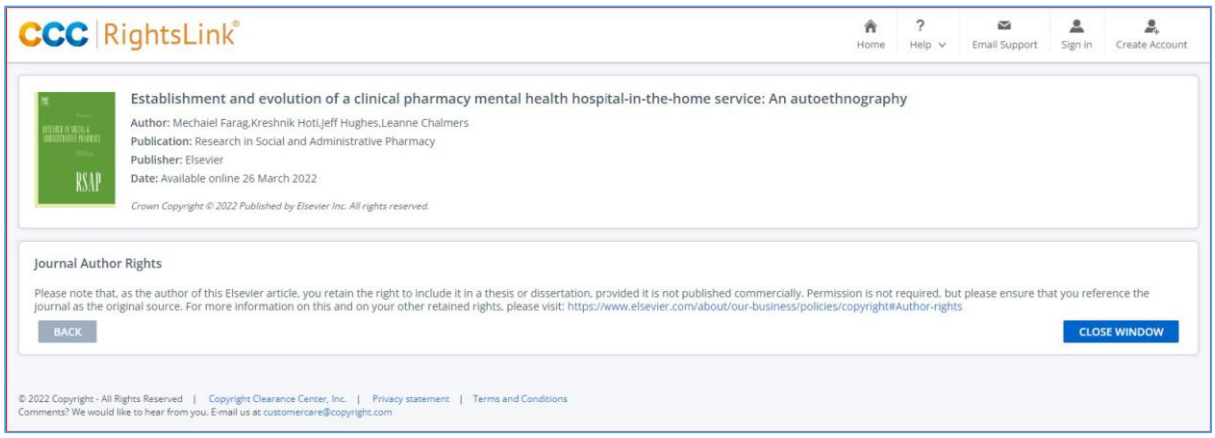
- Attending the *morning handover meeting*, where the HiTH team briefly discusses what each patient needs for the day and beyond. This is done on business days.
- As each patient is admitted to HiTH, *medication reconciliation* is performed. Any identified MRPs are promptly discussed with the HiTH team and addressed.
- An *MMP* is formulated as part of the medication reconciliation task.
- In the patient's home, a *medication review* is conducted, any other MRPs are identified and addressed and any complex medication supply is co-ordinated. For example, there are complex rules about prescribing and dispensing clozapine and not every pharmacy is registered to dispense it. The patient is also provided with verbal and written medication information.
- Medications are sighted, medication adherence is encouraged and any *excess/expired medication is removed* from the home. This is especially important for MH patients as part of medication safety measures, e.g. to reduce the risk of deliberate overdose.
- *Deprescribing* is considered and discussed with the treating team if applicable.
- Any *TDM* is done for high-risk medications* (e.g. lithium serum level, clozapine serum level).
- *Follow-up of dosage administration* is performed for depot and long-acting injectable (LAI) antipsychotics. Otherwise, these may be missed because the interval between doses is weeks to months.
- *Follow-up of clozapine monitoring*. Without a recent white blood cell count and neutrophil count, a pharmacist cannot dispense a clozapine prescription, as per the mandatory national clozapine protocol (WA uses Clopine® brand). This is sometimes overlooked and it becomes the job of the CP to ensure it is not missed. Missing clozapine doses could mean serious deterioration in patients' mental state.
- *Monitoring for side-effects*, e.g. clozapine-induced constipation has resulted in deaths in WA, yet it is sometimes considered a trivial side-effect. The MH-HiTH pharmacist often

recommends assertive preventative measures and aggressive treatment if constipation occurs in a patient taking clozapine.

- Approaching *discharge, medication reconciliation* is done by completing the medication section of the discharge summary.
- The role of the MH-HiTH pharmacist also includes support to clinician users of the *electronic health record*, managing staff access and providing software training.

* Source: Office of Patient Safety and Clinical Quality. WA high risk medications policy. Government of Western Australia, Department of Health; 2014. https://ww2.health.wa.gov.au/Articles/F_I/High-risk-medications. Accessed 09 Sept 2021.

Appendix 3.8 Publisher statement permitting use of the published article in the thesis



Appendix 4 Medication safety-related materials

Appendix 4.1 Medication safety KPI study data collection instrument

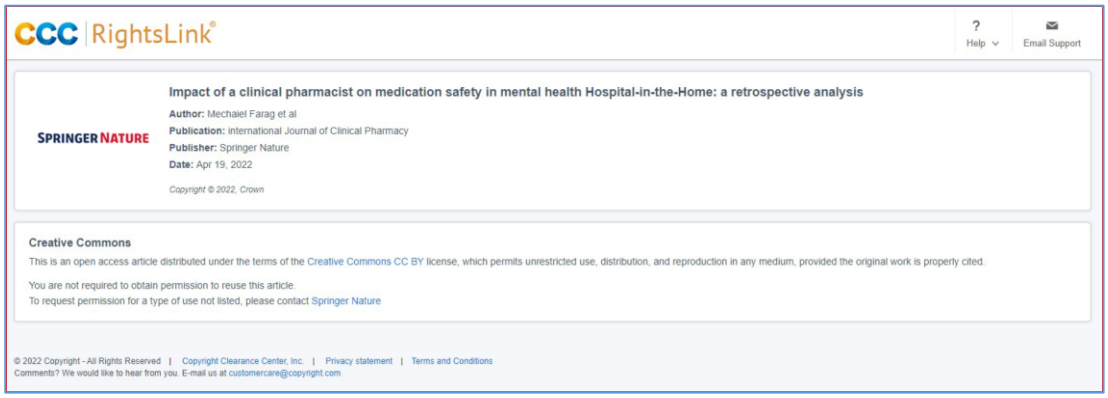
Patient			Admission			Pharmaceutical Review Policy						KPIs		Patient Safety	
						Med rec		Med profile		Info	Discharge summary		Poly-pharmacy		ADR	
SURNAME	Sex	UMRN	Date of admission	Source of adm	Date of discharge	Med rec on adm	Med rec > 1 source	Med profile	Chart review	Patient med info	D/c sum med list	D/c med list match script	D/c on multiple psychotropics	High dose	ADR list documented	ADR med prescribed
Example	M	A1234567	1/09/1996	Community	15/09/2015	Y	Y	Y	N	Y	Y	N	Y	N	Y	N

