Consumers’ willingness to use

Home Medicines Review

Stephen Carter

Thesis submitted in fulfillment of the requirements for the
degree of

Doctor of Philosophy

Faculty of Pharmacy
The University of Sydney
November 2012
DECLARATION

This thesis describes research carried out at the Faculty of Pharmacy, The University of Sydney, initially under the supervision of Professor Lesley White and Associate Professor Timothy Chen. Subsequently the research was carried out under the supervision of Associate Professor Timothy Chen and Doctor Rebekah Moles. The research was carried out with permission of the Dean of the Faculty of Pharmacy, Professor Iqbal Ramzan.

The research presented in this thesis is, to the best of my knowledge, original and entirely the product of my own scholarly work except as acknowledged in the text. No part of this work has been submitted in part or wholly toward the award of another degree at any other university. Full acknowledgement has been made where the work of others has been cited or used.

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ACKNOWLEDGEMENTS

I am very grateful to my supervisor Associate Professor Timothy Chen for his continued support, guidance and friendship throughout this process. I would also like to thank my associate supervisor, Dr. Rebekah Moles for her enthusiastic help and comradeship.

The research presented in this thesis would not have been possible without the 4th Community Pharmacy Agreement Research and Development grant obtained by Professor Lesley White. I wish to thank Professor White for her part in supervising the early stages of my PhD studies.

I would like to especially thank Simone Goppert for being my sounding board. I thank her for helping me to become a writer and for proof reading my thesis.

I would also like to thank my staff at Milton Pharmacy, especially Sarah, for their support which enabled me to spend time doing research.

I would like to thank my parents, family and friends for their continued love, support and motivation.
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HOME MEDICINES REVIEWS: A QUANTITATIVE STUDY OF THE VIEWS OF
RECIPIENTS AND ELIGIBLE NON-RECIPIENTS
LIST OF ABBREVIATIONS

CE      Communication Efficacy
CFA     Confirmatory Factor Analysis
CFI     Comparative Fit Index
COTA    Council on the Ageing
CPC     Comprehensive Pharmaceutical Care
CR      Construct Reliability
EFA     Exploratory Factor Analysis
EPPM    Extended Parallel Process Model
FCMAHS  Family Caregiver Medication Administration Hassles Scale
FG(n)   Focus Group (n)
GP      General Practitioner
HMR     Home Medicines Review
IOM     United States Institute of Medicines
IPA     International Pharmaceutical Abstracts
KH      Knowledge Hassles
KHISM   Knowledge Hassles Information Seeking Model
MPW     Medication-problem Worry
MTM     Medication Therapy Management
NPS     National Prescribing Service
NOE     Negative Outcome Expectancy
OE      Outcome Expectancy
OH      Other Hassles
PMT     Protection Motivation Theory
RISP    Risk Information Seeking and Processing model
RMSEA   Root Mean Square Error of Approximation
<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tr>
<td>RP</td>
<td>Risk Perception</td>
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<tr>
<td>PHARIA</td>
<td>Pharmacy Accessibility/Remoteness Index of Australia</td>
</tr>
<tr>
<td>POE</td>
<td>Positive Outcome Expectancy</td>
</tr>
<tr>
<td>PRISM</td>
<td>Planned Risk Information Seeking Model</td>
</tr>
<tr>
<td>SCT</td>
<td>Social Cognitive Theory</td>
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<tr>
<td>SEM</td>
<td>Structural Equation Model(ling)</td>
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<tr>
<td>SNGP</td>
<td>Subjective Norms of the General Practitioner</td>
</tr>
<tr>
<td>SPSS</td>
<td>Statistical Package for the Social Sciences</td>
</tr>
<tr>
<td>TLI</td>
<td>Tucker-Lewis Index</td>
</tr>
<tr>
<td>TMIM</td>
<td>Theory of Motivated Information Management</td>
</tr>
<tr>
<td>TPB</td>
<td>Theory of Planned Behavior</td>
</tr>
<tr>
<td>W</td>
<td>Willingness (to use Home Medicines Review)</td>
</tr>
<tr>
<td>WMI</td>
<td>Written Medicines Information</td>
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</table>
This thesis comprises the following peer-reviewed journal publications. A short description of each journal can be found in Appendix C.


iv. Carter SR, Moles R, White L, Chen TF. Consumers’ willingness to use a medication management service: the effect of medication-related worry and the


CONFERENCE ABSTRACTS


ii. Carter SR, Chen TF, Goppert S, White L. What’s the problem? – Why patients may not ask us about medication-related problems. Pharmacy Australia


vi. Carter S, Moles R, White L, Chen T. Developing and testing a new theoretical model for information-seeking behaviour - informal caregivers' willingness to

vii. Carter S, Moles R, White L, Chen T. Patients’ perception of the listening skills of the pharmacist has a strong impact on their willingness to re-use Home Medicines. Pharmacy Australia Congress - Program Handbook, Melbourne Convention Exhibition Centre, Melbourne, 19th-21st October 2012.

OTHER PEER-REVIEWED PUBLICATIONS

 Throughout the world the population is aging and the burden of chronic diseases and co-morbidity is growing. While the appropriate use of medicines help to decrease morbidity and mortality from chronic diseases, research consistently demonstrates that preventable medication-related problems cause unplanned hospitalisation and morbidity. The elderly and those consuming multiple medicines are at greatest risk. Pharmacist-provided medication management services aim to prevent and resolve medication-related problems for those consumers who have been identified as being at increased risk. This thesis deals with consumers' participation in pharmacist-provided medication management services with a particular focus on Australia's Home Medicines Review (HMR). HMR has been shown to improve health outcomes across a variety of research settings. The rationale for the thesis was that some consumers who have been identified as being at risk have declined the offer to use HMR.

Many potential consumers of HMR are cared for by informal caregivers such as spouses or other family members (caregivers). Caregivers therefore necessarily have a key role in enhancing consumer participation in medication management services. Therefore, the aim of this thesis was to investigate consumers' and caregivers' awareness, expectations and willingness to use HMR. In order to address the aim, the thesis used cross sectional studies with mixed-methods. Studies included qualitative methods using focus group discussions and quantitative methods using surveys. Given the preliminary nature of the research, survey data was obtained from three different samples in order to validate the measurement scales and to test and re-test hypotheses. Such an approach strengthens the key findings of the thesis.
Chapter One provides the background to the study. The literature review identified that consumers' most salient expectations of pharmacist-provided medication management services are those centred on the interpersonal interaction with the pharmacist during the patient-pharmacist interview. While it is acknowledged that these services improve medication safety through for example; enhanced inter-professional communication, goal setting, and optimised therapies, consumers tend to focus on the benefit of receiving personalised medicines information. Given the lack of previous research using behavioural theory to study the factors which influence willingness to use medication management services, a new framework was developed. The research was therefore guided by a conceptual model which was grounded in theories of medication information seeking behaviour.

Chapter Two reports a cross-sectional survey which was distributed to patients by 264 pharmacists throughout Australia. A total of 1893 questionnaires for HMR recipients were sent to pharmacists of which 595 (31%) were returned by patients. A total of 1829 questionnaires for consumers who were eligible to use HMR (eligible non-recipients) were sent to pharmacists of which 293 (16%) were returned and met the inclusion criteria. The results showed that most recipients of HMR were very satisfied with the service, had few barriers to using it and were very willing to re-use it. Eligible non-recipients were provided with a description of HMR in the survey and encouragingly, a majority reported that they would be willing to ask for an HMR, if they had concerns about their medicines. Overall however, they were less willing to use HMR than recipients. Having prior awareness of HMR increased eligible non-recipients' willingness to use it.

The research reported in Chapter Three used structural equation modelling to analyse the data from a subset of eligible non-recipient consumers (n=286) from Chapter Two who were using multiple medicines (taking more than 5 medicines daily or more than
12 doses daily). Results showed that consumers' willingness to use HMR was most strongly influenced by their *positive outcome expectancy* - expectations that HMR would provide them with increased medicines knowledge, help them to manage their medicines and reduce their medicine concerns ($\beta = 0.56$, $P < .001$). Importantly however, overall respondents recorded neutral rather than positive or negative scores on the positive outcome expectancy scale.

Having determined that consumers' positive outcome expectancy had a strong influence on their willingness to use it, the thesis then focussed on a deeper understanding of the factors which may influence their positive outcome expectancy and willingness to use HMR. The theoretical framework suggested that consumers' worries about experiencing medication-related problems may increase their positive outcome expectancy. Chapter Four reports a qualitative study which was used to explore consumers' expectations of and motivation to use HMR. For this study, 12 focus groups were held using the English language, two in Mandarin and one in Arabic. The data pertaining to recipient (n=28) and non-recipient (n=52) consumers were thematically analysed with the conceptual framework of the study. A key theme was that consumers experienced worries about their medicines. Medicines were considered to be innately harmful and consumers could also experience harm from making mistakes themselves. While some lacked information about their medicines, others believed that medicines information could be confronting. Another theme was that consumers expected that HMR would be useful because they expressed a clear preference to learn about their medicines during interpersonal interactions with pharmacists, rather than from written sources. Consumers' thoughts and feelings appeared to be more focussed on the positive outcomes of HMR when they were worried about medication-related problems.
Having demonstrated qualitative support for the hypothesis that increased *medication-problem worry* would increase positive outcome expectancy and willingness, Chapter Five aimed to test this hypothesis using quantitative methods. In addition, this study aimed to quantify the extent to which willingness was affected by the *social influence of the GP* - consumers' perceptions of what the GP thinks of HMR. For this study, eligible non-recipient consumers were recruited by postal survey of 1600 members of Council of the Ageing, NSW (COTA, NSW). Surveys received from 390 respondents (24.3%) who were taking multiple medicines were analysed. Similar to the results of Chapter Three, overall respondents recorded neutral rather than positive or negative scores on the positive outcome expectancy scale. Structural equation modelling revealed that consumers' medication-problem worry increased their positive outcome expectancy ($\beta = 0.66$, $P < .05$) and indirectly increased their willingness to use HMR ($\beta = 0.22$, $P < .05$). The effect of the social influence of the GP was to act directly on consumers' willingness to use HMR ($\beta = 0.27$, $P < .05$). The social influence of the GP did not increase positive outcome expectancy. In other words, this social influence was effective, even though it had no bearing over whether consumers thought that the HMR was personally beneficial.

Having examined some of the factors influencing *consumers'* willingness to use HMR, Chapter Six turned to the case of *caregivers*. The background to Chapter Six identified that caregivers may experience *knowledge hassles* - daily stressors experienced whilst dealing with tasks which require knowledge about the safety and effectiveness of the care-recipient's medicines. Similar to the effect that medication-problem worry had on consumers' willingness, it was predicted that knowledge hassles would increase caregivers' positive outcome expectancy for HMR and their willingness to assist their care-recipient to use HMR. For this study, a cross sectional postal survey was conducted among members of 2350 Carers (NSW, Australia). Respondents were included in the study if they were involved in medication-related tasks for their care-
recipient and were not paid as caregivers. Also, their care-recipient needed to be using multiple medicines and had not yet experienced HMR. There were 324 useable surveys which yielded a response rate of 14%. Structural equation modelling revealed that the higher the level of caregivers' knowledge hassles, the higher their positive outcome expectancy ($\beta = 0.40, P < .05$) and since positive outcome expectancy increased willingness ($\beta = 0.55, P < .05$), knowledge hassles indirectly increased willingness ($\beta = 0.19, P < .05$). Similar to research conducted with consumers (Chapters Three and Five), overall caregivers' positive outcome expectancy was neutral.

**Conclusion**

The central aim of this thesis was to investigate the factors which influence consumers' and caregivers' willingness to use HMR, before they have experienced the service.

One of the most important findings of the research was that if eligible consumers were informed of HMR they would be willing to ask for it, under the right circumstances. This indicates that consumers have an important role in driving participation in medication management services. Knowledge of the factors which influence willingness to use these services may therefore be used to improve the design and delivery of them with a view to improving consumer acceptance and engagement.

In this research, it was demonstrated that a strong influence on consumers' and caregivers' willingness to use HMR was the extent to which they believed that HMR would benefit them personally. In other words a very important influence on willingness was consumers' and caregivers' expectations that during the pharmacist-patient interview they would learn about their medicines, feel reassured, and be more capable managing their medicines. The fact that these expectations were not high yet very influential indicates that there is significant scope for increasing consumers' willingness.
to use HMR by building these expectations. While this research focussed on willingness as the dependent variable, future research could use intervention studies to determine whether increasing consumers’ expectations increases consumer participation.

Expectations about the benefits of participating in HMR appear to be highest if the consumer is worried about experiencing medication problems and when a caregiver is stressed about dealing with the knowledge required to manage their care-recipients medicines. Promotional programs for HMR could use this finding to appeal to consumers and caregivers who are worried or stressed about using medicines.

As expected, consumers’ medication-problem worry (Chapter Five) and caregivers’ knowledge stress (Chapter Six) was highest during the three months after the medicine-user had experienced a change in the medication regimen. At these times medicine-users are at greater risk and their and their caregivers’ emotional response to medicine changes may increase expectations and demand for HMR. This indicates that, as suggested in available service information sources (Appendix Two), HMR should ideally be offered within three months after a change in medication regimen.

The research also showed that efforts should be made to make the process of asking for an arranging HMR as transparent and easy as possible for eligible consumers and their informal caregivers. There are a variety of ways with which this could be addressed. Possibly the most influential would be to have community pharmacists initiate conversations with eligible non-recipients using consumer-directed promotional materials. They could explain how the HMR process works and offer to assist consumers overcome communication barriers.

Finally, this research showed that consumers will need to believe that their GP has positive attitudes towards HMR if service participation is to be consumer-driven. It is
likely that some form of GP endorsement of HMR such as promotional messages within GPs surgeries would increase consumers' intentions to ask their GP about the service. This could be achieved with posters or brochures about the service, or perhaps on GP network television commercials.
PART A

BACKGROUND
CHAPTER ONE

BACKGROUND

1.1 Preamble

Throughout Europe (Uijen and van de Lisdonk 2008; Junius-Walker, Voigt et al. 2010), North America (Fortin, Bravo et al. 2005) and Australia (Britt, Harrison et al. 2008) the population is ageing and the burden of chronic disease and co-morbidity is growing. In Australia, the proportion of those aged 65 years and older with two or more concurrent chronic health problems is 65% (Gilbert, Caughey et al. 2011). Multiple medicines are often used to manage common chronic diseases (Vitry and Zhang 2008), resulting in complex medication regimens (Moen, Antonov et al. 2009). Adverse events related to the consumption of medicines are a leading cause of morbidity in the Australian community (Miller, Britt et al. 2006). These adverse events are estimated to result in over 190,000 hospital admissions each year, approximately half of which are preventable (Roughead and Semple 2009). In 2007, the United States Institute of Medicine (IOM) report on preventing medication errors highlighted the urgent need for strategies to improve medication safety (Committee on Identifying and Preventing Medication Errors 2007). One of the key recommendations of the IOM report (Recommendation 2) was that regulatory agencies should provide consumers with increased access to medication information and medication self-management support (Committee on Identifying and Preventing Medication Errors 2007).

Medication management services provided by pharmacists are indicated for persons who consume multiple medicines (Moen, Antonov et al. 2009) and are at elevated risk of experiencing medication-related problems (Pit, Byles et al. 2008). These services
have been shown to be effective in reducing preventable medication-related problems (Roberts, Stokes et al. 2001; Sorensen, Stokes et al. 2004; Sorensen, Stokes et al. 2005; Castelino, Bajorek et al. 2009; Castelino, Bajorek et al. 2010; Castelino, Bajorek et al. 2010; Castelino, Hilmer et al. 2010; Ellitt, Engblom et al. 2010; Nishtala, McLachlan et al. 2011). Various models of outpatient services provided by pharmacists exist internationally, for example; the USA’s Medication Therapy Management (MTM) services (American Pharmacists Association 2011), the UK’s medicines management services (United Kingdom Department of Health), New Zealand’s Comprehensive Pharmaceutical Care (CPC) (Bryant, Coster et al. 2011) and Australia’s Home Medicine Review (HMR) service (Australian Government Depart of Heath and Ageing).

While the models of service provided in various countries have unique elements, there are significant similarities between them. Medication management services utilise the pharmacists’ expertise in the area of pharmacotherapy in order to prepare a medication history and optimise treatment for the patient. Depending on the service, there may be collaboration between the prescriber and the pharmacist. Of particular interest to this thesis is that these services generally include an interview between the patient and the pharmacist about the patient’s medicines.

Research into consumers’ perceptions of pharmacist-provided medication management services is critically important because studies conducted within the United Kingdom (UK), Australia and the United States of America (USA) demonstrate that some eligible consumers are reluctant to use medication management services and decline an offer to participate (Kyle and Nissen 2006; Law, Okamoto et al. 2008; Ponniah, Shakib et al. 2008; Latif, Pollock et al. 2010). Since these services resolve medication-related problems which can in turn improve health outcomes (Roberts, Stokes et al. 2001; Naunton and Peterson 2003; Roughead, Semple et al. 2003; Peterson, Fitzmaurice et al. 2004; Roughead, Barratt et al. 2004; Sorensen, Stokes et al. 2004; Roughead, Semple et al. 2005; Sorensen, Stokes et al. 2005; Sorensen,
Many medicine consumers who have vision impairment, dementia, or severe mental illness and those who are frail and elderly depend on informal caregivers to assist them to participate in health services. These informal caregivers share the burden of chronic disease and associated stress. The more complex a care-recipient’s medication regimen, the more stress a caregiver experiences (Travis, McAuley et al. 2007). Furthermore, better caregiver access to medication information may lower their stress and could help them avoid medication problems (Britten 2009). Yet, these informal caregivers tend not to use many of the services available to them and further work is needed to understand how to encourage participation (Lucke, Russell et al. 2008; Stockwell-Smith, Kellett et al. 2010). Therefore, this thesis also deals with the perceptions of informal caregivers of consumers who are eligible to use medication management services. This thesis explores both consumers’ and informal caregivers’ perceptions of Australia’s Home Medicines Review service and their willingness to use it.

The remaining parts of this background chapter include six sections. The first section describes Home Medicines Review. The second section describes the research setting. The third section provides a literature review of what is known about the perceptions of eligible non-recipients (and their informal caregivers) towards pharmacist-provided medication management services. The fourth section describes the theoretical framework for the study. The fifth section sets out the aims and
objectives of the thesis. The final section provides an overview of the layout of the thesis.

1.2 Home Medicines Review (HMR)

Home Medicines Review (HMR) (Australian Government Department of Human Services 2011) is a quality use of medicines intervention which aims to prevent and resolve medication-related problems and improve health outcomes for those at greatest risk of medicine related problems (Peterson, Fitzmaurice et al. 2004; Roughead, Barratt et al. 2009; Stafford, Tenni et al. 2009; Castelino, Bajorek et al. 2010; Ellitt, Engblom et al. 2010; Nishtala, McLachlan et al. 2011; Roughead, Barratt et al. 2011). HMR also aims to increase consumer and caregiver knowledge of medicines. HMR is provided collaboratively by general practitioners (GPs) and pharmacists. The providers claim for the full cost of service provision from the Australian government. An HMR is initiated with a referral from the consumer’s GP. The process for referral allows for the consumer to choose the accredited pharmacist. Therefore, the referral may be sent the consumers’ preferred community pharmacy or may be sent directly to an independent accredited pharmacist. The pharmacist generally visits the consumer and caregiver(s) in their home, for an extended interview regarding medication management issues where some medication-related problems are resolved. The pharmacist prepares a comprehensive medication history using information obtained from the GP, the community pharmacy (including the dispensing history) and the patient interview. Following the visit, the pharmacist sends a written report documenting medication review findings and recommendations to the GP, who then formulates a medication management plan with the consumer (Australian Government Department of Human Services 2011).
The HMR program was introduced to the Medical Benefits Schedule in 2001. Two successive evaluations of the HMR program in 2005 (Schwartzkoff 2005) and 2008 (Campbell Research and Consulting 2008) identified that uptake of the HMR program had been slower than expected. Each of these evaluations highlighted that if consumers were to derive the positive outcomes of HMR, they needed to be willing to participate. Yet each of these evaluations reported that consumers’ awareness of the program was low and more research was needed to understand consumers’ perspectives towards the program (Schwartzkoff 2005; Campbell Research and Consulting 2008). In particular, the perspectives of informal caregivers needed to be understood since they have a crucial role in ensuring the participation of many consumers who have vision impairment, dementia, or severe mental illness and those who are frail and elderly (Campbell Research and Consulting 2008).