Definitions used in the data collection instrument	
Term/Abbreviation	Meaning
UMRN	Unit medical record number
Date of admission	Date of admission to HiTH (not to the hospital as an inpatient)
Source of adm (source of admission)	Where was the patient referred from (Community MH Clinic, a hospital inpatient unit or Emergency Department/MH Observation Area)
Date of discharge	Date of discharge from HiTH

Med rec on adm (medication reconciliation on admission)	Was a medication list documented on admission?
Med rec > 1 source (medication reconciliation using more than one source)	Is there any evidence that medication reconciliation has been completed in accordance with the Medication Reconciliation policy (as published by the Office of Safety & Quality)? The policy states that more than one source of a medication list is required unless, in the opinion of the clinician, a second source is not necessary. For example, when a medication list is provided from a nursing home, no second source of medication reconciliation is necessary.
Med Profile (medication profile)	Was there a separate medication profile document?
Chart review	Was there evidence of the medication profile/chart being kept up to date?
Patient med info (patient medication information)	Evidence of patient being provided medication information?
D/c sum med list (discharge summary medication list)	Was there a medication list in the discharge summary?
D/c med list match script (discharge medication list matching the script)	Did that medication list match the discharge script? Hint: check the red Medical Records copy of the script.

D/c on multiple psychotropics (discharged on multiple psychotropics)	Was the patient discharged on more than two psychotropic drugs from the same category (e.g. two antidepressants)?
High dose	Was the patient discharged on greater than 100% of the antipsychotic load (according to the Antipsychotic Stewardship guidelines)?
ADR list (adverse drug reaction list)	Was there evidence of adverse drug reaction documentation in the discharge summary - including “nil known allergies” or “unknown”?
ADR med prescribed (adverse drug reaction-listed medication prescribed)	On discharge, was the patient prescribed a medication to which they had a previously documented ADR?

Appendix 4.2 Publisher statement permitting use of the published article in the thesis



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SPRINGER NATURE

Impact of a clinical pharmacist on medication safety in mental health Hospital-in-the-Home: a retrospective analysis

Author: Mechaiel Farag et al
Publication: International Journal of Clinical Pharmacy
Publisher: Springer Nature
Date: Apr 19, 2022

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Appendix 5 Stakeholder perceptions-related materials

Appendix 5.1 Participant information sheet for patients

Government of Western Australia
Department of Health
North Metropolitan Health Service Mental Health

Curtin University

Clinical Pharmacy Service to a Mental Health Hospital in The Home (HiTH) Programme

Participant Information Sheet - Patients

Principal Investigator: Mr Mechaiel Farag
Phone: (08) 9347 6677
Email: Mechaiel.Farag@health.wa.gov.au

You are invited to take part in this research project which is being undertaken for research purposes as part of the School of Pharmacy at Curtin University. The results of this research will be used by the principal investigator (Mechaiel Farag) to obtain a *Master of Clinical Pharmacy* degree. Because Mechaiel also works as a HiTH pharmacist, an approved independent Curtin University researcher will be conducting the study interview.

What is the purpose of this project?

The objective of this project is to explore what HiTH staff and HiTH patients think of the clinical pharmacy service provided to HiTH. A clinical pharmacy service to a mental health HiTH programme is a new service that has not been previously studied in Australia. The opinions obtained from this project will help in future evaluation and improvement of this pharmacy service. The ultimate aim to prevent the medication-related problems suffered by mental health patients.

What does this project involve?

First, your HiTH clinician will give you this *Participant Information Sheet*, and ask for your permission to participate in this project. If you agree, the HiTH clinician will inform the researcher. A time will be arranged for the researcher to visit you, with a HiTH clinician. When the researcher visits you, they will ask you to kindly sign a *Consent Form*, to confirm that you agree to continuing with this project. You will get a copy of this *Consent Form* to keep. The researcher will interview you for 20 to 30 minutes, asking you questions about your opinion of the pharmacy service provided to you. We request your permission to audio record the interview, in order to improve the validity of the research.

Your consent is required in order for your demographic information (including information regarding your mental illness) and for the information you give during the interview to be utilised by the researchers.

Do I have to take part in this research project?

Participation in the research project is voluntary. If you do not wish to take part, you do not have to. If you decide to participate and later change your mind, you are free to withdraw from the project at any stage. Your decision whether to participate or not, or to participate and then withdraw, will neither affect your treatment, your relationship with your clinician, your relationship with *North Metropolitan Health Service – Mental* Health (NMHS-MH) nor with Curtin University.

What are the possible risks of taking part?

It is unlikely that conducting the research interview will pose any risk to you or to your treatment. If at any time you feel uncomfortable answering the questions administered for the research purposes, you are under no obligation to continue and are free to withdraw from the project at any time.

What if I withdraw from this research project?

If you choose to withdraw, please notify your HiTH clinician who will provide you with a *Withdrawal of Consent Form*. Your withdrawal will ensure that no additional personal information is collected from you for the purposes of the research. All information already collected will be retained for research, unless specifically requested otherwise on the *Withdrawal of Consent Form*.

Costs and Reimbursements

There are neither additional costs, nor reimbursements, associated with participating in this research project.

What will happen to information about me?

Confidentiality: By signing the consent form you consent to the principal investigator and relevant research staff collecting and using personal information about you for the research project. Any information collected will be coded such that your name is not associated with the information, and all information will be treated as strictly confidential. Only the researchers will have access to the information collected during this project. This information will not be stored in your medical records. The project information will strictly be stored in a locked filing cabinet at Curtin University, and de-identified (coded) electronic information will be secured in a password-protected hard drive at Curtin University. Your information will not be given to any person, other than the researchers involved in this study, without your permission, except as required by law.

Publication of Results: The results of this research project may be published and/or presented in a variety of forums. The data may also be used in future research projects, provided that no identifying information is included in the data. However, your name will not be printed in any publications or presentations. Research data will be stored at Curtin University and retained for 7 years.