1.3 Research Setting

The impetus for this doctoral research stemmed from a funded project as part of the Fourth Community Pharmacy Agreement Research & Development Program managed by the Pharmacy Guild of Australia. The funded project was headed by Professor Lesley White and was titled: Increasing patient demand for Home Medicines Reviews: a marketing plan (White and Clarke 2010). Approval for the project was given by The University of Sydney Human Ethics Committee. While the student (SRC) was not involved in the grant application for the study, he was involved in all subsequent phases of the research. This included obtaining ethical approval for the project, setting the research questions, recruitment of study sample, writing interview guides for focus groups, facilitating focus groups, developing questionnaires for the quantitative study, and analysing results.
The funded study dealt with the perceptions of consumers who had received HMR (recipients) and non-recipient consumers who would be eligible to receive HMR based on program guidelines (eligible non-recipients) (Australian Government Department of Human Services 2011). In addition the perceptions of informal caregivers of recipients and eligible non-recipients were examined. Due to resource and time constraints that limit the scope of this thesis, some prioritisation was necessary. The main focus of the thesis was on the perceptions of eligible non-recipients and their informal caregivers. The research presented in this thesis therefore represents a secondary analysis of selected data from the funded study.

The next section of this chapter (Section 1.4, page 6) provides a literature review of what is known about the perceptions of eligible non-recipients (and their informal caregivers) towards HMR and other pharmacist-provided medication management services. The literature review informed the theoretical framework which was used to guide the research. The development of the conceptual model is described in greater detail in Section 1.5 (page 43).

1.4 The perceptions of eligible non-recipients (and their informal caregivers) towards medication management services

1.4.1 Scope of the review

This literature review aimed to identify and evaluate studies which specifically explored consumers’ and informal caregivers’ expectations of and willingness to use pharmacist-provided medication management services prior to service provision. In particular only those services which were provided within community pharmacy, within
an out-patient hospital service, within medical practices or within the patients’ home or care home were eligible. Articles were not eligible if the article reported the views of consumers towards traditional community pharmacy services which focussed on medication supply and/or patient counselling but did not report on extended or “cognitive” pharmaceutical services. Table 1 (page 8) provides a summary of the articles. Within this table, the name of the country where the study was conducted and the terminology used to describe the service is provided. Articles are arranged chronologically from earliest to latest.

The next section of the literature review outlines the terms used to describe medication management services and the historical context in which the terminology has evolved. The terminology used within each of the manuscripts is systematically identified.

While the search for literature and evaluation of the studies was completed prior to 2009, it has been continuously updated since that time. This literature review therefore includes all published studies up till September 2012, with the exception of studies published as a result of this research project.
<table>
<thead>
<tr>
<th>Reference</th>
<th>Country - type of service</th>
<th>Focus of the study</th>
<th>Main findings relevant to present study</th>
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<tbody>
<tr>
<td>Volume, Farris et al. (2001)</td>
<td>Canada - Pharmaceutical care</td>
<td>To compare patients’ adherence to therapy, expectations, satisfaction with pharmacy services, and health-related quality of life (HRQOL) after the provision of pharmaceutical care with those of patients who received traditional pharmacy care</td>
<td>Respondents had higher expectations of care related to dispensing medicines in a timely manner and providing advice, and lower expectations of communicating in depth, collaborating with prescribers or medicines management.</td>
</tr>
<tr>
<td>Nichols-English (2002)</td>
<td>USA-Pharmaceutical care</td>
<td>To explore attitudes, perceptions, and awareness of the pharmaceutical care concept and the role that pharmacists play in the provision of primary patient care.</td>
<td>Lay participants and participating health care professionals overall were satisfied with current pharmacy services in the community. None of the lay people was aware of the concept of pharmaceutical care. There was a lack of social demand for pharmaceutical care services.</td>
</tr>
<tr>
<td>Larson, Rovers et al. (2002)</td>
<td>USA-Pharmaceutical care</td>
<td>To explore the dimensional structure of a satisfaction survey in patients who have not yet received pharmaceutical care services.</td>
<td>There were two dimensions of performance evaluation of receiving pharmaceutical care services; Friendly Explanation and Managing Therapy. Respondents had lower expectations on items on the Managing Therapy scale lower than they did items on the Friendly Explanation scale.</td>
</tr>
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<td>Tootelian, Rolston et al.</td>
<td>USA – Pharmaceutical services not</td>
<td>To examine consumer perceptions of the future of healthcare delivery for</td>
<td>Consumers would be receptive to seeking advice relative to specific medications, however they would be less receptive to other possible services.</td>
</tr>
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<td>Reference</td>
<td>Country - type of service</td>
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<td>(2005)</td>
<td>related to the provision of medicines</td>
<td>prescription drugs and their interest in receiving medical services from pharmacists, which they traditionally have received from other healthcare providers</td>
<td>that pharmacists could provide. Overall, fewer than two in five respondents said they are somewhat or very willing to personally pay pharmacists for these services. Approximately half of the respondents indicated they are somewhat or very unwilling to pay. Furthermore, when respondents were asked what they would be willing to pay for, more than half indicated “nothing.”</td>
</tr>
<tr>
<td>Assa-Eley and Kimberlin (2005)</td>
<td>USA-Pharmaceutical care</td>
<td>To compare pharmacists’ and patients’ perspectives of the benefits of pharmaceutical care.</td>
<td>Patients valued the items regarding the provision of information as the most beneficial. Items related to the preparation of care-plans and monitoring were rated as less beneficial.</td>
</tr>
<tr>
<td>Hill and Dowse (2007)</td>
<td>South Africa - Pharmaceutical care</td>
<td>To examine willingness to pay for pharmaceutical care</td>
<td>46% said that they were willing to pay pharmacists for providing professional cognitive services. It is not clear from the manuscript about how the term cognitive service was defined. Although pharmacists were significantly more likely to provide participants with their prescription medicines, they compared unfavourably with doctors in terms of healthcare provider accessibility and in providing patients with health-related information and medication counselling. While the majority of participants surveyed classified their relationships with their pharmacists as good, just under half were willing to pay pharmacists for providing professional care.</td>
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<tr>
<td>Reference</td>
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<td>Doucette, Witry et al. (2007)</td>
<td>USA - Medication therapy management (MTM)</td>
<td>To assess consumers’ attitudes towards activities considered to be core elements of MTM.</td>
<td>Consumers held more positive attitudes towards MTM activities related to patient counseling than other MTM activities such as setting goals or monitoring follow-up. Consumers who had recently visited their doctor about an adverse drug event were more positive than others. Consumers who recognized their need for medicines held more positive attitudes towards MTM activities.</td>
</tr>
<tr>
<td>Tinelli, Bond et al. (2007)</td>
<td>United Kingdom - Community Pharmacy Medicines Management Project</td>
<td>To determine whether the intervention causes a change in patient satisfaction with, attitudes towards, and expectations of, or experience with community pharmacy in general.</td>
<td>Many of the outcomes expected of the service related to the opportunity to learn about the patient’s medicines by communicating with a pharmacist. Other outcomes related to collaborating with the doctor or providing a wider advisory health-related role. Those items which related to expectations about learning about medicines were rated more highly than items related to a wider advisory health-related role.</td>
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<tr>
<td>Franic, Tucker et al. (2008)</td>
<td>USA - Pharmaceutical care</td>
<td>To evaluate patients’ awareness and understanding of pharmacy practice, pharmacy services, and pharmaceutical care.</td>
<td>The practice of pharmaceutical care is not widely understood by patients. Furthermore, many patients were unaware of the cognitive and clinical services that pharmacists provide.</td>
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<tr>
<td>Law, Okamoto</td>
<td>USA - MTM</td>
<td>To explore the awareness of Medicare Part D</td>
<td>Awareness of MTM was low (93% unaware). Trust in the pharmacist centred on dispensing pharmacy services.</td>
</tr>
<tr>
<td>Reference</td>
<td>Country - type of service</td>
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<td>et al. (2008)</td>
<td></td>
<td>enrollees regarding MTM and to examine their expectations and perceptions of pharmacists in providing MTM.</td>
<td>prescriptions. Expectation of pharmacists also revolved around supply of products. Approximately 70% of respondents did not believe they needed MTM; however, 58% believed pharmacists were good candidates to provide MTM. Willingness to pay for MTM services was low (31%).</td>
</tr>
<tr>
<td>Schuh and Droge (2008)</td>
<td>USA - MTM</td>
<td>To examine willingness to pay for MTM services.</td>
<td>85% were willing to use MTM services if insurance paid 100% of the cost. Of those willing to use MTM at all, 47% of the sample was willing to pay 100% out-of-pocket expenses.</td>
</tr>
<tr>
<td>Kassam, Collins et al. (2009)</td>
<td>USA - Pharmaceutical care activities provided within community pharmacies</td>
<td>To develop and validate a patient satisfaction survey</td>
<td>There were three dimensions of expectations of ANY pharmacy. 1) monitoring outcomes, 2) information and education, and 3) personalized, collaborative and preventive care. Mean factor score of expectations were factor 3 (4.51 +/- 0.49), factor 2 (4.11 +/- 0.67) and factor 1 (3.71 +/- 0.78).</td>
</tr>
<tr>
<td>Truong, Layson-Wolf et al. (2009)</td>
<td>USA - MTM</td>
<td>To determine patients' perceptions and expectations about MTM services and to develop educational strategies and outreach programs aimed at increasing patients' knowledge of MTM services and the expanded role of</td>
<td>Patients had very limited knowledge of the core elements of an MTM service in the community pharmacy setting. 49 of 81 patients (60%) had never heard of MTM services. A total of 65 patients (80%) had never had or received a medication therapy review. Patients reported that pharmacist provision of MTM services was important, but they were concerned about privacy and pharmacists' time. Patients were supportive</td>
</tr>
<tr>
<td>Reference</td>
<td>Country - type of service</td>
<td>Focus of the study</td>
<td>Main findings relevant to present study</td>
</tr>
<tr>
<td>----------------------------</td>
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</tr>
<tr>
<td><strong>Garcia, Snyder et al. (2009)</strong></td>
<td>USA - MTM</td>
<td>To identify effective strategies for marketing pharmacist-provided MTM services to patients in a self-insured employer setting</td>
<td>Participants generally felt positively toward pharmacists. Some participants questioned pharmacists' education and qualifications for this enhanced role in patient care. Perceived benefits of MTM noted by participants included the opportunity to obtain personalized information about their medications and the potential for improved communication among their health providers. Barriers to patient participation were out-of-pocket costs and lack of time for MTM visits. Participants suggested use of alternative words to describe MTM and marketing approaches that involve personal contact.</td>
</tr>
<tr>
<td><strong>Friedrich, Zgarrick et al. (2010)</strong></td>
<td>USA - MTM</td>
<td>To determine patients' willingness to receive and self-pay for MTM services and to examine factors that may influence willingness to pay.</td>
<td>The majority of patients felt that pharmacists should provide MTM services. No correlation was found between complexity of the medication regimen and willingness to pay. Presence of certain chronic conditions and insurance status appeared to have a correlation with willingness to pay.</td>
</tr>
<tr>
<td><strong>Kassam, Collins et al.</strong></td>
<td>USA - Pharmaceutical care activities</td>
<td>To compare patients' expectations and experiences at pharmacies</td>
<td>The results of factor analysis revealed three dimensions of expectations of pharmacy. The results were very similar to the results of the</td>
</tr>
<tr>
<td>Reference</td>
<td>Country - type of service</td>
<td>Focus of the study</td>
<td>Main findings relevant to present study</td>
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<tr>
<td>(2010)</td>
<td>provided within community pharmacies</td>
<td>offering traditional APPE learning opportunities (for pharmacy student placements) with those offering enhanced APPEs that incorporate pharmaceutical care activities.</td>
<td>previous study. (Kassam, Collins et al. 2009)</td>
</tr>
<tr>
<td>Montgomery, Kälvemark Sporrong et al. (2010)</td>
<td>Sweden – Pharmaceutical care provided within community pharmacies</td>
<td>To describe and compare patients who had previously received a voluntary pharmaceutical care service and patients who had received standard service with regard to their perceptions of medicine use and the pharmacy encounter.</td>
<td>Respondents with the perception of greater need for medicines and greater concern about medicines were more likely to use the service than those who did not. Patients who used the service were more likely to have had; difficulties opening container (40.7% vs 29.0%, P&lt;.01), worries about side effects (44.7% vs 30.0%, P&lt;.001), experiences of side effects (52.9% vs 26.9%, P&lt;.001), worries about drug-drug interaction (27.0% vs 18.6%, P&lt;.05), inadequate treatment effects (16.8% vs 8.7%, P&lt;.05). Those who were interested in learning more about their medicines were also more likely to have volunteered to use the service.</td>
</tr>
<tr>
<td>Linton, Bacon et al. (2010)</td>
<td>USA - Medication reviews performed by physicians or pharmacists</td>
<td>To determine if beneficiaries will respond to a mailed request to pursue a medication review; and to identify where veterans had chosen to have medication reviews and outcomes from</td>
<td>The finding relevant to the present study was that the overall uptake of pharmacist provided medication review was low. 4000 beneficiaries were offered free medication review and 606 consented to be surveyed. Among the 373 who completed the survey, just 190 (50.9%) received reviews in a physician's office; 103 (27.6%) received reviews in a pharmacy; 60 (16.1%)</td>
</tr>
<tr>
<td>Reference</td>
<td>Country - type of service</td>
<td>Focus of the study</td>
<td>Main findings relevant to present study</td>
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</tr>
<tr>
<td>Hong, Liu et al. (2011)</td>
<td>USA - MTM</td>
<td>To identify attributes of MTM valued by Medicare beneficiaries and to determine patient preferences and willingness to pay for MTM attributes.</td>
<td>Study participants viewed cost (relative importance 32.2%) as the most important attribute of MTM, followed by service setting (24.2%), provider experience in overall practice (19.5%), and provider experience in geriatrics (16.6%). Community pharmacies ((\beta = 0.146, P = 0.007)) were the most preferred environment for MTM services, followed by clinics, whereas telephone consultation was the least preferred environment ((\beta = -0.349, P &lt; 0.001)).</td>
</tr>
<tr>
<td>Renberg, Wichman Törnqvist et al. (2011)</td>
<td>Sweden - Services provided by community pharmacy</td>
<td>To explore pharmacy clients’ expectations of services provided by an ideal community pharmacy</td>
<td>Consumers’ expectations of medication management services were not highly prevalent. In general, pharmacy did not present as a health-care destination. The authors concluded that this might be a challenge for promoting or implementing cognitive services.</td>
</tr>
<tr>
<td>Lee, George et al. (2012)</td>
<td>Australia - Home Medicines Review</td>
<td>To explore stakeholder perspectives on a government-subsidised Home Medicines Review (HMR) service and factors affecting the uptake of HMRs for older residents of retirement villages</td>
<td>These residents thought the service could be useful and beneficial in improving their understanding about medicines, assuring them that their medicines were appropriate, or simplifying their medication regimen. Some residents perceived a lack of need for the service at present but thought they might need it in the future.</td>
</tr>
</tbody>
</table>
1.4.2 Terminology and medication management services

The majority of research into consumers’ perceptions of medication management services has occurred within the United States of America. In that country, a federal program, Medicare Part D provides subsidies for medication costs for beneficiaries. The Medicare Modernization Act of 2003 requires that Medicare Part D insurers provide Medication Therapy Management (MTM) services to selected beneficiaries, with the goals of providing education, improving adherence, or detecting adverse drug events and medication misuse (Pellegrino, Martin et al. 2009).

Prior to and including 2007, the provision of medication management services had been referred to as pharmaceutical care (Volume, Farris et al. 2001; Larson, Rovers et al. 2002; Nichols-English 2002; Assa-Eley and Kimberlin 2005; Hill and Dowse 2007) or as non-traditional roles for community pharmacists (Tootelian, Rolston et al. 2005). Since 2007, research conducted within the USA into consumer perceptions of medication management services has tended to use the term MTM (Doucette, Witry et al. 2007; Law, Okamoto et al. 2008; Schuh and Droge 2008; Garcia, Snyder et al. 2009; Truong, Layson-Wolf et al. 2009; Friedrich, Zgarrick et al. 2010; Hong, Liu et al. 2011). Research into consumer perceptions of pharmaceutical care in the USA however, continues to appear (Franic, Tucker et al. 2008; Kassam, Collins et al. 2009; Kassam, Collins et al. 2010). A recent study in the USA investigated consumer uptake of medication review after a mailed promotion. The study compared the uptake of pharmacist versus general practitioner review yet no reference was made to pharmaceutical care or MTM (Linton, Bacon et al. 2010).

Different terms for medication review are used in Europe and the United Kingdom. A study within Sweden referred to medication management services supplied in community pharmacies as pharmaceutical care in 2010 (Montgomery, Kälvemark
Sporrong et al. 2010). Another study within Sweden examining consumers’ expectations of the types of services that community pharmacy should provide did not refer to a particular service by name (Renberg, Wichman Törnqvist et al. 2011). Within the United Kingdom a study published in 2007 referred to a medication management service as Community Pharmacy Medicines Management Project.

Only one study, which was published in 2012, dealt with consumer perceptions of Australia’s Home Medicines Review (Lee, George et al. 2012).

### 1.4.3 Methodological issues

There are a number of methodological considerations when conducting research into consumers’ perceptions of medication management services. Three categories of methodological considerations have been identified from the literature review. It is considered important that studies obtain the views of consumers who would be eligible to receive medication management services and their informal caregivers. Given the difficulty of identifying respondents who would be eligible to receive these services, the first methodological consideration deals with the recruitment strategy used to recruit respondents. The second methodological consideration deals with the issue of whether respondents were consumers who were using multiple medicines or their caregiver. The third methodological consideration covers the issue of how medication management services were described to study participants. This is considered important because at the time the research was conducted respondents were yet to experience the service.

#### 1.4.3.1 Recruitment strategies
A variety of strategies were employed to facilitate recruitment. Many studies had pharmacists or their staff approach clients/patients of community pharmacies (Franic, Tucker et al. 2008; Kassam, Collins et al. 2009; Truong, Layson-Wolf et al. 2009; Friedrich, Zgarrick et al. 2010; Kassam, Collins et al. 2010; Renberg, Wichman Törnqvist et al. 2011). In one study, physicians working at a specialist medical clinic asked their patients to participate (Tinelli, Bond et al. 2007). Other personal methods included approaching people on the street (Schuh and Droege 2008) within a senior citizen centre (Hong, Liu et al. 2011) and in a medical centre (Nichols-English 2002). In the study of Lee, George et al. (2012), residents of retirement villages were identified by using expression of interest (EOI) forms and posters distributed by the support staff of the retirement villages.

In order to overcome selection bias which affects convenience sampling, some studies used methods such as post, telephone or online sampling (Larson, Rovers et al. 2002; Assa-Eley and Kimberlin 2005; Doucette, Witry et al. 2007; Hill and Dowse 2007; Law, Okamoto et al. 2008; Linton, Bacon et al. 2010). A mixed method of recruitment was used by the study of Garcia et al (2009). In that case, flyers were used to recruit people at the workplace but this was supplemented by telephoning known contacts.

The recruitment strategy for each study is summarised in Table 2 (Page 19). Consistent with Table 1 studies are arranged chronologically, beginning with those published first.

1.4.3.2 Use of medicines among study participants
Medication management services are ideally suited to persons who use multiple medicines. Several studies have attempted to obtain the views of participants who were likely to be using multiple medicines while others did not attempt to target such participants. Studies did not always report the number of medicines used by participants making it difficult to infer the proportion of respondents who were using multiple medicines. Since increasing age is associated with increasing incidence of multiple medicine use (Moen, Antonov et al. 2009), it is likely that those studies which included a high proportion of respondents who were older also had a large proportion using multiple medicines. Table 2 (Page 19) provides an indication of the proportion of respondents who were using multiple medicines and some representative statistics to indicate the proportion of respondents who were of advanced age.

Finally, Table 2 identifies those studies in which there was a substantial proportion (or it was likely that there was a substantial proportion) of respondents who used multiple medicines as well as those studies in which there was a low proportion (or it was likely that there was a low proportion).
## Table 2 Characteristics of respondents

<table>
<thead>
<tr>
<th>Reference</th>
<th>Sample and recruitment strategy</th>
<th>Indication of the proportion of respondents who were of advanced age</th>
<th>Use of medicines by participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Volume, Farris et al. (2001)</td>
<td>Convenience sample of prescription customers of community pharmacies using three or more medicines aged over 65 years.</td>
<td>Mean age was 73 +/- 6 years.</td>
<td>All participants were using three or more medications according to pharmacy profiles. No data on medicine use was reported.</td>
</tr>
<tr>
<td>Nichols-English (2002)</td>
<td>Convenience sample of patients of a medical service.</td>
<td>27-74 years</td>
<td>No data on medicine use was reported</td>
</tr>
<tr>
<td>Larson, Rovers et al. (2002)</td>
<td>Convenience sample of prescription customers of community pharmacies using one or more medicines for chronic disease.</td>
<td>67% were 60 years old or more.</td>
<td>77% had used three or more medicines within the last 4 weeks.</td>
</tr>
<tr>
<td>Tootelian, Rolston et al. (2005)</td>
<td>Random sample of homes within using a telephone survey.</td>
<td>23% were 65 years or older.</td>
<td>No data on medicine use was reported.</td>
</tr>
<tr>
<td>Assa-Eley and Kimberlin (2005)</td>
<td>Random sample of homes using a telephone survey. Included only those who had received one prescription medication within the previous six months.</td>
<td>24% were older than 60 years.</td>
<td>All respondents had used at least one prescription within the previous six months but no data on medicine was reported.</td>
</tr>
<tr>
<td>Hill and Dowse (2007)</td>
<td>Purposive sample of the customers of community pharmacies.</td>
<td>14% were older than 65 years.</td>
<td>No data on medicine use was reported.</td>
</tr>
<tr>
<td>Reference</td>
<td>Sample and recruitment strategy</td>
<td>Indication of the proportion of respondents who were of advanced age</td>
<td>Use of medicines by participants</td>
</tr>
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</tr>
<tr>
<td>Doucette, Witry et al. (2007)</td>
<td>Sample obtained from a private database (Harris Interactive). Purposive sample of Medicare beneficiaries who were 65 years or older.</td>
<td>Mean age was 73 years.</td>
<td>45% used more than 4 medicines daily</td>
</tr>
<tr>
<td>Tinelli, Bond et al. (2007)</td>
<td>Convenience sample of clinic patients with established coronary artery disease recruited during attendance at the clinic.</td>
<td>76% were older than 65 years.</td>
<td>No data on medicine use was reported.</td>
</tr>
<tr>
<td>Franic, Tucker et al. (2008)</td>
<td>Convenience sample of customers of different types of community pharmacies.</td>
<td>Depending on the type of pharmacy the mean age of participants varied between 36 +/- 13 and 48 +/- 18</td>
<td>Depending on the type of pharmacy, the mean number of medicines taken by participant varied between 2.3 +/- 2.4 and 3.9 +/- 3.6.</td>
</tr>
<tr>
<td>Law, Okamoto et al. (2008)</td>
<td>Sample obtained from a private database (Harris Interactive). Purposive sample of Medicare beneficiaries.</td>
<td>Mean age was 72 +/- 5 years.</td>
<td>The median number of daily medicines was 4.0 [range 0 - 15].</td>
</tr>
<tr>
<td>Schuh and Droege (2008)</td>
<td>Random sample of general population using postal survey.</td>
<td>27% were aged 60 years or older.</td>
<td>67% were taking medicines.</td>
</tr>
<tr>
<td>Kassam, Collins et al. (2009)</td>
<td>Convenience sample of customers of community pharmacy presenting with prescription for</td>
<td>39% were older than 60 years.</td>
<td>No data on medicine use was reported.</td>
</tr>
<tr>
<td>Reference</td>
<td>Sample and recruitment strategy</td>
<td>Indication of the proportion of respondents who were of advanced age</td>
<td>Use of medicines by participants</td>
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</tr>
<tr>
<td>Truong, Layson-Wolf et al. (2009)</td>
<td>Convenience sample of customers of community pharmacies.</td>
<td>28% were aged 65 years or older.</td>
<td>48% were taking five or more regular medicines.</td>
</tr>
<tr>
<td>Garcia, Snyder et al. (2009)</td>
<td>Purposive sample of university employees who had at least one chronic diseases.</td>
<td>Mean age was 58 years.</td>
<td>81% were taking three or more regular medicines. 47% were taking five or more regular medicines.</td>
</tr>
<tr>
<td>Friedrich, Zgarrick et al. (2010)</td>
<td>Convenience sample of adult customers of community pharmacies.</td>
<td>29% were 65 years or older.</td>
<td>48% were taking three or more medicines daily. 15% were taking five or more medicines daily.</td>
</tr>
<tr>
<td>Kassam, Collins et al. (2010)</td>
<td>Convenience sample of customers of community pharmacy presenting with prescription for asthma medicines.</td>
<td>39% were older than 60 years.</td>
<td>No data on medicine use was reported.</td>
</tr>
<tr>
<td>Montgomery, Kälvemark Sporrong et al. (2010)</td>
<td>Convenience sample of customers of community pharmacies who were older than 60 years and were taking five or more medicines daily.</td>
<td>Mean age was 74 +/- 8 years.</td>
<td>All participants used medicines. 64% used more than 5 medicines daily. 10% used 11 medicines daily or more.</td>
</tr>
<tr>
<td>Linton, Bacon et al. (2010)</td>
<td>Postal invitation using purposive sampling of Medicare beneficiaries who used more than ten medications within the previous three months.</td>
<td>78% were aged 65 years or older.</td>
<td>Average number of maintenance medications was 12.3 +/- 2.0.</td>
</tr>
<tr>
<td>Hong, Liu et al.</td>
<td>A purposive sample of</td>
<td>100% of</td>
<td>No data on medicine use was reported.</td>
</tr>
</tbody>
</table>

CHAPTE R ONE - BACKGROUND
### Reference Sample and Recruitment Strategy

<table>
<thead>
<tr>
<th>Reference</th>
<th>Sample and recruitment strategy</th>
<th>Indication of the proportion of respondents who were of advanced age</th>
<th>Use of medicines by participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>al. (2011)</td>
<td>Medicare beneficiaries who were recruited at senior citizen centres.</td>
<td>participants were older than 65 years.</td>
<td>use was reported.</td>
</tr>
<tr>
<td>Renberg, Wichman, Törnqvist et al. (2011)</td>
<td>Convenience sample of the customers of community pharmacy with at least condition requiring treatment for more than three months.</td>
<td>The mean age was 61 years.</td>
<td>No data on medicine use was reported.</td>
</tr>
<tr>
<td>Lee, George et al. (2012)</td>
<td>A purposive sample of the residents of retirement villages.</td>
<td>53% were aged 65-79 and 47% were aged 80-86.</td>
<td>All participants were using three or more medicines.</td>
</tr>
</tbody>
</table>

* There was a substantial proportion (or it was likely that there was a substantial proportion) of respondents who used multiple medicines in these studies.

* There was a low proportion (or it was likely that there was a low proportion) of respondents who used multiple medicines in these studies.

### 1.4.3.3 Descriptions of medication management services

Since participants in these studies had not yet experienced medication management services it is important to report how the concept of the service or service elements were described to participants during the study. There is a dearth of literature about the details of how a particular medication management service was described to participants. There were several studies where MTM was explained to study participants but the explanation was not provided in the manuscript (Law, Okamoto et al. 2008; Garcia, Snyder et al. 2009; Truong, Layson-Wolf et al. 2009). In two studies the description provided in the manuscript was very brief. These descriptions were: “A 45 minute appointment-based service which was held within a private area of the
community pharmacy.” (Friedrich, Zgarrick et al. 2010) and “The new Medicare drug benefit will include a service to help some Medicare beneficiaries manage their medicines (Doucette, Witry et al. 2007). In one study the description of MTM provided to participants was apparently very detailed (although not provided in the manuscript) and defined terms such as medication therapy review, personal medication record and medication action plan (Truong, Layson-Wolf et al. 2009). Hong, Liu et al. (2011) performed a discrete choice experiment to evaluate preferences for seven various service elements of MTM such as service setting, experience of the pharmacist, years of practice and cost among other attributes, but it is unclear from the manuscript what participants were told or understood about the provision of MTM. Only one study provided a rationale for the description provided (Garcia, Snyder et al. 2009). In that case, the rationale was the researchers’ wish to probe five elements of MTM as defined by the professional bodies representing pharmacists in the United States (American Pharmacists Association and the National Association of Chain Drug Stores Foundation 2008).

In an attempt to determine the effect of promoting medication reviews (whether provided by a physician or pharmacist) to United States’ veterans who used multiple medicines, Linton, Bacon et al. (2010) mailed veterans directly. The manuscript did not describe the concept of medication review.

In the one study published regarding HMR, it is not clear from the manuscript how Home Medicines Review was described to participants (Lee, George et al. 2012).

Having explained methodological considerations, the next section examines consumers’ overall willingness to use medication management services.
1.4.4 Consumers’ overall willingness to use medication management services

There were two main categories of research methods investigating consumers’ willingness to use medication management services.

The first category of research methods dealt with observing the rate at which consumers used the services and describing the characteristics of consumers who did and/or did not use the services. There were two studies which used this method. In one of these studies the willingness to use pharmacist-provided medication review was investigated in a study of US veterans who were using more than ten medicines daily (Linton, Bacon et al. 2010). Of 4000 patients who were invited to participate in a study offering free medication review, only 123 actually received medication reviews by pharmacists. This was a disappointing result for the authors of the study. They concluded that more intensive interventions may be required to ensure that medication regimens are being actively managed among those who use a large number of prescription medications. While this study did not explore the perceptions of participants, it was included in this review because the results provide some information about the willingness of consumers to use medication management services. The second study compared the characteristics of consumers who chose to use a Swedish pharmaceutical care intervention with those who did not (Montgomery, Kälvemark Sporrong et al. 2010).

The second category of research used cross sectional methods to explore consumers’ perceptions of medication management services and their willingness to use them. In these studies, qualitative and quantitative methods were used to enquire as to consumers’ willingness to use the services and the factors which influence willingness. Using these methods, consumers’ willingness to use the services varied widely. In one study, after receiving a description of MTM only 18% of participants were willing to use
MTM (Law, Okamoto et al. 2008). The question posed to consumers in that case did not explain whether they had to pay for the service. Interestingly, the next question posed to respondents was how much they would be willing to pay for a service and 32% responded that they would be willing to pay a median of $10US. This result may be compared with that of another study where 85% were willing to use “cognitive services” if insurance paid 100% of the cost (Schuh and Droege 2008). Willingness to receive MTM was investigated by Friedrich, Zgarrick et al. (2010). In that study, it was reported that a surrogate measure for willingness to receive MTM was used. The surrogate measure was whether MTM was “a good idea”. It should be noted that consumers’ belief that something is a good idea is not the same as willingness to use the service. Of the sample, 94% stated that the MTM service would be a “very good idea” or “somewhat a good idea” (Friedrich, Zgarrick et al. 2010).

In summary there is a lack of information regarding consumers’ willingness to use medication management services. The few studies which have examined this issue indicate considerable variation in willingness. The next section examines factors which may be expected to influence this willingness.

1.4.5 Factors which may influence consumers’ willingness to use medication management services

Several studies investigated the factors which may influence consumers' willingness to use medication management services. These factors included: awareness and understanding of the service; perceptions of receiving benefits; perceptions of the role of the pharmacist to perform medication management services; psycho-social factors; and other factors.
1.4.5.1 Awareness and understanding of medication management services

Since demand for health services is influenced by consumer knowledge and understanding of the service (Ensor and Cooper 2004), it is possible that prior awareness of a medication management service may influence willingness to use it. Importantly, prior awareness appears to be low among relevant populations.

There were two studies which investigated awareness of MTM. In the study of Truong, Layson-Wolf et al. (2009) 60% of participants had never heard of MTM. Similarly, in the study of Law, Okamoto et al. (2008) 93% were unfamiliar with the term Medication Therapy Management or MTM. Furthermore, in a qualitative study participants were unsure about the suitability of the name MTM and suggested alternative words to describe MTM (Truong, Layson-Wolf et al. 2009). Participants felt that alternative terms such as “medication management” or “medication checkup” would be less confusing and have a more “personal” feel (Garcia, Snyder et al. 2009). Lee, George et al. (2012) concluded that residents’ lack of awareness of HMR was a barrier to them using it. Many residents reported they had not heard of the service, and were unaware that the service is government subsidised (Lee, George et al. 2012).

It remains unclear whether a lack of awareness or understanding of a medication management service influences consumers’ willingness to use it because no studies have used quantitative methods to address this issue.

Having dealt with what is known about awareness, the following section explores how consumers’ perception of the benefits of medication management services influences their willingness to use the service. It is important to explore
consumers’ benefit perceptions because consumers who believe that a service would be personally beneficial would be more willing to use it (Rosenstock 1974; Ajzen 1991).

1.4.5.2 The influence of benefit perceptions on willingness to use medication management services

The relationship between consumers’ benefit perceptions and willingness was explored in a study performed in the United States (Friedrich, Zgarrick et al. 2010). It was shown that participants’ willingness to receive MTM correlated highly with their beliefs that MTM would be helpful to them (Friedrich, Zgarrick et al. 2010). Closely related to whether consumers perceive medication management services to be beneficial is whether they believe that they need the service. A qualitative study has reported that residents’ lack of perceived need for HMR is a barrier to them using the service (Lee, George et al. 2012). In a quantitative study, it has been reported that just 7% of the cohort believed that they “fall into the category of need” for MTM and 21% believed that they would benefit, despite the fact that participants were taking a median of 4 medicines per day (Law, Okamoto et al. 2008).

In summary, there is some evidence that consumers’ benefit perceptions positively influence their willingness to use medication management services. It is also important to note that in neither of the two quantitative studies mentioned above were participants surveyed about how they were likely to benefit (Law, Okamoto et al. 2008; Friedrich, Zgarrick et al. 2010).

The next two sections therefore explore how consumers may benefit from medication management services. As described in Section 1.4.3.3 (page 22), it is relevant
whether consumers had received a description of the medication management service as part of research design. Therefore, the next section explores consumers’ perceptions in studies where the service had been described to them whereas the section following that explores consumers’ perceptions in studies where the service had not been described.

1.4.5.3 Exploring consumers’ perceptions of the benefit of medication management services – after the service had been described

In these studies respondents were provided with or it is assumed that they were provided with some definition of the medication management services of interest. In the only qualitative study regarding MTM activities, it was reported that the perceived benefits were the opportunity to obtain information about their medicines, to provide reassurance about their medicine concerns and receive the expert opinion of the pharmacist (Garcia, Snyder et al. 2009). Similar qualitative findings were reported in relation to HMR (Lee, George et al. 2012). The authors of that study added that residents believed that HMR could assist them to simplify their medication regimen (Lee, George et al. 2012).

In quantitative studies, a variety of methods have been employed to determine consumers' expectations of particular elements of medication management services and pharmaceutical care in general. The study of Doucette, Witry et al. (2007) assessed consumers’ attitudes towards those activities considered to be core elements of MTM. Attitudes were defined as consumers’ expectations that community pharmacy should provide certain activities as part of their Medicare Part D prescription drug benefit. In that study, the researchers used the same seven variables which were intended to tap aspects of pharmaceutical care, as previously defined (Assa-Eley and
Kimberlin 2005). While factor analysis was not used to group the variables, they were grouped according to the notions of the researchers about the benefits of pharmaceutical care. Three of the items were intended to relate to the benefit of learning about medicines through counselling and four items for MTM specific activities such as carrying out plans to solve or prevent problems with medicines. Those items which related to counseling activities were rated with higher expectations than for items relating to MTM specific activities (Doucette, Witry et al. 2007).

In another study participants were asked to rate the importance (to themselves) of a list of benefits of MTM (Truong, Layson-Wolf et al. 2009). The list of benefits included items such as; follow-up with physician, making recommendations about medication regimen, and providing medication review. Unlike other studies, participants were provided with detailed descriptions of each of these items. The survey also provided items related to more general benefits such as; improving overall health, improving medication use, and improving communication with health providers. There were no items related specifically to the benefit of communicating with a pharmacist about medicines. Interestingly, participants rated the highest level of importance to making recommendations about medication regimen.

1.4.5.4 Exploring consumers’ perceptions of the benefit of medication management services – where the service had not been described

In these studies, few detailed definitions of particular services were provided for participants. Participants were asked a variety of questions regarding their perceptions of the concept of pharmacists providing services related to medication management.
Franic, Tucker et al. (2008) used qualitative methods to explore underlying perceptions of pharmaceutical care activities. In their introduction, the authors defined pharmaceutical care as the “responsible provision of drug therapy for the purpose of achieving definite outcomes that improves the patient’s quality of life.” The researchers asked participants to describe what they knew about the term “pharmaceutical care”. Content analysis of open-ended responses was used to explore underlying themes. Whereas the proportion of respondents who provided usable responses to other items approached 100%, the researchers noted a high level of non-response when participants were asked to define the term pharmaceutical care (just 97/175 participants provided usable answers). In addition they reported that around only half the responses that were provided could be categorised into themes which corresponded with the researchers’ definition of pharmaceutical care. Other responses tended to describe supply functions or so-called early clinical functions. They concluded that “overall, study participants were not knowledgeable or did not have an articulated preconceived viewpoint of pharmaceutical care.” They also suggested that the profession needs to increase consumers’ expectations of pharmaceutical care services (Franic, Tucker et al. 2008).

The following studies used quantitative methods to explore consumers’ perception of receiving benefits.

Volume, Farris et al. (2001) explored patients’ expectations that their pharmacist would perform various elements of pharmaceutical care. In general, respondents had higher expectations of care related to dispensing medicines in a timely manner and providing advice, and lower expectations of communicating in depth or collaborating with prescribers. In another study, participants rated the perceived benefit of pharmaceutical care (Assa-Eley and Kimberlin 2005). In that study, the tasks provided were those related to pharmaceutical care as originally defined by Hepler and Strand.
(1990). Items related to receiving information about medicines were rated higher than items related to discussing general health matters. The study of Tootelian, Rolston et al. (2005) explored consumers’ perception of the value of community pharmacists providing various services. This was achieved by providing participants with a list of service elements and asking them to rate the value of each element. It should be noted that the research question did not ask how valuable the service element was to themselves, it simply asked how valuable each element was. Items related to receiving information about vitamins and reducing the cost and number of medicines were rated higher than working with other health providers and managing medications for specific disease states.