Who is organising and supporting the research?

This research is being supported by Curtin University and NMHS-MH. No member of the research team will receive a personal financial benefit from your involvement in this research study (other than ordinary wages).

Approval to conduct this research has been provided by the Human Research Ethics Committees of Curtin University and NMHS-MH Research Ethics and Governance Office (NMHS-MH REGO) in accordance with their ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting either the Curtin University School of Pharmacy, by email to pharmacy@curtin.edu.au, or, by contacting the NMHS-MH REGO Executive Officer on (08) 9347 6502 or NMAHSMHREGO@health.wa.gov.au. All research participants are entitled to retain a copy of any Participant Information Form and/or Participant Consent Form relating to this research project.

Appendix 5.2 Participant information sheet for clinicians

Government of Western Australia
Department of Health
North Metropolitan Health Service Mental Health

Curtin University

Clinical Pharmacy Service to a Mental Health Hospital in The Home (HiTH) Programme

Participant Information Sheet - Staff

Principal Investigator: Mr Mechaiel Farag
Phone: (08) 9347 6677
Email: Mechaiel.Farag@health.wa.gov.au

You are invited to take part in this research project which is being undertaken for research purposes as part of the School of Pharmacy at Curtin University. The results of this research will be used by the principal investigator (Mechaiel Farag) to obtain a *Master of Clinical Pharmacy* degree.

What is the purpose of this project?

The objective of this project is to explore what HiTH staff and HiTH patients think of the clinical pharmacy service provided to HiTH. A clinical pharmacy service to a mental health HiTH programme is a new service that has not been previously studied in Australia. The opinions obtained from this project will help in future evaluation and improvement of this pharmacy service. The ultimate aim to prevent the medication-related problems suffered by mental health patients.

What does this project involve?

The Principal Investigator will email this *Participant Information Sheet* to the HiTH Clinical Nurse Specialists, who will forward it to HiTH staff – past and present – requesting their participation in this project. Staff who are interest are to contact the Principal Investigator (Mechaiel Farag – details above).

Next, the Principal Investigator will contact you to arrange a suitable time for you to be interviewed. At the agreed time, an independent researcher will first ask you to kindly sign a *Consent Form*, to confirm that you agree to continue with this project. They will then interview you for 20 to 30 minutes. The interviewer will ask you questions about your opinion of the pharmacy service provided to the HiTH programme. We request your permission to audio record the interview, in order to improve the validity of the research.

Your consent is required in order for your demographic information (eg age range and position description), and for the information you give during the interview, to be utilised by the researchers.

Do I have to take part in this research project?

Participation in the research project is voluntary. If you do not wish to take part, you do not have to. If you decide to participate and later change your mind, you are free to withdraw from the project at any stage. Your decision whether to participate or not, or to participate and then withdraw, will neither affect your working relationship with pharmacy staff nor with Curtin University.

What are the possible risks of taking part?

It is unlikely that conducting the research interview will pose any risk to you. If at any time you feel uncomfortable answering the questions administered for the research purposes, you are under no obligation to continue and are free to withdraw from the project at any time.

What if I withdraw from this research project?

If you choose to withdraw, please notify the principal investigator (Mechaiel Farag – contact details above), who will provide you with a *Withdrawal of Consent Form*. Your withdrawal will ensure that no additional personal information is collected from you for the purposes of the research. All information already collected will be retained for research, unless specifically requested otherwise on the *Withdrawal of Consent Form*.

Costs and Reimbursements

There are neither additional costs, nor reimbursements, associated with participating in this research project.

What will happen to information about me?

Confidentiality: By signing the consent form you consent to the principal investigator and relevant research staff collecting and using personal information about you for the research project. Any information collected will be coded such that your name is not associated with the information, and all information will be treated as strictly confidential. Only the researchers will have access to the information collected during this project. The project information will strictly be stored in a locked filing cabinet at Curtin University, and de-identified (coded) electronic information will be secured in a password-protected hard drive at Curtin University. Your information will not be given to any person other than the researchers involved in this study without your permission, except as required by law.

Publication of Results: The results of this research project may be published and/or presented in a variety of forums. The data may also be used in future research projects, provided that no identifying information is included in the data. However, your name will not be printed in any publications or presentations. Research data will be stored at Curtin University and retained for 7 years.

Who is organising and supporting the research?

This research is being supported by Curtin University and North Metropolitan Health Service – Mental Health (NMHS-MH). No member of the research team will receive a personal financial benefit from your involvement in this research study (other than ordinary wages).

Approval to conduct this research has been provided by the Human Research Ethics Committees of Curtin University and NMHS-MH Research Ethics and Governance Office (NMHS-MH REGO) in accordance with their ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting either the Curtin University School of Pharmacy, by email to pharmacy@curtin.edu.au, or, by contacting the NMHS-MH REGO Executive Officer on (08) 9347 6502 or NMAHSMHREGO@health.wa.gov.au. All research participants are entitled to retain a copy of any Participant Information Form and/or Participant Consent Form relating to this research project.

Appendix 5.3 Participant consent form – patients

Government of Western Australia
Department of Health
North Metropolitan Health Service Mental Health

Curtin University

Clinical Pharmacy Service to a Mental Health Hospital in The Home (HiTH) Programme

Consent Form – Patients

Principal Investigator: Mr Mechaiel Farag
Phone: (08) 9347 6677
Email: Mechaiel.Farag@health.wa.gov.au

Thank you for agreeing to take part in this project. All the information that you provide will be kept strictly confidential and will not be released by the investigators unless required to do so by law. Information gathered during the course of the project will only be used for research and the data published will not reveal your identity. Whether you accept or decline to participate in this project, your treatment will not be altered in any way. Please read the following carefully, ask any additional questions you may have, and sign this consent form.