Similarly, Tinelli, Bond et al. (2007) assessed patient expectations that a community pharmacy-led medication management service should provide certain elements. Many of the elements provided to respondents related to the opportunity to learn about the patient’s medicines by communicating with a pharmacist. Other elements related to collaborating with the doctor or providing a wider advisory health-related role. Those items which related to expectations about learning about medicines were rated higher than items related to a wider advisory health-related role.

The following studies add an extra dimension to the studies above by grouping different elements of pharmaceutical care activities into overarching themes of consumer interest.

The first study in this section reported consumers' performance evaluation of various service tasks related to pharmaceutical care as part of the development of a “satisfaction with pharmaceutical care” questionnaire (Larson, Rovers et al. 2002). These assessments were measured prior to the introduction of formal pharmaceutical care activities in the pharmacy. The responses were factor analysed in order to determine underlying dimensions of patient perspectives of pharmaceutical care.
There were two dimensions: Friendly Explanation (including items related to friendliness of care, the setting of care, and medication counselling); and Managing Therapy (items dealing with the concept of pharmaceutical care — managing drug therapy and solving therapy problems). Participants reported lower scores for items on the Managing Therapy scale than items on the Friendly Explanation scale (Larson, Rovers et al. 2002).

Three studies explored participants’ expectations of pharmaceutical care provided by pharmacies (Kassam, Collins et al. 2009; Kassam, Collins et al. 2010; Montgomery, Kälvemark Sporrong et al. 2010). Participants were provided with a list of services and were asked as to whether they expected the services would be provided by any pharmacy. Responses to these statements were factor analysed. In each study, there were three dimensions of expectations: 1) monitoring outcomes; 2) information and education; and 3) personalized, collaborative and preventive care (Kassam, Collins et al. 2009; Kassam, Collins et al. 2010). In the first of these studies, mean factor score of expectations were factor 3 (4.51 +/- 0.49), factor 2 (4.11 +/- 0.67) and factor 1 (3.71 +/- 0.78) (Kassam, Collins et al. 2009). This indicates that participants held more positive expectations of activities related to patient counseling than other MTM activities such as setting goals or monitoring follow-up. In regard to these expectations, the results of the second study were very similar (Kassam, Collins et al. 2010). In the third study which examined consumers’ expectations, Renberg Wichman Törnvist et al. (2011) explored consumers’ normative expectations of community pharmacy encounters. Respondents were provided with a list of 54 items describing services which may be provided by community pharmacies. Using items on this list, respondents were asked to describe “an ideal community pharmacy encounter”. Participants acknowledged that medicines were central to pharmacy services, but did not particularly emphasise pharmacists acting in medication management roles “as a central desired concept”.

CHAPTER ONE - BACKGROUND
Overall consumers have well developed expectations that pharmacists generally provide them with medicines information and advice which may help them to manage their medicines. Consumers generally do not have highly developed expectations that pharmacists perform other technical functions such as making recommendations to prescribers or reviewing the medication for appropriateness. Truong and colleagues demonstrated that it is possible to create and measure expectations about these technical functions by providing detailed descriptions of them within a survey (Truong, Layson-Wolf et al. 2009). However in the absence of such detailed descriptions, qualitative and quantitative studies suggest that consumers’ most salient expectations about the benefit of medication management services relate to their participation in a discussion with a pharmacist. Consumers tend to expect that these discussions could provide them with information and reassurance that could help them manage their medicine regimen. While there is some evidence that these expectations increase consumers’ willingness, the evidence is not strong and further work is needed to clarify this issue.

Having explored the influence of awareness and benefit perceptions, the following section describes how consumers’ perception of the role of the pharmacist to perform medication management services may influence their willingness to use the services.

1.4.5.5 Role orientation

Evidence for this proposition that consumers’ perceptions of the role of the pharmacist to provide medication management services may influence their willingness to use it arises from several studies.
In a qualitative study of consumer attitudes towards MTM, participants generally felt positively toward pharmacists and the concept of MTM (Garcia, Snyder et al. 2009). However, some participants questioned pharmacists' education and qualifications for this enhanced role in patient care. Elsewhere, it was reported that only 54% of participants believed that pharmacists were good candidates to provide MTM (Law, Okamoto et al. 2008). In that study, the more frequently the participant interacted with a community pharmacist, the more likely they were to: be aware of MTM; believe that pharmacists can help with providing medication information; and believe that they would personally benefit from MTM. In previous research, Assa-Eley and Kimberlin (2005) explained that role orientation could be positively influenced by pharmacists providing a higher level of counseling in the store. They found that patients who reported that their usual pharmacist asked if they were having problems, saw pharmaceutical care services as more beneficial than patients whose pharmacist did not (Assa-Eley and Kimberlin 2005). This is consistent with another study where it was shown that participants’ perceptions of the benefit of MTM were higher among the patrons of pharmacies where more patient counselling may be expected to be provided (such as independent and clinic pharmacies) compared with the patrons of grocery and mass-merchandise pharmacies (Doucette, Witry et al. 2007).

Having described how awareness, benefit perceptions and role orientation may influence consumers' willingness to use medication management services, the next two sections explore the influence of psycho-social factors and other factors respectively.

1.4.5.6 Psycho-social factors
It is possible that consumers’ beliefs about the harmfulness of their medicines influence their willingness to use medication management services. This section describes two studies which examined this possibility. Montgomery et al. explored the relationship between consumers’ beliefs about medicines and their voluntary use of a pharmaceutical care service (Montgomery, Kälve mark Sporrong et al. 2010). Using the Beliefs about Medications Questionnaire (Horne, Weinman et al. 1999), they found that respondents with the perception of greater need for medicines and greater concern about the harmfulness of medicines were more likely to use the service than those who did not. This study also explored whether consumers who experienced medication-related problems were more likely to use the service. Compared with patients who had not used the service, those who had used the service were more likely to have had; difficulties opening containers (40.7% vs 29.0%, \( P < .01 \)), worries about side effects (44.7% vs 30.0%, \( P < .001 \)), experiences of side effects (52.9% vs 26.9%, \( P < .001 \)), worries about drug-drug interactions (27.0% vs 18.6%, \( P < .05 \)), and inadequate treatment effects (16.8% vs 8.7%, \( P < .05 \)) (Montgomery, Kälve mark Sporrong et al. 2010). This study also showed that those who were interested in learning more about their medicines were also more likely to have volunteered to use the service (Montgomery, Kälve mark Sporrong et al. 2010).

One study explored the relationship between patients’ beliefs about medicines and their perception of obtaining personal benefit from two dimensions of MTM activities: patient counseling activities; and setting goals or monitoring follow-up (Doucette, Witry et al. 2007). Using the Beliefs about Medications Questionnaire (Horne, Weinman et al. 1999) they found that patients with the perception of greater need for medicines perceived greater benefit from MTM activities related to setting goals or monitoring follow-up. Greater need for medicines was not associated with greater perceptions of benefit from patient counselling. Having greater concerns about medicines was not
associated with perceptions of benefit from patient counseling activities or other MTM activities (Doucette, Witry et al. 2007).

1.4.5.7 Other factors

Three studies explored the possibility that consumers may experience certain barriers to using medication management services. In one qualitative study, barriers identified were out-of-pocket costs and lack of time for MTM visits (Garcia, Snyder et al. 2009). A qualitative study identified that lack of time was a barrier to the use of HMR among residents of retirement villages (Lee, George et al. 2012). Residents reported that they were already overloaded with various medical appointments. In addition, another category of barrier was that residents thought that HMR could potentially compromise the relationship with their doctor (Lee, George et al. 2012).

In another study participants were encouraged to list any barriers which would prevent them from using MTM (Truong, Layson-Wolf et al. 2009). Of 81 participants surveyed, confidentiality and privacy was mentioned 12 times, and lack of time was listed 7 times.

No study was designed to determine whether perceived barriers influenced consumers' willingness to use MTM.

The discrete choice experiment of willingness to pay for MTM (Friedrich, Zgarrick et al. 2010) was included in this review because it evaluated consumers’ preferences for various service elements. It was shown that the preferred service setting for the service was the community pharmacy rather than the consumers’ home, medical clinic or telephone. Participants preferred pharmacists who provided MTM service to have greater experience and particularly geriatric pharmacy experience. Willingness did not
vary according to whether the patient had multiple chronic diseases or was taking multiple medicines (Friedrich, Zgarrick et al. 2010).

1.4.6 **Discussion of literature**

An analysis of the available peer-reviewed literature has been conducted. Studies were identified and evaluated which explored consumers’ expectations of and willingness to use pharmacist provided medication management services prior to service provision. Results indicate that prior to experiencing medication management services consumers are largely unaware that pharmacists provide these services. Once introduced to the concept, consumers hold cautiously positive views. Overall however, there remains considerable doubt as to whether a majority of consumers are personally willing to use these services. This was evidenced by a low uptake among US veterans who were promoted medication review by post. In the only study where consumers were actually asked whether they were personally willing to use a specific service (the United States’ MTM program), only a small minority were willing (Law, Okamoto et al. 2008). This low willingness was recorded despite the fact many participants in the study would have been legitimate candidates for MTM because they were taking multiple medicines. In that study, few believed that they needed MTM or believed that they would benefit.

At present, it is unknown whether consumers’ awareness of the benefits of HMR would drive participation. Nevertheless, since consumers’ awareness of (Ensor and Cooper 2004) and expectations of the benefits of (Boulding, Kalra et al. 1993) drive demand generally, it is worthwhile to conduct research into understanding consumers’
perceptions of HMR. The following section summarises what consumers are likely to perceive of the benefits of HMR.

1.4.6.1 Summary of benefit perceptions

Overwhelmingly, consumers appear to perceive that the major benefits to themselves of receiving specific medication management services or pharmaceutical care in general are those benefits related to receiving information about their own medication regimen. This finding is evident regardless of whether the studies were qualitative or quantitative and regardless of whether the study participants were provided a detailed definition of a particular service. A review of the descriptive statistics of quantitative studies reveals that items related to patient counselling are rated higher than items related to managing drug therapy and solving therapy problems. This is evident whether the target variable is consumer expectations (Volume, Farris et al. 2001; Doucette, Witry et al. 2007; Law, Okamoto et al. 2008; Kassam, Collins et al. 2009; Kassam, Collins et al. 2010), perceived benefit (Assa-Eley and Kimberlin 2005), perceived value (Tootelian, Rolston et al. 2005) or performance evaluation of current pharmacy (Larson 2000; Larson, Rovers et al. 2002).

This review demonstrates that consumers may find the technical aspects of medication management services relatively intangible. These technical aspects may include identifying medication-related problems, identifying the appropriateness of therapies and making recommendations to prescribers. Perhaps related to this finding is that several studies identify that some consumers question the pharmacist’s role in medication management. As a result of these issues, prior to service provision consumers appear to formulate a limited breadth and depth of expectations about the benefit of using medication management services. Since satisfaction depends on
meeting or exceeding expectations, the limited benefit expectations are consistent with the high level of satisfaction with pharmacists services generally (Panvelkar, Armour et al. 2010). However, these low expectations may limit consumers’ evaluation of personal need for medication management services and may moderate willingness to use the services.

1.4.6.2 Gaps in the literature

This review identifies some important gaps in the literature. Possibly the most important methodological problem facing research in this area is recruitment of the relevant consumer. Research should be directed at obtaining the views of consumers (or their informal caregivers) that are eligible to receive a particular medication management service but have not yet experienced it. Medication management services are often intended to benefit consumers who use multiple medicines and in particular those who are at risk of experiencing medication-related problems. Many of the studies reviewed have relied on the views of patients who were not taking multiple medicines. Furthermore, apart from identifying various disease states, most studies which explored consumers’ perceptions in detail have not attempted to identify whether participants had risk factors for medication misadventure. The one exception to this was that the qualitative study conducted regarding consumers’ views of Australia’s HMR did report these and this adds to the value of the manuscript (Lee, George et al. 2012). However, that study was not designed to determine whether experiencing these risk factors influenced consumers’ views. Therefore, it is not known whether experiencing these risk factors may influence willingness to use medication management services. Only one study included the views of caregivers and these
views were included in the results of other participants. Overall, many of the studies may lack generalisability to the relevant population.

The generalisability of some studies may also be limited by selection bias. Many studies have used convenience sampling of patients who attend pharmacies, clinics and medical practices. It is possible that subjects may be ‘hand-picked’ who are known to have favourable attitudes towards pharmacists.

It is clear that a study designed to explore consumer (and caregiver) perceptions of and willingness to use HMR should have a process to systematically identify eligible participants. This identification process could occur during the recruitment phase or during the data screening phase. Ideally, the recruitment of the study sample should occur using a number of strategies in order to minimise selection bias and improve generalisability. In this way, the findings obtained using a particular strategy could be cross-validated with the findings of another study.

While some studies have attempted to identify consumers’ expectations of receiving benefit from medication management services, there is a lack of knowledge as to whether these expectations actually influence willingness. Other than cost, which is not relevant to Australia’s HMR program as there is no direct cost to consumers, there remains a relative deficiency of investigation of barriers towards participation. The main barrier cited is a lack of perceived personal benefit but other barriers such as lack of trust in the pharmacist and lack of time may exist. One study suggests that consumers may not use Australia’s HMR program because they were unsure of what the GP would think of the service (Lee, George et al. 2012). No study has been designed to determine whether barriers influenced willingness to use medication management services.
The review highlights a relative absence of studies which use a theoretical framework to investigate the psycho-social factors affecting willingness to use the services. Only two such studies were identified (Doucette, Witry et al. 2007; Montgomery, Kälve mark Sporrong et al. 2010). Those studies, using constructs derived from self-regulation theory (Horne and Weinman 1999), showed that consumers’ beliefs about medicines influenced either their perceptions of the value of MTM (Doucette, Witry et al. 2007) or whether they had already volunteered to use a pharmaceutical care service (Montgomery, Kälvemark Sporrong et al. 2010). One study showed that patients who had recently visited their doctor about an adverse drug event were more likely to value MTM (Doucette, Witry et al. 2007). Another showed that those who experienced or were worried about experiencing medication-related problems were more likely to have volunteered to use the service (Montgomery, Kälvemark Sporrong et al. 2010). Furthermore, those who were interested in learning more about their medicines were also more likely to have volunteered to use the service (Montgomery, Kälvemark Sporrong et al. 2010).

These finding suggest that consumers’ perceptions of themselves being at risk (of experiencing medication-related problems) may increase their willingness to use a medication management service. This is an important issue because as explained earlier, eligibility for the program is premised on being at risk of experiencing medication-related problems.
1.4.7 Conclusion of the literature review

This literature review identified and evaluated studies which specifically explored consumers’ and informal caregivers’ expectations of and willingness to use pharmacist-provided medication management services prior to service provision. In order to further explore the factors which may influence such willingness, two important issues were identified. First, research methods are needed to systematically identify those consumers who would be eligible or their informal caregivers. Second, there is a need to develop a theoretical framework which links a consumer’s thoughts and feelings about the experiencing medication-related problems and their willingness to use Home Medicines Reviews. Therefore, the next section of this chapter sets out a theoretical framework which was developed to study some of the psycho-social factors affecting consumers’ willingness to use the services and informal caregivers’ willingness to assist their care-recipient to use HMR.
1.5 Theoretical framework

This section sets out the theoretical framework which was used to study the psycho-social factors affecting consumers’ willingness to use HMR and informal caregivers’ willingness to assist their care-recipient to use HMR.

1.5.1 Home Medicines Review as an information source

Demand for health services is influenced by expectations about the benefit to be derived (Boulding, Kalra et al. 1993; Catrine, Ekman et al. 2008). Therefore, willingness to use Home Medicines Reviews is likely to be influenced by expectations about the benefit that would be derived by participating. Given that past experience is a key determinant of a person’s expectations about a service (Zeithaml, Berry et al. 1993), eligible non-recipients expectations about medication management services would likely reflect their past experience of pharmacists acting in more familiar roles. The literature review presented in this chapter suggests that consumers’ most salient expectations of medication management services are those centred in receiving medication advice. Such expectations are probably derived whilst consumers are having their medicines dispensed. Consumers expect pharmacists to provide medication advice, although the lack of privacy in community pharmacy setting is considered to limit patient demand for such advice (Anderson, Blenkinsopp et al. 2004). It is well known that consumers prefer to learn about their medicines from interpersonal sources, such as medical practitioners and pharmacists (Raynor, Blenkinsopp et al. 2007). Written information is viewed as a supplement, rather than a replacement for contact with health professionals (Raynor, Blenkinsopp et al. 2007). It
is reported that 36% of consumers found written information difficult to read (Svarstad, Mount et al. 2005).

The literature review suggests that consumers formulate relatively higher levels of expectations of those aspects of medication management service which relate to information-seeking rather than those aspects related to other technical qualities (Section 1.4.5.4, page 29). The technical qualities include managing drug therapy, solving therapy problems and making recommendations to prescribers. Since consumers have low expectations of the technical benefit of medication management services, it is questionable whether receiving these benefits would drive participation. Whereas, the desire to search for health information is a basic step in the process of choosing and participating in medical services (Lenz 1984). The theoretical foundation of this thesis is therefore centred on the proposition that eligible non-recipients’ willingness to use medication management services is driven by their expectation that these services would provide medication information tailored to their individual needs.

1.5.2 **Theories of health information seeking behaviour.**

This section introduces several models of information-seeking behaviour from within the health psychology and health communication literature. Lambert and Loiselle (2007) suggest that in the context of health, information-seeking is often framed as a coping strategy which attempts to reduce the cognitive stress and emotional arousal arising from health-related uncertainty. Each of the following models theorise that thoughts and feelings about experiencing health problems have a central role in stimulating a person to seek health-related information. These theoretical models are: the Comprehensive Model of cancer-related Information Seeking (CMIS) (Johnson and Meischke 1993); the Theory of Motivated Information Management (TMIM) (Afifi and
Weiner 2004); the Risk Information Seeking and Processing (RISP) model (Griffin, Dunwoody et al. 1999); and the Planned Risk Information Seeking Model (PRISM) (Kahlor 2010). These models are different to the Health Belief Model (HBM) which is purely a cognitive model (Becker 1974; Rosenstock 1974). In the Health Belief Model, emotional arousal does not have a role.

At their core, these models share similarities in that they draw relationships between experiencing cognitive stress and emotional arousal about a health-related topic and the act of seeking information about the topic. Within each model, there is an interpretation phase in which cognitive stress and emotional arousal occurs. There is an evaluation phase, in which a person considers the outcomes and processes involved in information seeking. These phases are followed by intention which is in-turn followed by action (see Figure 1, page 45).

However, these models differ markedly in the interpretation phase. In this phase, the cognitive stress and emotional arousal which drive the process are conceived differently. In Comprehensive Model of cancer-related Information Seeking,
experiencing particularly salient beliefs about personal risk are instrumental. In the Theory of Motivated Information Management, experiencing unwanted uncertainty which induces anxiety is the driver. In the Risk Information Seeking and Processing model and Planned Risk Information Seeking Model, risk perception and worry cause a person to focus on how much information is actually needed, which can act to drive information seeking intent.

The models are also different in that the conceptual framework which links the interpretation phase with the evaluation and/or intention phases is unique to each model. For example: the Comprehensive Model of cancer-related Information Seeking model has expectancy-value elements which underpin the Heath Belief Model (Rosenstock 1974); the Theory of Motivated Information Management uses a framework adapted from both Bandura’s (1997) Social Cognitive Theory and Maddux and Rogers’ (1983) Protection Motivation Theory (PMT) while the Risk Information Seeking and Processing model and the Planned Risk Information Seeking Model use the Theory of Planned Behavior framework (Ajzen 1991).