Declaration by Participant

- I have read and understood the Participant Information Sheet and have been given a copy of it.
- I understand the purposes, procedures and risks of the research described in the project.
- I understand that in addition to the information gathered by the research interview, my demographic information and information about my mental illness may be utilised for the research.
- I have had an opportunity to ask questions and I am satisfied with the answers I have received.
- I agree to participate in this research project as described and understand that I am free to withdraw at any time during the study.
- I understand that I may keep a copy of this Consent Form.
- I agree that research data gathered for the study with my participation can be published as long as my name or other identifying information is not used in any publication.
- I understand that all information provided by me is treated as confidential and will not be released by the investigators unless required to do so by law.
- I understand all information provided and agree that research data gathered for this study can be utilised in future research projects approved by the Institutional Ethics Committee, as long as my name or other identifying information is not used.
- **I agree to having the interview audio-recorded to monitor the interviewer's performance** (please tick) **YES** ☐ **NO** ☐
- **I agree that additional research data can be gathered from case notes** (please tick) **YES** ☐ **NO** ☐

Name of participant (please print) _____

Signature _____ Date _____

Declaration by the interviewer

I have given a verbal explanation of the research project, its procedures and risks and I believe that the participant has understood that explanation.

Name of participant (please print) _____

Signature _____ Date _____

Approval to conduct this research has been provided by the Human Research Ethics Committees of Curtin University and the North Metropolitan Health Service – Mental Health Research Ethics and Governance Office (NMHS-MH REGO) in accordance with their ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting either the Curtin University School of Pharmacy, by email to pharmacy@curtin.edu.au, or, by contacting the NMHS-MH REGO Executive Officer on (08) 9347 6502 or NMAHSMHREGO@health.wa.gov.au. All research participants are entitled to retain a copy of any Participant Information Form and/or Participant Consent Form relating to this research project.

Appendix 5.4 Participant consent form – clinicians

Government of Western Australia
Department of Health
North Metropolitan Health Service Mental Health

Curtin University

Clinical Pharmacy Service to a Mental Health Hospital in The Home (HiTH) Programme

Consent Form – Staff

Principal Investigator: Mr Mechaiel Farag
Phone: (08) 9347 6677
Email: Mechaiel.Farag@health.wa.gov.au

Thank you for agreeing to take part in this project. All the information that you provide will be kept strictly confidential and will not be released by the investigators unless required to do so by law. Information gathered during the course of the project will only be used for research and the data published will not reveal your identity. Please read the following carefully, ask any additional questions you may have, and sign this consent form.

Declaration by Participant

- I have read and understood the Participant Information Sheet and have been given a copy of it.
- I understand the purposes, procedures and risks of the research described in the project.
- I understand that in addition to the information gathered by the research interview, my demographic information and information about my position may be utilised for the research.
- I have had an opportunity to ask questions and I am satisfied with the answers I have received.
- I agree to participate in this research project as described and understand that I am free to withdraw at any time during the study.
- I understand that I may keep a copy of this Consent Form.
- I agree that research data gathered for the study with my participation can be published as long as my name or other identifying information is not used in any publication.
- I understand that all information provided by me is treated as confidential and will not be released by the investigators unless required to do so by law.
- I understand all information provided and agree that research data gathered for this study can be utilised in future research projects approved by the Institutional Ethics Committee, as long as my name or other identifying information is not used.
- **I agree to having the interview audio-recorded to monitor the interviewer's performance** (please tick)
  YES ☐ **NO** ☐

Name of participant (please print) _____ Position (if staff) _____

Signature _____ Date _____

Declaration by the interviewer

I have given a verbal explanation of the research project, its procedures and risks and I believe that the participant has understood that explanation.

Name of participant (please print) _____

Signature _____ Date _____

Approval to conduct this research has been provided by the Human Research Ethics Committees of Curtin University and the North Metropolitan Health Service – Mental Health Research Ethics and Governance Office (NMHS-MH REGO) in accordance with their ethics review and approval procedures. Any person considering participation in this research project, or agreeing to participate, may raise any questions or issues with the researchers at any time. In addition, any person not satisfied with the response of researchers may raise ethics issues or concerns, and may make any complaints about this research project by contacting either the Curtin University School of Pharmacy, by email to pharmacy@curtin.edu.au, or, by contacting the NMHS-MH REGO Executive Officer on (08) 9347 6502 or NMAHSMHREGO@health.wa.gov.au. All research participants are entitled to retain a copy of any Participant Information Form and/or Participant Consent Form relating to this research project.

Appendix 5.5 Guide to interview – patients

Data collection instrument for patients

The patient is to be asked for their profession/level of education. The other demographic information (age, gender and principal psychiatric diagnosis) is to be obtained from the patient case notes.

Participant demographics

- Age:
- Gender:
- Profession or highest level of education attained:
- Principal psychiatric diagnosis:

Interview outline

1) What do you think of the service provided by your MH-HiTH pharmacist?
    a. Prompt questions:
        i. Benefits of the service?
        ii. Any specific difficulties?
2) What is your opinion of the MH-HiTH pharmacist's role in managing your medications?
    a. Prompt questions:
        i. Home medication review service?
        ii. Organising for your medication to be dispensed by the hospital or community pharmacy?
        iii. Collaboration with other health professionals (e.g. liaison with doctors & nurses)?
3) Describe how the MH-HiTH pharmacist helped with your medication management?
    a. Prompt question:
        i. What benefits did you feel resulted from the MH-HiTH pharmacist's home visit?
        ii. Did you learn something new?
        iii. Did you ask about an issue that was not resolved by other clinicians?
4) How do you feel the pharmacy service to MH-HiTH patients may be improved?

a. Prompt questions:
    i. Any improvements to the home medication review service & how?
    ii. Any improvements to the medication dispensing service & how?

5) Can you think of any other way that pharmacists can assist you with your medications?
    a. Prompt questions:
        i. Does your community pharmacist do any services you think your HiTH pharmacist may do to help during your HiTH admission?
        ii. Ways of remembering when to take your medication.
        iii. Ways of providing you with more information about your medications or anything related?
6) Would you like to add anything else?

Appendix 5.6 Guide to interview – clinicians

Data collection instrument for clinicians

Clinician basic demographics are to be collected to aid with data analysis.