1.5.3 The conceptual model

Prior to conducting this research, no theoretical framework existed for studying consumers' willingness to use HMR. In particular no framework existed which linked a consumer's thoughts and feelings about experiencing medication-related problems, their expectations of HMR, the social influences to participate in HMR, and their willingness to use the service. Therefore for the purpose of this research, a conceptual model was developed which synthesises various elements from each of the theories mentioned in section 1.5.2 (page 44).
The broad conceptual model is presented in Figure 2. The framework for the model sets out four phases in the decision-making process regarding consumers’ willingness to use HMR: 1) an interpretation phase, where individuals’ thoughts and feelings about medication-related problems are influential; 2) an evaluation phase, where individuals’ expectations about the outcomes and processes of HMR are influential; 3) an intention phase, where an individual decides whether they are willing to use HMR; and 4) an action phase where an individual uses HMR.

**Figure 2 The conceptual model**

The next part of the Background section describes how the relationships between the interpretation, evaluation and intention phases were explored. In terms of how the research was conducted, qualitative research was initially conducted, followed by the quantitative research.

1.5.4 **Intention phase**
The first step taken in developing the conceptual model was to define the construct for the intention phase. Most of the research conducted with social cognitive theory places behavioural intention as the antecedent variable to actual behaviour. In general terms therefore, the conceptual model includes variables related to intention. However, Gibbons and colleagues (2009) argue that willingness to perform a behaviour, that is intention conditioned on certain premises, may explain more variation in actual behaviour than intention alone. Willingness may capture irrational and reactive influences (Gibbons, Houlihan et al. 2009). Based on qualitative research (White, Carter et al. 2011) it was hypothesised that respondents may be willing to use HMR if the GP suggested it to them and/or if they were concerned about their medicines. Therefore, within the present model, Willingness (W), that is intention conditioned on these 2 premises formed the dependent variable. In the case of caregivers, willingness refers to the willingness of an informal caregiver to arrange an HMR for their care-recipient.

1.5.5 Evaluation phase

The next step of model development included defining the evaluation phase. Two of the three broad categories of constructs for the evaluation phase are most closely aligned with that of the Theory of Motivated Information (Figure 3, page 49) (Afifi and Weiner 2004). The Theory of Motivated Information Management is specifically designed to explain a person’s motivation to seek information from an interpersonal source. Therefore a majority of the conceptual model is based on this theory with some notable exceptions.

As in the Theory of Motivated Information Management, the conceptual model suggests that outcome expectancy and communication efficacy have direct effects on
Willingness (W). The following two sub-sections provide descriptions of the outcome expectancy and communication efficacy constructs and how they relate to willingness, respectively. At this stage, the Theory of Motivated Information Management has not fully explored how social normative influence may affect information seeking. Therefore, the conceptual model differs from that theory and a separate sub-section is provided in section 1.5.5.3 (page 51). This section describes the hypothesised relationship between Willingness (W) and the social normative influence of the consumer’s GP. The conceptual model differs from the Theory of Motivated Information Management in the interpretation phase and the key differences are described in section 1.5.6 (page 52).

Figure 3 The theory of motivated information management. Adapted from (Afifi and Weiner 2004)
1.5.5.1 Outcome expectancy

The first category of beliefs deals with an individual’s focus on outcomes expectancies. These may be further divided into positive expectancies and negative expectancies. This evaluation broadly follows a benefit versus cost trade-off. In identifying potential positive outcome expectancies for HMR, consistent with TMIM (Afifi and Weiner 2004) the literature suggests that patients expect to receive medication information which would assist medicines management, and that they would feel reassured by receiving this information (Tinelli, Bond et al. 2007; Bissell, Blenkinsopp et al. 2008; Latif, Pollock et al. 2010). It is therefore hypothesised that positive outcome expectancies, centred on these observations, would have a direct and positive effect on willingness to use HMR.

Consistent with TMIM, willingness to use HMR would depend on the patient overcoming negative process-based outcome expectancies. The HMR service is free to the patient therefore, any potential costs (to patients) are non-financial. A qualitative study in the UK concluded that patients who were unwilling and had declined to use medication management “hid” complex reasons for declining to participate (Latif, Pollock et al. 2010). It is unclear at the present, what these negative feelings represent and whether they would impact on willingness to use. Within the HMR model, the patient interview is performed by a pharmacist whom the patient may or may not know. Patients have the option of having the interview in their home. However studies conducted by the present study group (White, Carter et al. 2011; Carter, Chen et al. 2012) and another’s (Campbell Research and Consulting 2008) indicate that some patients express negativity, such as feeling a loss of privacy and independence. Therefore, it is hypothesised that process-based negative outcome
expectancies, related to the potential discomfort of being visited at home, would have a direct and negative effect on willingness to use HMR.

1.5.5.2 Communication efficacy

The second broad category of beliefs is assessments about an individual’s ability to perform the information seeking action, self-efficacy (Bandura 1997). In the present context, self-efficacy evaluations most closely follow those of TMIM’s construct known as communication efficacy (Afifi and Weiner 2004). These evaluations centre on a patient’s perception of their ability to overcome potential barriers in the communication process such as: making time for; organising; and if required, asking the patient’s doctor for the HMR. In a qualitative study it was mentioned that some individuals appeared to lack the capability or confidence to address these potential barriers (White, Carter et al. 2011). It was apparent that some patients expressed difficulty asking the doctor for an HMR, if they thought the doctor would interpret the request as an indication that they lacked confidence in the doctor (White, Carter et al. 2011). Therefore, it is hypothesised that communication efficacy would have a direct and positive effect on willingness.

Having dealt with outcome expectancies and communication efficacy, the following sub-section explores how social pressure may influence willingness.

1.5.5.3 Subjective norms of the GP

In a qualitative study it was found that some participants who thought HMR would be beneficial were not willing to use a pharmacist-provided service because they could not be sure that their general practitioner (GP) approved of the service (White, Carter
et al. 2011). Within social cognitive theory, social persuasion is a recognised antecedent to both outcome expectancy and self-efficacy (Bandura 1997). Subjective norms, derived from the Theory of Planned Behavior (Ajzen 1991) is a related construct. Within the context of information-seeking, subjective norms operate such that if the subject thinks that someone close to themselves, such as a family member, friend or carer, would approve of the utilisation of the information resource; and if the subject has motivation to comply with the wishes of the close person then the subject is more likely to seek information (Griffin, Dunwoody et al. 1999). Subjective norms have been integrated into the Risk Information Seeking and Processing model (Griffin, Dunwoody et al. 1999) and the Planned Risk Information Seeking Model (Kahlor 2010) and they have been shown to be one of the strongest predictors of health information-seeking intent (Kahlor 2010). Given the strong relationship between a consumer and their GP, subjective norms of the GP could have a potentially powerful and direct influence over medication behaviours. For example, subjective norms of the GP has increased the likelihood of patient persistence with antidepressant medicines (Van Geffen, Heerdink et al. 2010). In the context of the current study therefore, subjective norms of the GP was defined as the perceived social pressure (of the consumer’s GP), to use HMR. It was hypothesised that subjective norms of the GP would have a direct and indirect positive effect on willingness.

Having dealt with the evaluation phase of the decision process, the following section explores constructs within the interpretation phase of the conceptual model.

1.5.6 Interpretation phase

In the framework selected for this thesis, the interpretation phase includes process in-which a subject becomes aware of the need to seek-information. Consistent with the
Comprehensive Model of cancer-related Information Seeking, the Theory of Motivated Information Management, Risk Information Seeking and Processing model, and Planned Risk Information Seeking Model, the conceptual model draws relationships between cognitive stress and emotional arousal about a health-related topic and the act of seeking information about the topic. The conceptual model proposes that thoughts and feelings about experiencing medication-related problems form the broad category of cognitive and emotional drivers for information seeking by using HMR (Figure 2, page 47).

In Chapter Four of this thesis, a qualitative study based on the conceptual model is presented. That study investigated the cognitive and emotional processes surrounding consumer's medication information seeking behaviour. Using the Theory of Motivated Information Management as a framework for analysis, Chapter Four explores consumers' uncertainties and worries about the health problems resulting from taking medicines and their motivations to seek information about medicines from a variety of sources including HMR.

In the Theory of Motivated Information Management, the motivating force for information-seeking about a topic is unwanted uncertainty about the topic and the ensuing anxiety. It is considered that the act of information-seeking assists a person to manage their anxiety. Thoughts about unwanted uncertainty occur first, but it is the negative affect - anxiety, which is the proximal antecedent variable to the evaluation phase. This conceptualisation is similar to that of the Risk Information Seeking and Processing model and the Planned Risk Information Seeking Model, in that cognition occurs first, followed by worry.

At the time the quantitative study was conducted (2008-2009), Theory of Motivated Information Management was a very new theory. It had been applied in predicting
health behaviours in few studies (Afifi and Weiner 2006). Furthermore, the unwanted uncertainty is defined as uncertainty discrepancy. In order to probe unwanted uncertainty in a survey, rather complicated questions are needed. For example, in terms of the current context, uncertainty discrepancy could be measured by asking “How much information do you have about the problems which could arise from taking your medicines? " [1 = more than I want to 7 = less than I want]. The ensuing anxiety could be measured with “The size of the similarity/difference between how much I know and how much I’d like to know about the problems which could arise from taking your medicines is 1 = extremely comforting through to 7 = anxiety-producing”. It was felt that many of the elderly participants would have less difficulty with framing thoughts and feelings about medicine-problems in terms of risk and worry. Therefore in this thesis, the primary motivating force for consumers’ information seeking is more similar to Risk Information Seeking and Processing model and the Planned Risk Information Seeking Model. It was proposed that risk perception induces worry which acts to motivate information seeking. In the present context, risk perception was defined as a person’s perception of the likelihood of them experiencing problems as a result of taking their medicines. Worry was defined as the specific (and mild) anxiety state which arises in tandem with this risk perception.

1.5.6.1 Medication-problem worry (MPW)

For many consumers who use multiple medicines, the possibility of experiencing health problems as a result of taking their medicines can be worrisome. Elderly consumers who use multiple medicines have many concerns especially about side effects and their management (Gordon, Smith et al. 2007). In that study, consumers reported that they lacked information or understanding about their medicines and having problems with access to support services.
In this thesis, medication-problem worry was identified as the *frequency* with which a person worries about the health problems resulting from taking medicines. It was measured with a single 5-point semantic differential scale with available responses ranging from 1= “never” to 5= “always”.

Similar to the Theory of Motivated Information Management, the conceptual model suggests that experiencing emotional arousal (negative affect) about a topic causes a person to focus on their expectations of outcomes to be derived from information seeking and the communication tasks processes involved. That is, it is assumed that negative affect influences a person’s evaluations about the information source. This model differs from that of Risk Information Seeking and Processing model and the Planned Risk Information Seeking Model in that those models assume that negative affect does not influence evaluations (or attitudes) about the information source. In Risk Information Seeking and Processing model and the Planned Risk Information Seeking Model, negative affect influences intention to seek information independently. It is hypothesised that worry increases consumers’ positive outcome expectancy. The net effect of worry on willingness is unknown, since it is possible that heightened levels could diminish a person’s capacity to undertake the communication tasks necessary to participate in an HMR. In short, negative affect could reduce communication efficacy.

1.5.6.2 Medication risk factors

The Risk Information Seeking and Processing model (Griffin, Dunwoody et al. 1999) and the Planned Risk Information Seeking Model (Kahlor 2010) place various demographic and situational factors as antecedents to risk perception and worry. Chapter Five focussed on the potential impact of three different *situations* facing a multiple medicine user which could induce risk perception and medication-problem
worry: a) whilst a person adjusts to changes to the medication regimen. During this time the person undergoes a period of “self-monitoring” to detect any physiological response to the change. Prescribers, pharmacists and nurses often encourage such self-monitoring in order to avoid preventable adverse effects; b) whilst a person adjusts to changes in their overall health after hospitalisation; and c) when a person is required to implement the instructions of multiple regular prescribers, which could at times be conflicting (Carpenter, DeVellis et al. 2010). Each of the situations mentioned above: a) having a change in the regimen within the past three months, b) having been hospitalised within the past month, and c) having multiple regular prescribers, place an individual at increased risk of experiencing medication-related problems (Pit, Byles et al. 2007; Pit, Byles et al. 2008). These risk factors may also be used to identify consumers who may benefit from HMR (Australian Government Department of Human Services 2011) and it was hypothesised that these risk factors would increase medication-problem worry.

1.5.6.3 Knowledge hassles

It was an intention of the thesis to explore the willingness of an informal caregiver (of a person who uses multiple medicines) to use HMR for their care-recipient. In section 1.5.6.1 (Page 54), the relationship between a form of negative affect (medication-problem worry) and willingness to use HMR was explored. The present section explores the possibility that informal caregivers experience another form of negative affect which increases their positive outcomes expectancy of using HMR. It is known that caregivers experience daily hassles as a result of performing tasks related to managing their care-recipients’ medicines (Travis, Bethea et al. 2000; Travis, Bernard et al. 2003).
Daily hassles are the “irritating, frustrating, distressing demands that to some degree characterise everyday transactions with the environment” (DeLongis, Coyne et al. 1982). Experiencing hassles can represent an on-going and insidious threat to health. For example, the frequency and severity of daily hassles is a better predictor of psychological distress and somatic disease than major life events such as death in a relative, marital changes and serious financial problems (DeLongis, Coyne et al. 1982). Past research has shown that experiencing daily hassles with friends, family, environment, and life’s practicalities, is associated with negative affect (Russell and Davey 1993). Furthermore, experiencing daily hassles is associated with the tendency to interpret events as threatening and with the tendency to seek out threat-relevant information (known as “monitoring”) (Russell and Davey 1993). It is proposed that when the caregiver experiences daily hassles, specifically related to knowledge processing, they are motivated to consider outcome expectancy of information-seeking and expectations about their capacity to undertake the communication tasks involved. Experiencing knowledge hassles could increase informal caregivers’ positive outcome expectancy. The net effect of knowledge hassles on willingness was however unknown, since it was possible that heightened levels of knowledge hassles and other hassles could diminish a person’s capacity to undertake the communication tasks necessary to participate in an HMR. In short, negative affect could reduce communication efficacy.

In Section 1.5.6.2, it was hypothesised that medication risk factors would increase consumers’ medication-related worry which would in-turn increase their positive outcome expectancy. Since there is a similarity between worry and stress, it was hypothesised that the same risk factors would increase the need for caregivers to process specialised medication information thereby increasing knowledge hassles; a) having a change in the regimen within the past three months, b) having been hospitalised within the last month, and c) having multiple regular prescribers.
1.6 Aims and objectives of the thesis

The overall aim of this thesis was to determine the factors which influence consumers’ willingness to use HMR and caregivers’ willingness to assist their care-recipient to use HMR, prior to service provision.

The specific objectives of the research were:

I. To compare the perceptions of patients who have experienced HMR with those who have not yet experienced it. Further, the study aimed to determine the effect of having experienced HMR on patients’ willingness to use HMR and the effect of having prior awareness on their willingness to use HMR (Chapter Two).

II. To test the capacity for the conceptual model to predict the willingness of eligible non-recipient patients to use HMR. Specifically, this study aimed to determine the influence of patients’ positive and negative outcome expectancies and communication efficacy over their willingness to use HMR (Chapter Three).

III. To investigate psychosocial factors which may motivate patients who are at risk of experiencing medication-related problems to use HMR (Chapter Four).

IV. To test the capacity for the conceptual model to predict the willingness of eligible non-recipient consumers to use HMR. Specifically, this study aimed to determine the effects of consumers’ medication-related worry and the social influence of
the consumer’s general practitioner over their willingness to use HMR (Chapter Five).

V. To test the capacity for the conceptual model to predict the willingness of informal caregivers to assist their care-recipient to use HMR. Specifically, this study aimed to determine the effects of caregivers’ knowledge hassles - daily stressors experienced whilst dealing with tasks which require knowledge about the safety and effectiveness of the care-recipients’ medicines over their willingness to assist their care-recipient to use HMR (Chapter Six).
1.7 Thesis overview

The thesis is presented in three main parts; Part A - Background, Part B – Qualitative and quantitative studies, and Part C – Discussion and Conclusion.

Part B

Part B of this thesis (Chapters Two to Six) reports the research which used qualitative and quantitative studies.

In Chapter Two, a quantitative study is presented which compared the perceptions of recipients of HMR with those of eligible non-recipients. Among eligible non-recipients, the effect of having prior awareness on their willingness to use HMR was investigated. A background is provided which briefly sets out what was known about the perceptions of consumers towards HMR. The methods section describes how recipients and non-recipients of HMR were recruited by community pharmacists. There is a description of the development of the survey and how it was pilot-tested. The results of the survey are presented using descriptive statistics and chi-square tests. In this study there were 595 recipients of HMR (31% response rate) and 293 eligible non-recipients (16% response rate). The results are discussed and compared with published literature. While the influence of having prior awareness of HMR on eligible non-recipients’ willingness to use HMR was discussed, the study recommended that future research should investigate the influence of other factors.

Chapter Three reports a quantitative study which explored the factors influencing consumers’ willingness to use HMR. In terms of how this study relates to the conceptual model, Chapter Three examined the evaluation phase and the intention
phase of the decision-making process (Figure 2, page 47). The background to this chapter provides a detailed presentation of the theoretical framework for the investigation. Using constructs adapted from Social Cognitive Theory (Bandura 1997) and the Theory of Motivated Information Management (Afifi and Weiner 2004), the study aimed to determine the influence of patients’ positive and negative outcome expectancies and communication efficacy over their willingness to use HMR.

The study sample was a subset of eligible non-recipients from Chapter Two who were using multiple medicines (n=286). Exploratory and confirmatory factor analysis was used to develop measurement scales. Structural equation modelling was used to test hypotheses. The results are discussed in terms of assisting health practitioners to present the benefits of HMR to consumers and in terms of optimising the content of consumer-directed promotional material. The study acknowledged that the findings may lack generalisability because of selection bias and recommended that study be repeating using a sample of consumers who were not recruited by community pharmacists.

Chapter Four reports a study which used qualitative methods to investigate the psychosocial factors which may motivate consumers who are at risk of experiencing medication-related problems to use HMR. Chapter Four builds on the study reported in Chapter Three by examining the interpretation phase of the conceptual model (Figure 2, page 47). The methods section describes the recruitment of the study sample, the development of the interview guide and how the focus groups were conducted. Thematic analysis was used to analyse the data obtained from 14 focus groups comprising 88 participants. The discussion of the results centred on consumers’ perceptions of being at risk of experiencing medication-related problems, their worry about these problems and how these factors influenced their willingness to use HMR.
Chapter Five reports a quantitative study of the willingness of eligible non-recipient consumers to use HMR. Chapter Five builds on previous chapters by undertaking a quantitative examination of the effect of variables in the interpretation phase and another variable from the interpretation phase. Specifically, this study aimed to determine the effects of consumers’ medication-related worry and the social influence of the consumer’s general practitioner over their willingness to use HMR. The study sample was obtained by postal invitation to members of a community organisation, Council on the Ageing (COTA NSW). Structural equation modelling was used to test the model. The discussion focussed on the relationship between consumers’ worry about medication-related problems and their motivation to use HMR. In addition, the importance of understanding what consumers believe their GP thinks about HMR was discussed.