Participant demographics

- Age group (18-30; 31-45; 46-60; >60):
- Gender:
- Position (e.g. nurse):
- Years of practice (in the above position):

Interview outline

1) What do you think of the current system of pharmacy services to MH-HiTH?
    a. Prompt questions:
        i. Benefits of the service?
        ii. Any specific difficulties?
2) What is your opinion of the MH-HiTH pharmacist's role?
    b. Prompt questions:
        i. Home medication review service?
        ii. Co-ordination of medication supply?
3) What is your view of the MH-HiTH pharmacist's role as the support officer for the electronic health record?
    c. Prompt question:
        i. What improvements would you expect from the pharmacist being the support officer?
        ii. How do you feel this compares to the old method of handwritten paper case notes?*
        iii. How does this role compare to an Information Technology (IT) officer?
4) How do you feel the pharmacy service to MH-HiTH may be improved?
    d. Prompt questions:
        i. Any improvements relating to the clinical pharmacy service?
        ii. Any improvements relating to the home medication review service?

iii. Any improvements relating to the medication dispensing service?

iv. Any improvements relating to patient medication counselling?

5) Can you suggest any new potential services that may be offered by pharmacists in this MH-HiTH setting?
6) Would you like to add anything else?

* NB. Discussion of the findings related to the electronic health record alone (i.e. not in the context of the clinical pharmacist's service) was outside the scope of this analysis.

Appendix 5.7 COREQ (COnsolidated criteria for REporting Qualitative research) checklist*

A checklist of items that should be included in reports of qualitative research. This checklist was used during the reporting of the qualitative study in Chapter 5.

Topic	Item No.	Guide Questions/Description	Reported on Page No.
Domain 1: Research team and reflexivity			
Personal characteristics			
Interviewer/ facilitator	1	Which author/s conducted the interview or focus group?	157
Credentials	2	What were the researcher's credentials? E.g. PhD, MD	BPharm, PGradDipClinPharm, MClinPharm, MPS, MSHP, AACPA, M HiTH Soc Australasia
Occupation	3	What was their occupation at the time of the study?	Senior Pharmacist
Gender	4	Was the researcher male or female?	Male
Experience and training	5	What experience or training did the researcher have?	Underwent Curtin University's PhD Research Integrity Course, Member of the Pharmaceutical Society of Australia, Member of the Society of Hospital Pharmacists of Australia (SHPA), member of the Hospital in the Home (HiTH) Society of Australasia. Author of various conference papers presented to: - SHPA Conferences 2007, 2013, 2014, 2015, 2016. - Rural and Remote Mental Health Conference 2007 - HiTH Society Conference 2014, 2015, 2016. Completed, with high distinction, Master's

			degree units on Health Research Methods, Biostatistics and Pharmacy Research Project Development. - Proficient in the use of Microsoft Excel®. - Proficient in the use of NVivo® qualitative research analysis software. - Experience as a registered pharmacist since 2001. - Experience as a mental health clinical pharmacist since 2007.
Relationship with participants			
Relationship established	6	Was a relationship established prior to study commencement?	In some cases, yes. The PhD candidate was working in the capacity of the senior clinical pharmacist in the MH-HiTH service in which the patients were admitted. This information was fully disclosed to the NMHS-MH and Curtin University Ethics Committees, all MH-HiTH patients and clinicians. Further this information is fully disclosed in the *Conflict of Interest* section of this chapter.
Participant knowledge of the interviewer	7	What did the participants know about the researcher? e.g. personal goals, reasons for doing the research	The participants were fully informed of the role of the researcher via their treating clinician (e.g. MH nurse) verbally and via a participant information sheet.
Interviewer characteristics	8	What characteristics were reported about the inter viewer/facilitator? e.g. Bias, assumptions, reasons and interests in the research topic	Any potential bias was fully disclosed to the Ethics Committees, as well as in the *Methods* and *Conflict of Interest* sections of this chapter.
Domain 2: Study design			
Theoretical framework			

Methodological orientation and Theory	9	What methodological orientation was stated to underpin the study? e.g. grounded theory, discourse analysis, ethnography, phenomenology, content analysis	157 Phenomenological approach
Participant selection			
Sampling	10	How were participants selected? e.g. purposive, convenience, consecutive, snowball	157
Method of approach	11	How were participants approached? e.g. face-to-face, telephone, mail, email	158
Sample size	12	How many participants were in the study?	157
Non-participation	13	How many people refused to participate or dropped out? Reasons?	157
Setting			
Setting of data collection	14	Where was the data collected? e.g. home, clinic, workplace	157
Presence of non-participants	15	Was anyone else present besides the participants and researchers?	158
Description of sample	16	What are the important characteristics of the sample? e.g. demographic data, date	158 & 165
Data collection			

Interview guide	17	Were questions, prompts, guides provided by the authors? Was it pilot tested?	175-176
Repeat interviews	18	Were repeat inter views carried out? If yes, how many?	157
Audio/visual recording	19	Did the research use audio or visual recording to collect the data?	157
Field notes	20	Were field notes made during and/or after the interview or focus group?	No field notes were made.
Duration	21	What was the duration of the inter views or focus group?	157
Data saturation	22	Was data saturation discussed?	158
Transcripts returned	23	Were transcripts returned to participants for comment and/or correction?	159
Domain 3: analysis and findings			
Data analysis			
Number of data coders	24	How many data coders coded the data?	157
Description of the coding tree	25	Did authors provide a description of the coding tree?	157
Derivation of themes	26	Were themes identified in advance or derived from the data?	159
Software	27	What software, if applicable, was used to manage the data?	157

Participant checking	28	Did participants provide feedback on the findings?	157
Reporting			
Quotations presented	29	Were participant quotations presented to illustrate the themes/findings? Was each quotation identified? e.g. participant number	159-164
Data and findings consistent	30	Was there consistency between the data presented and the findings?	165
Clarity of major themes	31	Were major themes clearly presented in the findings?	152-171
Clarity of minor themes	32	Is there a description of diverse cases or discussion of minor themes?	152-171

* Source: Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. Int J Qual Health Care. 2007;19:349-357. https://doi.org/10.1093/intqhc/mzm042.

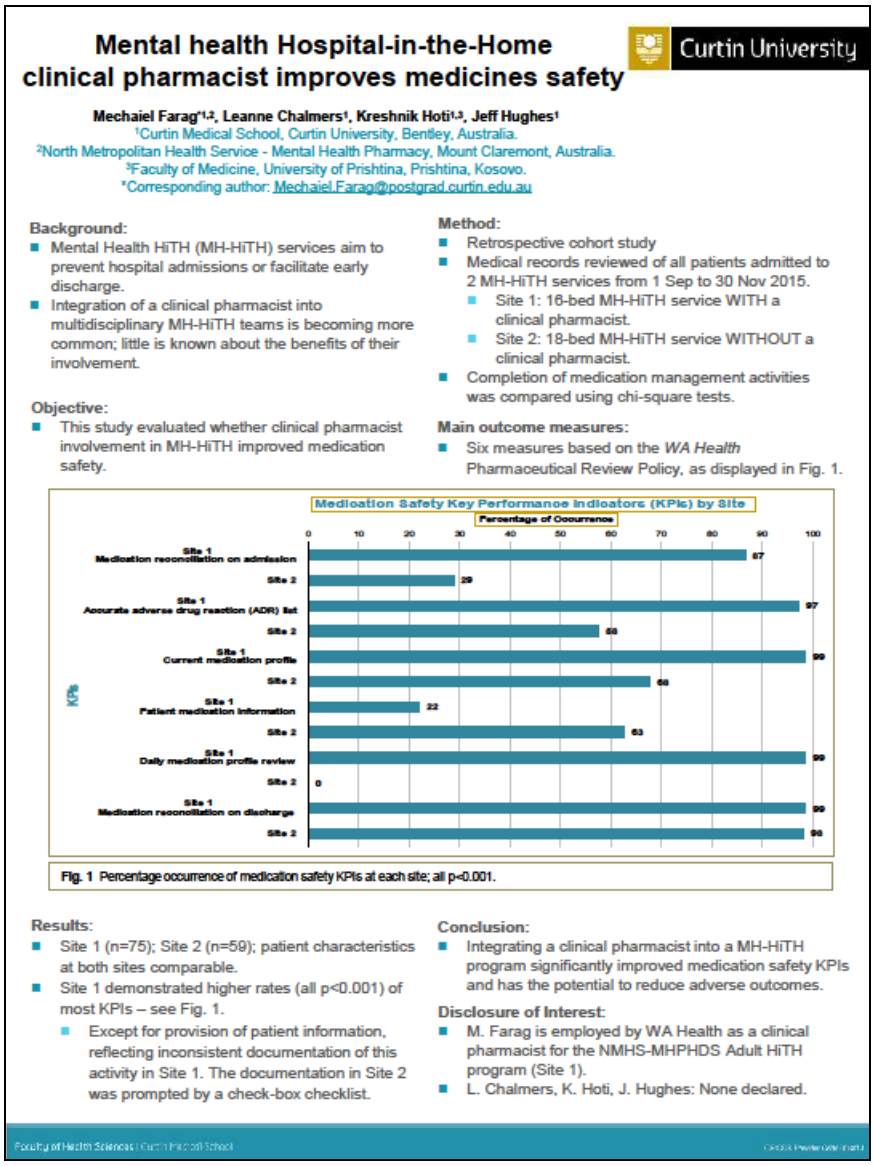
Appendix 6 International conference presentation

Appendix 6.1 Conference poster

This poster was presented at the following international conference:

European Society of Clinical Pharmacists (ESCP) Symposium. 19-21 October 2021.

All ESCP Symposium abstracts are published in the International Journal of Clinical Pharmacy (IJCP), which is a bi-monthly peer-reviewed journal.



Mental health Hospital-in-the-Home clinical pharmacist improves medicines safety

Curtin University

Mechaiel Farag[*1,2], Leanne Chalmers[1], Kreshnik Hoti[1,3], Jeff Hughes[1]

[1]Curtin Medical School, Curtin University, Bentley, Australia.
[2]North Metropolitan Health Service - Mental Health Pharmacy, Mount Claremont, Australia.
[3]Faculty of Medicine, University of Prishtina, Prishtina, Kosovo.
[*]Corresponding author: Mechaiel.Farag@postgrad.curtin.edu.au

Background:

- Mental Health HiTH (MH-HiTH) services aim to prevent hospital admissions or facilitate early discharge.
- Integration of a clinical pharmacist into multidisciplinary MH-HiTH teams is becoming more common; little is known about the benefits of their involvement.

Objective:

- This study evaluated whether clinical pharmacist involvement in MH-HiTH improved medication safety.

Method:

- Retrospective cohort study
- Medical records reviewed of all patients admitted to 2 MH-HiTH services from 1 Sep to 30 Nov 2015.
  - Site 1: 16-bed MH-HiTH service WITH a clinical pharmacist.
  - Site 2: 18-bed MH-HiTH service WITHOUT a clinical pharmacist.
- Completion of medication management activities was compared using chi-square tests.

Main outcome measures:

- Six measures based on the *WA Health* Pharmaceutical Review Policy, as displayed in Fig. 1.

Fig. 1 Percentage occurrence of medication safety KPIs at each site; all p<0.001.

Results:

- Site 1 (n=75); Site 2 (n=59); patient characteristics at both sites comparable.
- Site 1 demonstrated higher rates (all p<0.001) of most KPIs – see Fig. 1.
  - Except for provision of patient information, reflecting inconsistent documentation of this activity in Site 1. The documentation in Site 2 was prompted by a check-box checklist.

Conclusion:

- Integrating a clinical pharmacist into a MH-HiTH program significantly improved medication safety KPIs and has the potential to reduce adverse outcomes.

Disclosure of Interest:

- M. Farag is employed by WA Health as a clinical pharmacist for the NMHS-MHPHDS Adult HiTH program (Site 1).
- L. Chalmers, K. Hoti, J. Hughes: None declared.