Chapter Six extends the research of the previous chapters by reporting a quantitative study of the willingness of informal caregivers to assist their care-recipient to use HMR. This research was considered important because many older persons and those with disabilities rely on informal caregivers to participate in health services. The background to this chapter provides a detailed description of how the conceptual model was applied to this situation. The study sample was obtained by postal invitation to members of a community organisation, Carers NSW. Exploratory and confirmatory factor analysis was used to develop measurement scales. Structural equation modelling was used to test hypotheses. The discussion highlighted the important role of informal caregivers in providing medication management services to vulnerable persons.
Part C

Part C of this thesis includes a general discussion of all the studies conducted with conclusions and directions for future research in this field.
PART B

QUALITATIVE AND QUANTITATIVE STUDIES
CHAPTER TWO

HOME MEDICINES REVIEWS: A QUANTITATIVE STUDY OF THE VIEWS OF RECIPIENTS AND ELIGIBLE NON-RECIPIENTS

Carter SR, Chen TF, White L.

Home Medicines Reviews: a quantitative study of the views of recipients and eligible non-recipients

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Keywords
awareness; Home Medicines Reviews; medication review; patient perceptions; satisfaction

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Received March 22, 2011
Accepted September 27, 2011

Abstract

Objective There is a lack of knowledge regarding recipients’ experiences with, perceptions of, and willingness to reuse the Home Medicines Review (HMR) programme in Australia. In addition, little is known about eligible non-recipients’ awareness of and willingness to use the HMR service. The aim of the study was therefore to explore perceptions of, and willingness to use, HMRs.

Methods A cross-sectional questionnaire was conducted with recipients and eligible non-recipients of HMRs. Eligible non-recipients were defined as those who had not had an HMR and were at risk of medication misadventure. The questionnaire was distributed by 264 practising pharmacists throughout Australia.

Results A total of 595 out of 1893 (31%) HMR recipients and 293 out of 1829 (16%) eligible non-recipients completed the questionnaires. Overall, 91% of recipients were satisfied with the service. Compared with eligible non-recipients, recipients were more willing to have an HMR if their general practitioner (GP) suggested it (91% versus 71%, \( P < 0.001 \)) and more willing to ask for an HMR if they were having concerns about their medicines (82% versus 63%, \( P < 0.001 \)). Among eligible non-recipients, 23% were aware of HMRs. Predominantly pharmacists (68%) and GPs (36%) provided awareness of HMRs, which was associated with increased willingness to have an HMR if their GP suggested it (83% versus 67%, \( P < 0.014 \)).

Conclusions An overwhelming majority of patients were satisfied with the HMR programme. Experience with HMR, and to a lesser extent, prior awareness, increased willingness to use HMR. Therefore, pharmacists and GPs who introduce HMR to eligible non-recipients may increase their willingness to use this service.

Introduction

Throughout Europe,[1,2] North America[3] and Australia[4] the population is ageing and the burden of chronic disease and co-morbidity is growing. Multiple medicines are often used to manage common chronic diseases,[5] resulting in complex medication regimens.[6] Adverse events related to the consumption of medicines are a leading cause of morbidity in the Australian community.[7] These adverse events result in over 190 000 hospital admissions each year, approximately half of which are preventable.[8] Pharmacist-provided medication management services including medication review have been shown to be effective in reducing preventable medication-related problems.[9-14] Little is known about patients’ perceptions of these services or their willingness to use them. However, theory suggests that expectations created through awareness and/or prior experience influence willingness to use services.[15]
following steps: (1) GP referral of a patient to the patient’s preferred community pharmacy based on standard criteria, e.g. the patient taking five or more medicines or a medicine with a narrow therapeutic index; (2) the pharmacist conducts an interview (usually) in the patient’s home to ascertain a comprehensive medication profile; (3) the pharmacist’s written report documenting HMR findings and recommendations is sent to the GP; and (4) the GP and patient agree on a medication management plan based on the HMR report. Thus, HMR aims to be a collaborative process, although some argue that aspects of the communication processes between health professionals could be improved.

Internationally, lack of awareness of pharmacist-provided medication management services is recognised as a significant patient barrier to participation. Qualitative studies show that overall, patients are unaware of HMRs. Furthermore, there are anecdotal reports where patient’s refusal to have an HMR was attributed to a lack of awareness. To date, no large scale quantitative studies designed to investigate the overall awareness of HMRs have been published. Specifically, none have investigated whether patients’ willingness to use HMRs is influenced by their lack of awareness.

Theory suggests that patient’s willingness to use health services is driven by their expectations of receiving personal benefit. With regard to medication management services, recipients have reported several benefits derived from participating in the extended patient interview. These benefits include: increased general medicines knowledge, improved understanding of the purpose and need for the medicines, and reassurance about medication concerns. Yet one unresolved issue is whether recipients believe that HMR improves their ability to manage their complex medicine regimens confidently.

There is a lack of data concerning the range of benefits that eligible non-recipients would expect to receive if they had an HMR. A quantitative study of consumer attitudes towards MTM activities in the USA suggests that eligible non-recipients who were informed of the service held positive attitudes toward receiving information during the patient interview. However, an Australian qualitative study reported that eligible non-recipients of HMRs did not generally expect to receive any additional medicines information than had already been provided by their GPs and/or community pharmacists.

Within the HMR model, the patient interview is performed by a pharmacist whom the patient may or may not know. Patients have the option of having the interview in their home; however, some patients express negativity, such as feeling a loss of privacy and independence. Despite these barriers, the GP/patient relationship is important. Patients’ willingness to have an HMR if it was suggested by the GP may be facilitated by the social pressure to comply with the GP’s wishes. Such social influence has, for example, been shown to increase the likelihood of patient persistence with antidepressant medicines.

Theoretically, the HMR process could be initiated in two ways: the GP suggests it, or the patient asks for it. However, patients may be inhibited from asking for an HMR due to behavioural controls. Patients have difficulty in seeking medicines information from GPs. Overall, there is a lack of quantitative data from which to draw robust conclusions regarding patient perceptions of HMRs.

The aim of the study was therefore to explore patient perceptions of HMRs. The objectives of the study were to: (1) report on key elements of the HMR service experience including patient satisfaction; (2) examine and compare the perceived benefits reported by recipients with the expected benefits of eligible non-recipients; (3) examine recipients’ barriers, facilitators and willingness to use HMRs and compare these with those of eligible non-recipients; and (4) explore eligible non-recipients’ awareness of HMRs and determine its effect on their willingness to use the service.

Methods

Approval for the project was given by The University of Sydney Human Ethics Committee, Australia.

Questionnaires

Two purpose-designed questionnaires were developed to meet the specific objectives of this study, one for recipients of HMRs and the other for eligible non-recipients. The first and final sections of both questionnaires included questions on patients’ characteristics including demographics. In the first section there were six questions regarding the presence of risk factors for medication misadventure which had a response format of yes, no or not sure. Also included was the Medication Adherence Report Scale (MARS). Within the first section of the questionnaire for recipients, there were three questions about HMR service provision; how long ago they had their HMR interview, who first suggested the HMR, and how many HMRs they had participated in. In the first section of the questionnaire for eligible non-recipients, respondents were asked about their awareness of ‘Home Medicines Reviews or HMR’ with a response format of yes/no/not sure. Those who answered yes were provided with four options regarding the source of awareness. These respondents were also asked ‘How do you recall the Home Medicines Review being mentioned?’ with a response format being a five-point scale ranging from very negative to very positive.

The second sections of the questionnaires contained attitudinal items concerning HMR. Respondents in both questionnaires were asked to record their level of agreement with each statement on a five-point Likert scale, with
responses ranging from strongly disagree to strongly agree. For eligible non-recipients, a short explanation of the HMR service was included (Box 1). Respondents were asked two questions regarding their willingness to use (or re-use in the case of recipients) HMRs. The first question probed whether respondents would agree to have an HMR (or another HMR) if their GP suggested it. The second question probed whether they would ask their GP for an HMR (or another HMR) if they had concerns about their medicines. Recipients were also asked about their overall satisfaction and whether they would recommend the service to others. Both recipients and eligible non-recipients were asked about potential benefits, barriers and facilitators to participation (or re-participation). Items were formulated from a review of the literature and the results of focus groups.

In the questionnaire for recipients, the wording of statements regarding benefits of HMRs were formulated on the basis of service performance evaluation. For example: As a result of the Home Medicines Review, managing my medicines is easier. In the questionnaire for eligible non-recipients, the wording used predictive expectations. For example: If I had an HMR, managing my medicines would be easier.

The questionnaires were tested for face validity by a panel of seven expert community pharmacists, consultant pharmacists and academic pharmacists. They were pretested with 10 HMR recipients and 15 eligible non-recipients, which resulted in the rewording of some questions and reducing the number of variables. In the final questionnaire there were 33 attitudinal items for recipients and 28 for non-recipients. This paper reports the results only for those items which directly address the stated aims.

Study respondents

Respondents were recruited throughout Australia by pharmacists who were practising within community pharmacy and/or practising as HMR consultant pharmacists. Of the 898 pharmacists contacted, 264 (29%) agreed to participate. Pharmacists were provided with a study materials kit containing a participant information statement, a questionnaire and a reply-paid envelope for each respondent. Follow-up calls were made to the pharmacists five working days and 28 days after dispatching the study materials, in order to facilitate maximum distribution. Questionnaires were distributed to pharmacists from November 2008 through to May 2009.

Pharmacists were asked to recruit five respondents who had received an HMR within the previous 6 months and/or five eligible non-recipients. Pharmacists could choose to recruit more respondents if desired. Since eligibility for the HMR programme is premised on the patient being at risk of medication misadventure, pharmacists were instructed to recruit non-recipients who had at least one of six risk factors: taking more than five regular medicines daily; taking more than 12 doses daily; taking medicines which need particular monitoring (warfarin, lithium or digoxin); having experienced a change in medication regimen within the past 3 months; experiencing hospitalisation within the past 1 month; and having multiple regular prescribers. These risk factors were selected from a previous study which found that patients could reliably self-report them, and because community pharmacists could also be aware of them during their day-to-day interactions with patients. In order to ensure that the study only analysed the results of eligible non-recipients, those questionnaires that did not record the presence of any risk factors were excluded.

Data analysis

Descriptive statistics were computed. Non-parametric tests were used to test for differences in categorical data. The χ² test was used for binary variables whereas the Mann–Whitney U-test was used for ordinal variables. Responses to the Likert scales were dichotomised into: (1) agree and strongly agree (agree) and (2) a combined group of neither agree nor disagree, disagree and strongly disagree (not agree). Consistent with the treatment of Mårdby et al., the MARS results were dichotomised into adherent and non-adherent individuals. Non-adherent respondents were those who answered sometimes, often or always to any of the five MARS questions. Adherent respondents were those who answered never or rarely to all five MARS questions.

The level of significance was preset at P < 0.05.

Results

A total of 1893 questionnaires for HMR recipients was sent to pharmacists of which 595 (31%) were returned. A total of
1829 questionnaires for eligible non-recipients was sent to pharmacists of which 320 were returned and, of these, 293 (16%) met the inclusion criteria. The researchers were unable to determine the number of questionnaires that pharmacists handed to patients. Therefore, the percentages of questionnaires returned should not be interpreted as true response rates and probably underestimate the true response rates.

### Characteristics of respondents

<table>
<thead>
<tr>
<th></th>
<th>HMR recipients</th>
<th>Eligible non-recipients</th>
<th>χ²/Mann–Whitney U†</th>
<th>P</th>
</tr>
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<tbody>
<tr>
<td>Gender</td>
<td></td>
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</tr>
<tr>
<td>Male</td>
<td>49.0</td>
<td>50.2</td>
<td>0.11</td>
<td>0.739</td>
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<tr>
<td>Female</td>
<td>51.0</td>
<td>49.8</td>
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<td></td>
</tr>
<tr>
<td>Age group</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Under 65</td>
<td>16.0</td>
<td>28.4</td>
<td>89636</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>65–74</td>
<td>26.5</td>
<td>36.6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>75–84</td>
<td>41.1</td>
<td>28.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>85+</td>
<td>16.4</td>
<td>6.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Location</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metropolitan</td>
<td>70.3</td>
<td>66.6</td>
<td>1.26</td>
<td>0.261</td>
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<td>Rural/remote</td>
<td>29.7</td>
<td>33.4</td>
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<tr>
<td>Education level‡</td>
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<tr>
<td>Year 10 or below</td>
<td>58.9</td>
<td>50.2</td>
<td>59706</td>
<td>0.006</td>
</tr>
<tr>
<td>Year 12, technical certificate or equivalent</td>
<td>27.9</td>
<td>30.2</td>
<td></td>
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<tr>
<td>University degree</td>
<td>13.2</td>
<td>19.6</td>
<td></td>
<td></td>
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<tr>
<td>Risk factors for medication misadventure§</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Five or more medicines</td>
<td>93.6</td>
<td>97.3</td>
<td>5.45</td>
<td>0.019</td>
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<td>12 or more doses per day</td>
<td>20.7</td>
<td>35.9</td>
<td>22.03</td>
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<td>Warfarin, lithium or digoxin</td>
<td>17.3</td>
<td>19.8</td>
<td>0.77</td>
<td>0.379</td>
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<tr>
<td>Medication regimen changes in last three months</td>
<td>23.9</td>
<td>27.0</td>
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<td>Hospital within the last month</td>
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<td>10.2</td>
<td>0.15</td>
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<td>Multiple regular prescribing doctors</td>
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<td>27.0</td>
<td>0.31</td>
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<td>Self-reported adherence¶</td>
<td></td>
<td></td>
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<tr>
<td>Adherent (based on MARS results)</td>
<td>74.4</td>
<td>77.9</td>
<td>1.28</td>
<td>0.258</td>
</tr>
<tr>
<td>Non-adherent (based on MARS results)</td>
<td>25.6</td>
<td>22.1</td>
<td></td>
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</tr>
</tbody>
</table>

HMR, Home Medicines Review; MARS, Medication Adherence Report Scale. *Refers to valid responses only, so that the sum of responses may not add up to the total. †The χ² test statistic is reported for the comparison of binary variables, whereas the Mann–Whitney U-test statistic is reported for ordinal variables. ‡Within Australia, the two categories of high school education level: year 10 and year 12, indicate 11 and 13 years of formal school education respectively. §Respondents were dichotomised into those who answered: yes, or those who answered no or don’t know. The numbers and proportions refer to those who answered yes. ¶Using responses from the MARS questions, respondents were dichotomised into two groups. Non-adherent respondents were those who answered: sometimes, often or always to any of the five MARS questions. Adherent respondents were those who answered: never or rarely to all five MARS questions.

1829 questionnaires for eligible non-recipients was sent to pharmacists of which 320 were returned and, of these, 293 (16%) met the inclusion criteria. The researchers were unable to determine the number of questionnaires that pharmacists handed to patients. Therefore, the percentages of questionnaires returned should not be interpreted as true response rates and probably underestimate the true response rates.

### Characteristics of respondents

The demographic characteristics of respondents are reported in Table 1. Responses were obtained from an approximately even number of male and female respondents. The majority of respondents were aged over 65 years which reflects the distribution of multiple-medicine users within the community. Respondents had a range of educational backgrounds and were predominantly located in metropolitan areas. Recipients were more likely to be older and have a lower level of education than eligible non-recipients. There was no difference in other demographic characteristics.

Risk factors for medication misadventure also are reported in Table 1. The most commonly reported risk factor was taking five or more medicines daily. Recipients were less likely than eligible non-recipients to be taking more than five medicines daily (94% versus 97%, P = 0.019) and were less likely to be taking 12 doses daily (21% versus 36%, P < 0.001). There were no significant differences between the groups in the incidence of other risk factors or self-reported adherence.

### Recipients’ experiences of the Home Medicines Review

An HMR had first been suggested to recipients by their GP (83% of cases), pharmacist (15%) or family and/or friends (2%). Recipients recorded that they had experienced: one (64%); two (20%); three (9%); more than three (3%) HMRs...
and 4% responded as not sure. They recorded that their most recent HMR had occurred: less than 1 month ago (24%), between 2 and 4 months ago (44%), more than 4 months ago (32%) and 8% were not sure.

Recipients rated the interpersonal skills of the visiting pharmacist extremely highly. More than 97% agreed with each of three statements that: the pharmacist was courteous, a good listener, and respectful. Ninety-two percent agreed that, overall, they felt satisfied with their experience of the HMR. In addition, 95% agreed that they would recommend an HMR to their family and/or friends who had concerns about their medicines.

Eligible non-recipients’ awareness of the Home Medicines Review

Eligible non-recipients’ prior awareness of HMRs was 23%. Information about HMRs came from pharmacists (68%), GPs (36%), other sources (28%) and family and friends (12%). Their recollection of how HMR was described was overwhelmingly positive, with 80% of eligible non-recipients recalling either a positive or very positive mention of HMR, and only 4% recalling a negative discussion.

Benefits of the Home Medicines Review

Table 2 shows that more than 50% of recipients agreed with five out of seven items relating to the potential benefits. A high proportion of recipients agreed that they understood more and had fewer concerns about their medicines. Recipients recorded low levels of agreement with the two that suggested that the HMR resulted in taking fewer medicines (16%) or saving money on medicines (25%). Fewer than 50% of eligible non-recipients agreed with all items relating to benefit expectations (Table 2). The benefit statement which respondents from both groups recorded the highest level of agreement with suggested that the HMR helped (or would help) them to understand more about their medicines.

A higher proportion of recipients than eligible non-recipients agreed with all matching items relating to benefits/expected benefits ($P$ range $<0.001–0.045$).

Barriers and facilitators

Table 3 shows that a majority of all respondents did not agree with items relating to potential barriers to participation. Recipients were less likely to agree than eligible non-recipients for all items. The difference between the groups reached the 5% level of significance for the following items: privacy of medical records may be harmed; difficulty arranging the HMR, no time for an HMR; feeling uncomfortable with regular pharmacist in the home and feeling uncomfortable with an unknown pharmacist in the home.

Table 3 also shows that a majority of all respondents agreed with the two items related to potential facilitators (Table 3). A higher proportion of recipients than eligible non-recipients agreed that: their GP would be happy to be asked for an HMR (78% versus 66%, $P < 0.001$); and that it mattered to them what their GP thought about HMRs (73% versus 58%, $P < 0.001$).

Willingness to use Home Medicines Review

The majority of respondents were willing to have an HMR if their GP suggested it, with recipients more willing than eligible non-recipients (91% versus 71%, $P < 0.001$). Respondents indicated that they were willing to ask their GP for an HMR if they had concerns about medicines, with recipients more willing than eligible non-recipients (82 % versus 63 %, $P < 0.001$). However, both recipients and eligible non-recipients were more willing to have an HMR if their GP

Table 2  Potential benefits of a Home Medicines Review*†

<table>
<thead>
<tr>
<th>Variable</th>
<th>Benefits recorded by HMR recipients</th>
<th>Expectations of benefit recorded by eligible non-recipients</th>
<th>$\chi^2$</th>
<th>$P$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ease with managing medicines</td>
<td>68.9% 379</td>
<td>20.9% 61</td>
<td>176.29</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Fewer concerns about the long term effects of the medicines</td>
<td>67.7% 367</td>
<td>32.4% 95</td>
<td>95.83</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Less concern about the effects of combining different medicines</td>
<td>67.8% 369</td>
<td>40.5% 118</td>
<td>58.05</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>More confident that the medicines are helping</td>
<td>79.2% 438</td>
<td>38.7% 113</td>
<td>138.20</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Understand more about the medicines</td>
<td>81.7% 447</td>
<td>47.6% 139</td>
<td>105.20</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Take fewer medicines</td>
<td>16.1% 83</td>
<td>11.0% 32</td>
<td>4.02</td>
<td>0.045</td>
</tr>
<tr>
<td>Save money on the medicines</td>
<td>25.4% 133</td>
<td>16.2% 47</td>
<td>9.35</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Assist the patient to live independently at home for longer</td>
<td>50.6% 274</td>
<td>25.3% 74</td>
<td>50.39</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

HMR, Home Medicines Review. *Numbers and percentages represent respondents who agree/strongly agree with each statement. †Refers to valid responses only, so that the sum of responses may not add up to the total.
suggested it, than if it meant asking their GP for it (91% versus 82%, $P < 0.001$; and 71% versus 63%, $P < 0.001$ respectively).

Eligible non-recipients who had prior awareness were more willing to have an HMR if their GP suggested it, than those who were previously unaware (83% versus 67%, $P = 0.014$). However, prior awareness had no significant effect on their willingness to ask their GP for an HMR (67% versus 62%, $P = 0.478$).

**Discussion**

**Main findings**

Recipients were overwhelmingly satisfied with the HMR. They rated the pharmacist’s interpersonal skills extremely highly and would recommend HMRs to others. Only a minority perceived barriers to further participation. The majority were willing to have another HMR if prompted by their GP. In most cases, recipients would be willing to ask their GP for another HMR if they had concerns about their medicines. Most believed that their GP would want to be asked under such circumstances.

Overall, the level of prior awareness of HMRs among eligible non-recipients was low (23%). After a brief introduction to HMRs, the majority of eligible non-recipients were willing to have an HMR if their GP suggested it, and were willing to ask for one if they were worried about their medicines. Eligible non-recipients, compared to recipients, were however: less convinced of the potential benefits; more sensitive to emotional barriers; less convinced that their GP wanted them to ask for an HMR; and overall less willing to have an HMR.

**Strengths and limitations**

This study is the largest to date to quantitatively survey the perceptions of HMR recipients. It is estimated that during the 8-month study period, approximately 32 000 HMR services would have been provided throughout Australia. Therefore, the views of 595 respondents represent 2% of the views of recent HMR recipients. No other quantitative study has explored the perceptions of persons who would be eligible but have not yet experienced an HMR. Respondents were recruited from a wide geographic area throughout Australia, which meant that there was diversity in respondents’ health providers, GPs, community pharmacists and consultant pharmacists. Such diversity of patient backgrounds enhances the generalisability to the wider Australian population.

A limitation of this study was that the true response rates could not be calculated. The researchers note, however, a relatively low proportion of questionnaires returned compared with those sent to pharmacists. This low proportion may have resulted from the two-step methodology which involved questionnaires being sent to practising pharmacists who then had to either contact patients or wait for eligible respondents to call in before distributing the questionnaires. This occurred despite repeated reminder calls to pharmacists. Estimates of the true response rates could have been made if pharmacists had been asked to return non-distributed questionnaires.

The researchers needed to overcome the difficulty of recruiting eligible non-recipients. Defining their eligibility required making assumptions which may limit the generalisability of the study. Pharmacists used their professional expertise in combination with a list of risk factors to identify respondents. In practice, however, GPs would use their professional expertise in combination with these and other risk factors to identify patients who may benefit from HMRs.
Thus, it is possible that GPs and pharmacists may differ in their use of risk factors, which may in turn have influenced subject selection and overall results.

Another limitation of the study relates to the potential bias introduced by pharmacists recruiting respondents. This bias could occur in two ways. Firstly, it is possible that pharmacists selectively recruited patients with known favourable attitudes towards HMRs or pharmacists’ services generally. Secondly, only 29% of pharmacists agreed to recruit patients. It is possible that these pharmacists had favourable attitudes, and that their attitudes were reflected in the responses of respondents. Further studies could be conducted using a different recruitment strategy. For example, GPs could be contacted to distribute questionnaires. Random telephone calls or postal delivery could also be used to recruit non-recipients and a risk assessment tool could be used to determine eligibility. However, non-recipients selected in such a way could appear to be at risk, but actually have adequate medicines knowledge, practical support and good management skills. This means that in actual practice, many of these individuals may not have been considered eligible for HMRs. Caution is therefore necessary in the use of randomised methods for recruitment of eligible non-recipients.

Even though the HMR shares many attributes with other international medication review services, it cannot be assumed that the overall positive attitudes and willingness to use HMRs found in the present study, would apply to these services.

**Comparison with published literature**

Our finding, that a majority of respondents felt willing to ask their doctor for an HMR (if they were worried about their medicines), calls into question the conclusions of another qualitative study which stated that consumers were unlikely to ask their GP for an HMR. However, that study involved only 112 respondents compared with 888 in the present quantitative study. Our finding has important implications for pharmacy practice. It demonstrates that patients may have a role in driving participation in medication review services and that research should be directed to understand the factors which influence patients’ willingness to participate.

Recipients’ positive attitudes and willingness to reuse HMRs may be the result of them experiencing an extended interview and patient counselling session with a pharmacist. This interview and patient counselling session may last for up to 1 hour. Qualitative studies have shown that patients have unaddressed concerns about complex medication regimens. Patients may perceive that GPs do not have enough time with them to adequately cover their medicine concerns and an HMR may fill that gap. In accordance with other medicines’ management studies, the majority of recipients agreed that HMRs provided them with increased understanding of the purpose and need for the medicines, and reassurance about medication concerns. In addition, the present study showed that the majority of recipients agreed that HMRs assisted them with managing their medicines, and approximately half agreed that it helped them to live independently.

The fact that the majority of eligible non-recipients were unaware of HMRs is consistent with previous qualitative findings. Importantly, the present study showed that a lack of awareness was associated with decreased willingness to have an HMR. This finding confirms that low awareness may act as a significant barrier for HMR participation. Of concern, 33% of unaware eligible non-recipients did not indicate that they were willing to have an HMR, even if their GP suggested had it. One possible reason for this is that the majority of older patients wish to retain personal control over medical decisions and discuss decisions before agreeing to participate in investigations and services. Future studies could further investigate factors which influence whether an eligible non-recipient would agree to an HMR if their GP suggested it.

Our study found that after describing HMRs to eligible non-recipients, they held low expectations of personal benefit. This finding was consistent with a study conducted among non-recipients of the US MTM programme. These low expectations contrasted markedly with recipients’ positive evaluations. Given the link between expectations and demand, non-recipients’ low expectations of HMRs and other pharmacist-provided cognitive services is problematic for expansion of these services. Perhaps understandably, pharmacists and patients differ in their role beliefs regarding pharmacists’ provision of cognitive services. Tootelian proposes that patients see value in pharmacists’ services directly related to the supply of medicines but they may not be thinking of pharmacists in broader healthcare roles. However, it has been argued that widespread consumer recognition of the role of the pharmacist to provide education and counselling during supply may be used in promotional campaigns to increase patient demand for cognitive pharmacy services.

Marketing campaigns designed to promote a service would necessarily include some description of the service. The description of HMRs we have provided to non-recipients (Box 1) was adapted from that provided by the Australian Government. This information briefly mentioned that the HMR provided patient counselling. A recent content analysis of information available to consumers on the internet about HMRs was conducted. This study demonstrated significant variation in descriptions of the communication processes. For example, some websites described the interview as a unique opportunity for patients to learn about their medicines and have their concerns addressed whereas other websites did not mention these opportunities. In addition, significant variation was found in related information which may influence message salience, such as: descriptions of the
need for or benefit from having an HMR, descriptions of preventable medication-related problems, and the presentation of objective and subjective risk factors for medication misadventure. Further research among eligible non-recipients could use vignettes to determine how eligible non-recipients respond to different descriptions of HMR programme.

Conclusion

A clear majority of recipients were satisfied with their HMR. Among eligible non-recipients awareness of HMRs had been provided mainly by health professionals, yet the overall awareness of HMRs was low. Previous experience of HMRs, and to a lesser extent, prior awareness, increased patients’ willingness to have an HMR. Therefore, if health professionals introduced HMRs to patients during their regular consultations it is likely to have an HMR. Therefore, if health professionals introduced HMRs to patients during their regular consultations it is likely that, overall, more patients would be willing to use HMRs. Future research could focus on exploring factors, other than prior experience and awareness, which may influence patients’ expectations of and willingness to use HMRs.

References


Declarations

Conflict of interest

The Author(s) declare(s) that they have no conflicts of interest to disclose.

Funding

This project was funded by the Australian Government Department of Health and Ageing as part of the Fourth Community Pharmacy Agreement Research & Development Program managed by the Pharmacy Guild of Australia.

Acknowledgements

We would like to thank all respondents for their time and contribution to this study as well as the community pharmacists who assisted with recruitment. We are grateful to Christiane Klinner who coordinated the project.

Author's Contributions

Stephen Carter conducted the study, performed the analysis and wrote the manuscript. Lesley White supervised and conducted the study and critically revised the manuscript. Tim Chen critically revised the manuscript.

Stephen Carter

Lesley White

Tim Chen
CHAPTER THREE

PATIENTS’ WILLINGNESS TO USE A PHARMACIST-PROVIDED MEDICATION MANAGEMENT SERVICE: THE INFLUENCE OF OUTCOME EXPECTANCIES AND COMMUNICATION EFFICACY

Elements of the conceptual model explored in this chapter

Carter SR, Moles R, White L, Chen TF.

Patients’ willingness to use a pharmacist-provided medication management service: The influence of outcome expectancies and communication efficacy


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Abstract

Background: Previous research has demonstrated that some patients who are at risk of experiencing medication-related problems express a lack of willingness to use pharmacist-provided medication management services. Little is known about the factors that influence willingness to use these services among patients who have not yet experienced the service.

Objectives: The aim of this study was to test a model of willingness to use the Australian Home Medicines Review (HMR) service. Specifically, this study aimed to determine the influence of positive and negative outcome expectancies and communication efficacy over willingness among patients who were eligible to receive the service but have not yet experienced it.

Methods: A cross-sectional survey was conducted with patients who were recruited by 264 community pharmacists throughout Australia. Patients were included in the study if they had not yet experienced HMR but were taking more than 5 medicines daily or more than 12 doses daily. Measurement scales were developed using exploratory and confirmatory factor analyses. Structural equation modeling was used to test the model.

Results: Questionnaires received from 286 patients (15.6%) were analyzed. Multi-item measurement scales were observed to have acceptable construct reliabilities (range, 0.69-0.94). Importantly, respondents held overall neutral expectations about the personal benefits of HMR (positive outcome expectancies) but high communication efficacy. Structural equation modeling revealed that positive outcome expectancies ($\beta = 0.56$, $P < .001$) and communication efficacy ($\beta = 0.25$, $P < .05$) influenced willingness to use, whereas negative outcome expectancies had no significant effect.

Conclusions: The extent to which patients believe that HMR would provide them with increased medicines knowledge, improve their medicines management capability, and reduce their medicine concerns had a significant influence over willingness to use the service. Because these expectancies are relatively low, there appears to be significant scope for increasing patient demand for these services. Patient-directed
Introduction

The 2007 Institute of Medicine (IOM) report on preventing medication errors highlights the urgent need for strategies to improve medication safety.\(^1\) It is likely that there is an international need to develop and expand these strategies. This article deals with patient willingness to participate in a medication safety intervention in ambulatory care. Preventable adverse events that occur in ambulatory care are a significant cause of morbidity in Australia.\(^2\) It is estimated that adverse events result in 2% to 3% of all hospital admissions, 50% of which may be preventable.\(^3\) One of the key recommendations of the IOM report (recommendation 2) was that regulatory agencies should provide patients with increased access to medication information and medication self-management support.\(^4\) Medication management services provided by pharmacists are indicated for persons who consume multiple medicines\(^5\) and are at elevated risk of experiencing medication-related problems.\(^6\) Studies show that these services resolve medicine-related problems and improve health outcomes.\(^6-8\)

Within the backdrop of service provision and Medicare Part D, a recent editorial highlighted the importance to the profession of research into the needs of key stakeholders including patients.\(^9\) Research into patient perception is critically important because studies conducted within the United Kingdom, Australia, and the United States have demonstrated that some patients may be reluctant to use medication management services.\(^10-13\)

A recent example of reluctance to participate in medication management services is provided by a study of patient attitudes toward a free to the patient service within Australia, Home Medicines Review (HMR).\(^14\) In a quantitative study conducted by the present group, respondents who were identified by pharmacists as having risk factors for medication misadventure were provided with a brief explanation of HMR (Appendix 1) and were asked whether they would be willing to accept the suggestion of a general practitioner (GP) to use the HMR service. Some 30% of respondents who had not previously had an HMR did not indicate willingness to use the service.\(^14\) In stark contrast, satisfaction levels among those who had received an HMR were extremely high, and only 10% did not indicate willingness to reuse the service. These findings highlight the importance of understanding more about the factors that influence willingness among eligible nonrecipients.

Demand for health services is influenced by patient knowledge and understanding of the service\(^15\) and expectations about the benefit that would be derived by participating.\(^16,17\) An important problem facing the profession is that the technical qualities of medication management services are relatively intangible and therefore the health benefits may not be obvious to the patient. Given that past experience is a key determinant of a person’s expectations about a service,\(^18\) eligible nonrecipients’ expectations about medication management services would likely reflect their past experience of pharmacists acting in more familiar roles. Possibly the most salient of these experiences would be receiving medication advice during dispensing or within the hospital ward. Patients expect pharmacists to provide medication advice, although the lack of privacy in community setting is considered to limit patient demand for such advice.\(^19\)

The authors contend that an important influence on eligible nonrecipients’ willingness to use medication management services is their expectation that these services would provide medication information tailored to their individual needs. This contention is supported by qualitative research conducted by our research group.\(^20\) When eligible nonrecipients are presented with the concept of medication management services, they formulate expectations that the pharmacist would provide an extended patient counseling session.\(^20\) Although some persons may be unsure about important aspects of the service such as pharmacists making recommendations to the doctor,\(^21\) when prompted many believe that the service could provide them with medication information tailored to their individual needs.\(^20\) The desire to search for health information is a basic step in the process of choosing and participating in medical services.\(^22\) It is well known that patients do prefer to learn about their medicines from interpersonal sources, such
as medical practitioners and pharmacists. Written information is viewed as a supplement, rather than a replacement for contact with health professionals.

Therefore, a person’s willingness to use medication management services may depend on how much they believe that a pharmacist would provide them with knowledge that would help them manage their medicines. Furthermore, willingness may depend on whether patients could overcome any psychological or practical barriers to seeking medication information from this unique resource. A better understanding of these factors would provide insights to improving the development and implementation of these services. Furthermore, because some of these factors may be at least partially controllable through the design of patient-directed descriptions of the service, patient participation may be maximized. Therefore, the aim of the research was to test a model of patient willingness to use HMR.

The HMR service

HMR is a medication review service provided collaboratively by GPs and pharmacists. An HMR is initiated with a request from the patient’s GP to a pharmacist, who then visits the patient and caregivers at their home, for a single patient interview. After the visit, the pharmacist writes a report and collaborates with the GP, who then discusses a revised medication management plan with the patient.

Model development

Theoretical foundation

According to social cognitive theory (SCT), whether a person is motivated to undertake a particular activity may be influenced by their expectations about the outcome of participating in the activity and expectations about their capacity to undertake the activity. The Theory of Motivated Information Management (TMIM) by Afifi and Weiner was adapted to the present investigation because it further develops SCT to help explain a person’s motivation to seek information from an interpersonal source. Within TMIM, the motivating force for information seeking about a topic is unwanted uncertainty about the topic and the ensuing anxiety. It is considered that the act of information seeking assists a person to manage his or her uncertainty and to reduce his or her level of anxiety. Whether a person proceeds to seek information depends on the expectations about the outcomes and processes of the search. Based on the literature and qualitative studies, constructs were adapted to the context of this investigation (Fig. 1). The context explored the willingness to use HMR of an individual who has not previously received HMR but who was presented with information about the service. The model creates links between expectations about the outcomes and processes involved in HMR and willingness to use the service.

The model

The first category of beliefs deals with an individual’s focus on outcomes expectancies. These may be further divided into positive expectancies and negative expectancies. This evaluation broadly follows a benefit versus cost trade-off. In identifying potential positive outcome expectancies (POE) for HMR, consistent with TMIM, the literature suggests that patients expect to receive medication information that would assist medicines management and that they would feel reassured by receiving this information. It is therefore hypothesized that POE, centered on

![Fig. 1. The model of willingness to use HMR.](image-url)
these observations, would have a direct and positive effect on willingness to use HMR (H1).

Consistent with TMIM, willingness to use HMR would depend on the patient overcoming negative process-based outcome expectancies. The HMR service is free to the patient; therefore, any potential costs (to patients) are nonfinancial. A qualitative study in the United Kingdom concluded that patients who were unwilling and had declined to use medication management hid complex reasons for declining to participate.12 It is unclear at the present, what these negative feelings represent and whether they would impact on willingness to use. Within the HMR model, the patient interview is performed by a pharmacist whom the patient may or may not know. Patients have the option of having the interview in their home. However, studies conducted by the present study group14,20 and another’s28 indicate that some patients express negativity, such as feeling a loss of privacy and independence. Therefore, it is hypothesized that process-based negative outcome expectations (NOE), related to the potential discomfort of being visited at home, would have a direct and negative effect on willingness to use HMR (H2).

The second broad category of beliefs is assessments about an individual’s ability to perform the information-seeking action, self-efficacy.25 In the present context, self-efficacy evaluations most closely follow those of TMIM’s construct known as communication efficacy (CE).26 These evaluations center on a patient’s perception of his or her ability to overcome potential barriers in the communication process such as making time for; organizing; and if required, asking the patient’s doctor for the HMR. In a qualitative study, it was mentioned that some individuals appeared to lack the capability or confidence to address these potential barriers.20 It was apparent that some patients expressed difficulty asking the doctor for an HMR, if they thought the doctor would interpret the request as an indication that they lacked confidence in the doctor.20 Therefore, it is hypothesized that CE would have a direct and positive effect on willingness (H3).

Most of the research conducted with SCT uses behavioral intention as the antecedent variable to actual behavior. In general terms, therefore, our model includes variables related to intention. However, Gibbons et al29 argue that willingness to perform a behavior, that is intention conditioned on certain premises, may explain more variation in actual behavior than intention alone. Willingness may capture irrational and reactive influences.29 Based on a qualitative study,20 it was hypothesized that respondents may be willing to use HMR if the family medical practitioner suggested it to them and/or if they were concerned about their medicines. Therefore, within the present model, willingness, that is, intention conditioned on these 2 premises forms the dependent variable.

**Methods**

The study used a cross-sectional survey design to develop the measures and test the theoretical model.

**Sample**

Respondents were eligible for inclusion in this study if they had not previously received an HMR but were eligible to receive it because they were taking either 5 or more medicines daily or 12 or more doses daily.

**Questionnaire**

Items included in the questionnaire were derived from the results of previous qualitative studies.20,27 The questionnaire was assessed for face validity by a panel of 7 expert community pharmacists, consultant pharmacists, and academic pharmacists. The questionnaire was pretested with 15 respondents, which resulted in a refinement of question wording and reduction in the number of variables measured. A short explanation of the service was provided within the questionnaire, which was adapted from an Australian Government consumer brochure (Appendix 1).30

**Belief measures**

The following belief measures were generated for the study (Table 1).

POE were defined as a person’s beliefs about the effectiveness of an HMR to improve knowledge about medicines, help manage the medicines, and reduce anxieties about taking multiple medicines.20,21 Included within the scale were 6 items to which respondents provided their level of agreement on a 5-point Likert scale.

NOE were defined as negative sentiments related to uncomfortable feelings about being visited in the home and the feeling that having an HMR indicated reduced personal capability.20,21 Four 5-point Likert scales were used.

CE was defined as beliefs that would potentially assist the respondent to overcome difficulties
with having or asking the GP for an HMR. Five 5-point Likert scales were used. Note that some of these items were reverse coded before further analysis.