Appendix 6.2 Conference abstract published in IJCP

Background and Objective: The aim of this study was to explore the association between number of prescribed medications and their impact on frequency of falls and hospitalizations in community-residing older adults.
Method: This observational, cross-sectional study was conducted as part of the EUROAGEISM H2020 ESR 7 project. Presented data are preliminary and include 84 adults aged ≥ 65 years who attended three community pharmacies in the City of Zagreb. Data were collected using structured, standardized questionnaire developed for the purpose of the EUROAGEISM H2020 project. Descriptive and inferential statistical methods were applied to analyse data using IBM SPSS v 20.
Main outcome measures: Association between number of prescribed medications and the incidence of falls and hospitalizations in the last 12 months.
Results: Final analysis included 84 participants (67.9% female; median age 73 (IQR 68–80)). Every participant used on average 5,62±2,916 prescribed medications, while polypharmacy (5+medications) was identified in 51 (60,7%) of them. Use of at least one medication from the benzodiazepine drug class was observed in 32 (38,1%) of the participants, with females using them statistically significantly more often than males ($X^2(1) = 4,251$, $p < 0,05$). Of the total number of participants, 57 (67,9%) experienced a fall in the past, of which 17 (20,2%) in the last 12 months. Female participants have fallen statistically significantly more often in the past than males ($X^2(1) = 4,673$, $p< 0,05$). Only 12 (14.3%) participants were hospitalized in the last 12 months, while men were statistically significantly more often hospitalized than women ($X^2(1) = 4,403$, $p< 0,05$). A positive trend was observed showing that higher number of medications were prescribed in participants who fell (6.00 ± 2.716 vs. 5.52 ± 2.976; p> 0.05) or were hospitalized (6.58 ± 2.937 vs. 5.46 ± 2,902; p> 0.05) in the last 12 months, however, the statistical significance was not confirmed.
Conclusion: This study provides preliminary results regarding association between number of medications prescribed and frequency of falls and hospitalizations in community-residing older adults in the City of Zagreb and indicates the importance of pharmacotherapy optimisation in this vulnerable age group.
Grant support: EuroAgeism H2020 MSCF-ITN-764632, Inomed NO.CZ.02.1.01/0.0/0.0/18_069/0010046, Progress Q42- Faculty of Pharmacy, Charles University, START/MED/093 CZ.02.2.69/0.0/0.0/19_073/0016935, SVV 260551 and ICARB4OLD H2020 -96534.

PDF01.9

Use of fall-risk-increasing drugs in older patients admitted to the department of emergency medicine- a retrospective study with focus on central nervous system drugs

Liesbeth Huys[*1], Peter De Paepe[2], Mirko Petrovic[3], Andreas Capiau[1,4], Sabrina Commeyne[1], Annemie Somers[1,4]

[1]Department of Pharmacy, [2]Department of Emergency Medicine, [3]Department of Geriatrics, Ghent University Hospital , [4]Pharmaceutical Care Unit, Ghent University, Ghent, Belgium

Background and Objective: Falls and fall-related injuries are an increasing problem, primarily in older people. Certain drug classes are associated with an increased risk of falls and are therefore called fall-risk-increasing drugs (FRIDs).
We aimed (i) to evaluate the use of FRIDs, sedative and anticholinergic drugs as well as drugs with a risk of orthostatic hypotension; (ii) to determine the incidence of falls and the characteristics of patients with and without falls; (iii) and to analyse potentially inappropriate prescribing (PIP) with focus on drugs that act on the central nervous system (CNS) in a population of older patients.
Method: A retrospective study of older patients (≥ 65 years) admitted to the department of emergency medicine of Ghent University Hospital between October 2020 and January 2021, in whom a medication reconciliation was performed by a hospital pharmacist.
Main outcome measures: Number of prescribed FRIDs, sedative and anticholinergic drugs and drugs with risk of orthostatic hypotension (OH); Sedative Load Model (SLM) and Anticholinergic Impregnation Scale (AIS) score of drugs; incidence of falls; CNS PIP using the STOP-NL criteria.
Results: For 200 patients 1791 drugs, of wich 596 FRIDs were identified (median 3, IQR 1-4). A total of 32.9% were CNS drugs, with opioids and hypno-sedatives being the most frequently prescribed classes of FRIDs. There was a positive association between the number of FRIDs and the total number of drugs, the number of comorbidities, the number of sedative and anticholinergic drugs as well as the number of OH inducing drugs, the SLM and AIS score ($p < 0.001$). Fifty patients (25%) reported a fall in the recent or past history. Furthermore, age ($p = 0.014$), sex ($p < 0.001$) and rate of PIP ($p < 0.001$) were significantly different between patients with and without falls. Almost one-fourth of patients was treated with at least one CNS PIP item.
Conclusion: The prevalence of FRID use was high in older patients admitted to the department of emergency medicine of Ghent University Hospital. Fallers had a higher number of CNS PIP items. The results from this study confirm the need for multidisciplinary medication review, with focus on attempts for deprescribing of CNS FRIDs.

POSTER DISCUSSION FORM II

PDF02.1

Mental health hospital in the home clinical pharmacist improves medicines safety

Mechaiel Farag[*1,2], Leanne Chalmers[1], Kreshnik Hoti[1,3], Jeff Hughes[1]

[1]Curtin Medical School, Curtin University, Bentley, [2]North Metropolitan Health Service - Mental Health Pharmacy, Graylands Hospital, Mount Claremont, Australia, [3]Faulty of Medicine, University of Prishtina, Prishtina, Kosovo, -

Background and Objective: Mental Health HiTH (MH-HiTH) services aim to prevent hospital admissions or facilitate early discharge. Integration of a clinical pharmacist into multidisciplinary MH-HiTH teams is becoming more common but little is known about the benefits of their involvement. This study evaluated whether clinical pharmacist involvement in MH-HiTH improved medication safety.
Method: In a retrospective cohort study, medical records were reviewed of all patients admitted to two MH-HiTH services between 1 September and 30 November 2015. The first site (*Site 1*) is a 16-bed MH-HiTH service based in a tertiary psychiatric hospital incorporating a clinical pharmacist as part of its multi-disciplinary team. The second site (*Site 2*) is an 18-bed MH-HiTH service based in a tertiary general hospital without clinical pharmacist involvement. Completion of medication management activities was compared using chi-square analysis.
Main outcome measures: Five measures based on the *WA Health* Pharmaceutical Review Policy: (1) medication reconciliation on admission and discharge; (2) accurate adverse drug reaction (ADR) list; (3) documentation of a current medication profile during admission and on discharge; (4) provision of patient medication information; and (5) regular medication profile review.

Results: Seventy-five patient records from *Site 1* were assessed and 59 from *Site 2*. Patient characteristics from both sites were comparable in terms of age, sex, diagnosis and source of admission. The HiTH service incorporating a pharmacist (*Site 1*) demonstrated statistically significantly higher rates of completion of medication reconciliation (87% versus 29%), accurate ADR list (97% versus 58%), accurate discharge medication list (74% versus 45%), accurate medication profile (99% versus 68%) and medication chart review (99% versus 0%); all $p<0.001$.
Conclusion: Integrating a clinical pharmacist into a MH-HiTH program significantly improved medication safety parameters, and has the potential to reduce adverse outcomes.

PDF02.2

Optimising physical health treatment in mental illness that is severe (OPTIMISE)

Aoife Carolan[*] [1, 2], Dolores Keating[1], Caroline Hynes[1], Stephen McWilliams[3], Judith Strawbridge[4], Cristin Ryan [5]

[1]Pharmacy Department, SAINT JOHN OF GOD HOSPITAL, [2]Royal College of Surgeons Ireland, [3]SAINT JOHN OF GOD HOSPITAL, [4]School of Pharmacy and Biomolecular Science, Royal College of Surgeons Ireland, [5]School of Pharmacy and Pharmaceutical Sciences, Trinity College Dublin, Dublin, Ireland

Background and Objective: The life expectancy of people with Severe Mental Illness (SMI) is shorter than those without SMI, with multimorbidity and poorer physical health contributing to health inequality. Screening tools could potentially assist the optimisation of medicines to protect the physical health of people with SMI. We designed a medicines optimisation tool (OPTMISE) to help clinicians achieve the goal of Optimising Physical Health in Mental Illness that is Severe.
Method: OPTMISE was drafted with reference to the literature, and the Delphi consensus technique used to develop and validate the contents. A 17-member multidisciplinary panel of experts from the UK and Ireland completed 2 rounds of Delphi consensus, rating their level of agreement to 83 prescribing indicators using a 5-point Likert scale. Indicators with a median of 1 or 2 and 75th centile value of ≤ 2 were accepted. Interrater reliability was assessed among 4 clinicians across 20 datasets and the chance corrected level of agreement (kappa) was calculated.
Main outcome measures: Level of agreement using a 5-point likert scale and interrater reliability were the main outcome measures assessed.
Results: Consensus was achieved after 2 rounds of Delphi for 63 prescribing indicators. Interrater reliability of OPTIMISE between physicians and pharmacists indicated a substantial level of agreement, which is comparable to other optimisation tools.
Conclusion: OPTIMISE is a 63 indicator medicines optimisation tool, developed using Delphi consensus techniques, to assist decision making in treating people with SMI. The tool has the potential to enhance medicines optimisation, ensuring preventative medicines are considered when clinically indicated. Further robust research studies involving the implementation of this prescribing tool is required to demonstrate its true benefit.

PDF02.3

Key factors underlying oncology patients' willingness to engage in medication redispensing

Lisa-Marie Smale[*] [1], Toine Egberts[2, 3], Rob Heerdink[3, 4], Bart van den Bemt[5, 6], Charlotte Bekker[5]

[1]Department of Clinical Pharmacy, Radboud Institute for Health Sciences, Radboud university medical center, Nijmegen, [2]Clinical Pharmacy, University Medical Centre Utrecht, Department of Clinical Pharmacy, Division of Laboratory and Pharmacy, [3]Division of Pharmacoepidemiology and Clinical Pharmacology, Utrecht University, Faculty of Science, Utrecht Institute for Pharmaceutical Sciences (UIPS), [4]Research Group Innovations of Pharmaceutical Care, Utrecht University of Applied Sciences, Utrecht, [5]Department of Clinical Pharmacy, Radboud university medical center, Radboud Institute for Health Sciences, [6]Department of Pharmacy, Sint Maartenskliniek, Nijmegen, Netherlands

Background and Objective: Redispensing medication unused by patients could potentially reduce the financial loss and environmental pollution caused by medication waste, particularly for expensive medication such as oral anticancer drugs. To achieve medication redispensing patients' engagement is required. Therefore this study aims to identify key factors underlying oncology patients' willingness to engage in the redispensing of unused oral anticancer drugs.
Method: Semi-structured interviews via telephone or video call were conducted with adult oncology patients from two Dutch hospitals. The interview guide was framed using the COM-B model, to elicit patients' capability, opportunity and motivation to engage in medication redispensing. Questions related to patients' willingness to accept redispensed medication, reasons thereof, and perceived concerns and needs. Inductive thematic analysis was applied, and emerging key factors were mapped to the COM-B model.
Main outcome measures: Key factors underlying willingness of oncology patients to engage in medication redispensing mapped to the COM-B model.
Results: Seventeen patients (aged 38–82 years, 70% female), suffering eight different types of cancer participated. The majority of participants supported medication redispensing.
Four categories of key factors underlying oncology patients' willingness to engage in medication redispensing were identified. First, perception of social relevance was identified as the driver for engaging in medication redispensing. This perception resulted from previous frustrations with medication waste and social responsibility regarding the healthcare budget and environment. The second key factor was trust in quality, influenced by the initial perception of the quality of redispensed medication, knowledge about the quality process and advocacy by caregivers and relatives. Finally, two facilitators for engaging in medication redispensing were identified: convenient logistics, which related to return possibilities of unused medication to pharmacies, and transparent communication, about quality control, financial profits and the consequences of medication waste. All factors were mapped to the COM-B model of behavioural change.
Conclusion: This study shows that oncology patients want to engage in medication redispensing with a drive for achieving positive societal impact and a need for high-quality medication, transparent communication and a convenient process as underlying key factors. Future interventions that increase oncology patients' capability, opportunity and motivation may support willingness to engage in medication redispensing.

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