Willingness to use HMR, hereafter called willingness was measured with 2 5-point Likert scales. Respondents indicated their level of agreement as to whether they would accept a GP’s recommendation to have an HMR and ask their GP if they had medicine concerns.

Sociodemographic data

The demographic information collected in the questionnaires included sex, age group, education, and postcode. The postcode was used in combination with Australian census data to provide an index of socioeconomic advantage and disadvantage. The index is a continuum of advantage (high values) to disadvantage (low values), which takes into account factors relating to a person’s access to materials and social resources. Medication risk factors were recorded as either present, absent, or unknown.

Data collection

The survey was conducted from November 2008 through May 2009. Respondents were recruited by community pharmacists. Eight hundred ninety-eight pharmacists, spread geographically throughout Australia, were contacted, and 264 (29%) agreed to recruit 5 or more respondents for the study. In total, 1829 questionnaires were distributed to pharmacists. Pharmacists were provided with a study materials kit containing recruitment instructions, a respondent information statement, a questionnaire, and a reply-paid envelope for each respondent. Aiming to maximize distribution, the questionnaires were not numbered so that the anonymity of the pharmacist was preserved. Because eligibility for the HMR program is premised on the patient being at risk of medication misadventure, pharmacists were provided with a list of risk factors to assist recruitment: taking more than 5 regular medicines daily, taking more than 12 doses daily, taking medicines that need particular monitoring (warfarin, lithium, or digoxin), having experienced a change in medication regimen within the past 3 months, experiencing hospitalization within the past 1 month, and having multiple regular prescribers. These risk factors were selected from a previous study, which found that patients could reliably self-report them and because community pharmacists could also be aware of them during their day-to-day interactions with patients.

Pharmacists handed questionnaires with paid reply envelopes to respondents who completed and posted them directly to the research team, anonymously. Follow-up calls were made to the pharmacist 5 working days and 4 weeks after dispatching.

Table 1

<table>
<thead>
<tr>
<th>Construct</th>
<th>Item code</th>
<th>Item</th>
<th>Mean (SD)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>POE</td>
<td>POE1</td>
<td>Ease with managing my medicines</td>
<td>2.70 (0.97)</td>
<td>282</td>
</tr>
<tr>
<td></td>
<td>POE2</td>
<td>Understand more about my medicines</td>
<td>3.20 (1.09)</td>
<td>282</td>
</tr>
<tr>
<td></td>
<td>POE3</td>
<td>Assist me to live at home independently</td>
<td>2.75 (0.98)</td>
<td>283</td>
</tr>
<tr>
<td></td>
<td>POE4</td>
<td>Fewer concerns about long-term side effects</td>
<td>2.93 (1.01)</td>
<td>283</td>
</tr>
<tr>
<td></td>
<td>POE5</td>
<td>Fewer concerns about drug interactions</td>
<td>3.06 (1.05)</td>
<td>281</td>
</tr>
<tr>
<td></td>
<td>POE6</td>
<td>More confident the medicines are helping me</td>
<td>3.01 (1.07)</td>
<td>282</td>
</tr>
<tr>
<td>CE</td>
<td>CE1</td>
<td>Difficulty arranging (reverse score provided)</td>
<td>3.59 (0.89)</td>
<td>278</td>
</tr>
<tr>
<td></td>
<td>CE2</td>
<td>No time (reverse score provided)</td>
<td>3.59 (0.91)</td>
<td>282</td>
</tr>
<tr>
<td></td>
<td>CE3</td>
<td>Difficulty asking GP (reverse score provided)</td>
<td>3.83 (0.84)</td>
<td>279</td>
</tr>
<tr>
<td></td>
<td>CE4</td>
<td>Confident asking GP</td>
<td>4.04 (0.65)</td>
<td>279</td>
</tr>
<tr>
<td></td>
<td>CE5</td>
<td>Asking for HMR indicates that I have no confidence in GP (reverse score provided)</td>
<td>3.58 (0.93)</td>
<td>276</td>
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<tr>
<td>NOE</td>
<td>NOE1</td>
<td>Uncomfortable with regular pharmacist</td>
<td>2.54 (1.05)</td>
<td>274</td>
</tr>
<tr>
<td></td>
<td>NOE2</td>
<td>Uncomfortable with unknown pharmacist</td>
<td>3.03 (1.10)</td>
<td>277</td>
</tr>
<tr>
<td></td>
<td>NOE3</td>
<td>Privacy compromised</td>
<td>2.41 (0.95)</td>
<td>281</td>
</tr>
<tr>
<td></td>
<td>NOE4</td>
<td>HMR feels like a check on my capability</td>
<td>2.54 (1.00)</td>
<td>281</td>
</tr>
<tr>
<td>Willingness</td>
<td>W1</td>
<td>Willing to have an HMR if suggested by the GP</td>
<td>3.65 (0.92)</td>
<td>283</td>
</tr>
<tr>
<td></td>
<td>W2</td>
<td>Willing to ask the GP for an HMR if having concerns about medicines</td>
<td>3.51 (0.95)</td>
<td>282</td>
</tr>
</tbody>
</table>

SD, standard deviation.

* Responses varied from 1 (strongly disagree) to 5 (strongly agree).
the study materials to assure maximum questionnaire distribution by pharmacists. No incentives were offered to pharmacists or respondents. Approval for the project was given by the University of Sydney Human Ethics Committee.

Analysis

PASW version 18.0.03 (SPSS Inc., Chicago, IL) (www.spss.com) was used for descriptive statistical analyses and exploratory factor analyses (EFA). Confirmatory factor analysis (CFA) and structural equation modeling (SEM) were performed with Amos 18.0.0 (Amos Development Corporation, Crawfordville, FL), which uses a full information maximum likelihood estimator. With this technique, the means and intercepts may be estimated concurrently with the covariance matrix so that estimates are provided in the presence of missing data.

Each of the 3 multi-item measurement scales, (POE, NOE, and CE constructs) were subject to initial EFA to determine dimensionality and exclude any items with low communality (<0.5). After this procedure, CFA was performed in the presence of the dependent variable. SEM with maximum likelihood estimation requires the presence of multivariate normality. Therefore, before performing CFA, items selected for the measurement scales were examined for evidence of skewness and kurtosis.

Convergent validity of the constructs was assessed by inspection of the results from CFA. Standardized factor loadings should exceed 0.50 with statistical significance to demonstrate high convergence on a common point. In addition, the average variance extracted should equal or exceed 50%. The reliability of the constructs was computed using the formula suggested by Fornell and Larcker. The construct reliability values equal to or greater than 0.7 indicate that the construct of the model is reliable, although coefficients of between 0.5 and 0.8 may be considered acceptable during preliminary investigations. Discriminant validity was assessed through the use of variance extracted test. Constructs were evaluated by comparing the variance extracted estimates for 2 factors and then compared with the square of the correlation between the 2 factors. Discriminant validity is demonstrated if both variance extracted estimates are greater than the squared correlation.

Using the method of Westland, the minimum sample size for an appropriate indicator to latent ratio, with 4 latent constructs and 17 indicators, was calculated to be 91. Therefore, the study had sufficient power to perform CFA. Measurement errors were fixed to (1–reliability) × variance.

Using the method of Westland, a sample size of more than 313 was required to detect a minimum effect size of 0.20 with a power of 0.8 and P < .05. Using the same method, post hoc it was estimated that the minimum effect size that could reliably be determined with the sample of 286 and the same power and significance settings was 0.21.

Results

Questionnaires were received from 319 respondents and after excluding those who did not meet the inclusion criteria, 286 remained providing an effective response rate of 15.6%. Descriptive statistics of the sample are provided in Table 2.

Belief measures

Means and standard deviations for the belief measures from each group are presented in Table 1. The following provides some descriptive statistics of the belief measures and the results of EFA for each construct.

Positive outcome expectancies

For most variables, the median score was 3, the neutral response. This indicates that overall, respondents were relatively unconvinced that an HMR would provide positive outcomes. All 6 items loaded onto the 1 factor with eigenvalues above 1, which explained 75.5% of the variance. All items had communalities above 0.5. The factor loadings ranged between 0.78 and 0.92.

Negative outcome expectancies

For most variables, the median score was 2, indicating overall low levels of negative expectancies. All 4 items loaded onto the 1 factor with eigenvalues above 1, which explained 75.5% of the variance. However, 2 of the items (NOE3 and NOE4) had relatively low communalities of 0.36 each. The 2 items with (equally) low communalities were therefore excluded. The factor loadings ranged between 0.78 and 0.92.

Communication efficacy

After reverse coding (as appropriate), the median score for each variable was 4, indicating overall high levels of CE. All 5 items loaded onto the 1 factor with eigenvalues above 1; however, 1 item, CE4, had very low communality (0.26) and was excluded from further analysis. The 4 remaining items loaded onto the 1 factor, which explained
56.9% of the variance. The factor loadings ranged between 0.68 and 0.79.

**Willingness**

The median score for each of these items was 4, indicating that overall, respondents were willing to have an HMR if suggested by the GP and willing to ask the GP if they had concerns about their medicines. This 2-item scale was not subjected to EFA.

**Confirmatory factor analysis**

Inspection of the items of the derived scales and the dependent variable revealed that skewness and kurtosis statistics were less than or equal to an absolute value of 1. Missing data analysis revealed that the overall level of missing data was small (<5% for all variables). Examination of the correlation matrix revealed that no relationships were above 0.90; therefore, multicollinearity was not considered problematic.

The parameter estimates and the goodness of fit indices indicated that overall, the measurement model was a reasonable fit for the data. Apart from the significant chi-square \( \chi^2 = 156, df = 71, P < .001 \), model fit indices were good. Model fit statistics: comparative fit index (CFI) = 0.96, Tucker-Lewis Index (TLI) = 0.93, Root Mean Square Error of Approximation (RMSEA) = 0.065 (90% confidence interval, 0.051-0.079). Standardized and unstandardized factor loadings, construct validities, and average variances extracted are presented in Table 3. The variances of the indicator variables loading onto each latent construct were significant. All the factor loadings were greater than or equal to 0.5. For each of the constructs, average variances extracted were greater than 50%, with the exception of the CE scale (44%). Although the CE scale

### Table 2
Sample characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>%</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>50.9</td>
<td>141</td>
</tr>
<tr>
<td>Female</td>
<td>49.1</td>
<td>136</td>
</tr>
<tr>
<td>Age group (y)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Younger than 65</td>
<td>28.4</td>
<td>80</td>
</tr>
<tr>
<td>65-74</td>
<td>36.5</td>
<td>103</td>
</tr>
<tr>
<td>75-84</td>
<td>28.4</td>
<td>80</td>
</tr>
<tr>
<td>85 and older</td>
<td>6.7</td>
<td>19</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metropolitan</td>
<td>66.8</td>
<td>191</td>
</tr>
<tr>
<td>Rural or remote</td>
<td>33.2</td>
<td>95</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 10 or below</td>
<td>50.2</td>
<td>138</td>
</tr>
<tr>
<td>Year 12 or equivalent</td>
<td>30.2</td>
<td>83</td>
</tr>
<tr>
<td>University</td>
<td>19.6</td>
<td>54</td>
</tr>
<tr>
<td>Presence of medication risk factors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 or more doses daily</td>
<td>36.8</td>
<td>103</td>
</tr>
<tr>
<td>Warfarin, lithium, or digoxin</td>
<td>18.9</td>
<td>51</td>
</tr>
<tr>
<td>Medication regimen change within last 3 mo</td>
<td>26.5</td>
<td>75</td>
</tr>
<tr>
<td>Hospital within the last month</td>
<td>9.5</td>
<td>27</td>
</tr>
<tr>
<td>Multiple regular prescribing doctors</td>
<td>27.2</td>
<td>77</td>
</tr>
<tr>
<td>Socioeconomic status by postal location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Index of relative disadvantage and advantage, mean (SD)</td>
<td>963 (61)</td>
<td>277</td>
</tr>
</tbody>
</table>

SD, standard deviation.

\( a \) Refers to valid responses only so that the sum of responses may not add up to the total.

\( b \) Refers to the proportion who responded (yes) to the presence of the risk factor.

\( c \) The index of relative disadvantage/advantage ranks locations (in this case by postcode) based on data obtained from the national 2006 census and uses socioeconomic factors such as income, education, occupation, and housing conditions. A lower index indicates relative disadvantage, and a higher index indicates relative advantage. The mean rank for Australia is 1000.

Table 3

<table>
<thead>
<tr>
<th>Item</th>
<th>SRW</th>
<th>URW</th>
<th>SE of URW</th>
<th>CR</th>
<th>AVE, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>POE1</td>
<td>0.80</td>
<td>1.00</td>
<td>0.00</td>
<td>0.94</td>
<td>71.3</td>
</tr>
<tr>
<td>POE2</td>
<td>0.88</td>
<td>1.14</td>
<td>0.07</td>
<td>0.92</td>
<td>68.7</td>
</tr>
<tr>
<td>POE3</td>
<td>0.90</td>
<td>1.20</td>
<td>0.07</td>
<td>0.92</td>
<td>68.7</td>
</tr>
<tr>
<td>POE4</td>
<td>0.91</td>
<td>1.25</td>
<td>0.07</td>
<td>0.92</td>
<td>68.7</td>
</tr>
<tr>
<td>POE5</td>
<td>0.84</td>
<td>1.17</td>
<td>0.07</td>
<td>0.92</td>
<td>68.7</td>
</tr>
<tr>
<td>POE6</td>
<td>0.72</td>
<td>0.90</td>
<td>0.07</td>
<td>0.85</td>
<td>65.9</td>
</tr>
<tr>
<td>NOE1</td>
<td>0.72</td>
<td>1.00</td>
<td>0.00</td>
<td>0.69</td>
<td>53.3</td>
</tr>
<tr>
<td>NOE2</td>
<td>0.74</td>
<td>1.10</td>
<td>0.15</td>
<td>0.72</td>
<td>56.1</td>
</tr>
<tr>
<td>CE1</td>
<td>0.63</td>
<td>1.00</td>
<td>0.00</td>
<td>0.75</td>
<td>43.6</td>
</tr>
<tr>
<td>CE2</td>
<td>0.70</td>
<td>1.19</td>
<td>0.14</td>
<td>0.77</td>
<td>46.2</td>
</tr>
<tr>
<td>CE3</td>
<td>0.76</td>
<td>1.28</td>
<td>0.14</td>
<td>0.79</td>
<td>49.1</td>
</tr>
<tr>
<td>CE5</td>
<td>0.53</td>
<td>0.93</td>
<td>0.13</td>
<td>0.67</td>
<td>47.6</td>
</tr>
<tr>
<td>W1</td>
<td>0.61</td>
<td>1.00</td>
<td>0.00</td>
<td>0.71</td>
<td>56.1</td>
</tr>
<tr>
<td>W2</td>
<td>0.87</td>
<td>1.38</td>
<td>0.19</td>
<td>0.74</td>
<td>57.8</td>
</tr>
</tbody>
</table>

SRW, standardized regression weights; URW, unstandardized regression weights; SE, standard error; CR, construct reliability; AVE, average variance extracted; W, willingness.
did not achieve the target average variance extracted, each of the factor loadings were above 0.5 and the construct reliability of this scale was reasonable (0.75); therefore, the scale was retained. The minimum construct reliability estimate was 0.69. Discriminant validity was demonstrated because for each pair of constructs both average variance extracted estimates were greater than the squared correlation.

**Structural equation model**

The parameter estimates and the goodness of fit indices indicated that overall, the structural equation model was a reasonable fit for the data. Apart from the significant chi-square $= 163$, $df = 72$, $P < .001$, model fit indices were good for the measurement model. Model fit statistics: $CFI = 0.96$, $TLI = 0.94$, $RMSEA = 0.065$ (90% confidence interval, 0.053-0.080). The model predicted 46% of the variation in willingness. Fig. 2 provides the results of hypothesis testing. POE had a strongly positive effect on willingness ($\beta = 0.56$, $P < .001$). CE had a moderate effect on willingness ($\beta = 0.25$, $P < .05$). NOE had no significant effect on willingness.

**Discussion**

This study demonstrates that 46% of the variation in respondents’ willingness to use HMR may be predicted by the model. Respondents’ expectations about the personal benefits of HMR and beliefs about their capability to ask for and arrange an HMR were instrumental in determining willingness, whereas negative expectancies about the processes of HMR had no significant effect.

Consistent with the Theory of Motivated Information Management (TMIM), the extent to which respondents believed that HMR would provide them with increased medicines knowledge, improve their medicines management capability, and reduce their medicine concerns had a strong influence over whether they were willing to use the service. It appears therefore that patients view HMR as an information resource and that their willingness to use HMR is in part driven by expectations about the services’ capacity to provide medication information. That willingness to use pharmacist-provided services is motivated by information seeking is consistent with the findings of 2 international studies that investigated factors influencing participation in these programs. A study of patients who either voluntarily participated in a Swedish service or not concluded that “patients receiving a Pharmaceutical Care service are a worried, vulnerable, and information-seeking group.” Similarly, some of the patients who accepted rather than declined to participate in the UK Medicine UR Review program did so because it was “a good thing to keep up their knowledge.”

However, multiple medicine users in the present study were overall unconvinced that they would benefit from HMR as an information resource. A quantitative study within the United States also demonstrated that persons who use multiple medicines and who are naive to pharmacist-provided medicines management services have low to moderate expectations of receiving personal benefit. The relatively low expectations about the benefits of HMR should be compared with the high level of outcome benefits reported by respondents after receiving the service. For example, whereas only 21% of nonrecipients expected that having an
HMR would help them to manage their medicines, after having an HMR 69% of recipients agreed that the HMR did help them with medicines management.\textsuperscript{14} It is plausible that low expectations of receiving the benefits explored in the present study could be the main reason why eligible nonrecipients of HMR are significantly less willing than recipients to use HMR.\textsuperscript{14}

In summary, among eligible nonrecipients, positive expectations about the capacity for pharmacist-provided services to provide medication information that would improve self-efficacy for medicines management have strong influences over willingness, yet these expectations are not high. These findings have important implications for the future of the pharmacy profession and for the marketing of these services. There appears to be scope for the profession to increase demand for these services, through lifting expectations of medication management services as information resources.

The present study did not investigate the influence of patients' expectations of other intangible benefits of medication management services on willingness to participate. For example, the study did not examine whether willingness depended on patients' thoughts about pharmacists making recommendations to the doctor or about the pharmacists checking the appropriateness of their medication. However, it has been argued by Chewning and Schommer\textsuperscript{38} and Nau et al\textsuperscript{39} that the profession needs to address the difficulty of clearly articulating the range of benefits of participation to patients. Yet, describing intangible benefits to patients is difficult.\textsuperscript{14} A recent study that analyzed the content of patient-directed information regarding HMR found that descriptions of the service may lack salience for the patient.\textsuperscript{40} It was suggested that laypersons may find the concept of medication-related problems, the resolution of which underpins the programs, unclear.\textsuperscript{40} Descriptions of HMR did not generally inform readers about concepts of dose problems, appropriateness, age-related change in sensitivity, or drug-drug/food-drug interactions. Patients may therefore not understand the need to be informed about these issues.\textsuperscript{40} In addition, the benefits need to be articulated without causing excessive medicine-related anxiety. Health professionals may understand that medication-related problems occur because of timing of administration, drug interactions, and incorrect doses or that prescribed medications may, for a variety of reasons, be inappropriate. Explaining these concepts to patients may generate sufficient medicine-related anxiety to seek information because anxiety motivates information seeking.\textsuperscript{26} However, it is also possible that excessively increasing medicine-related anxiety could stimulate nonadherence, as demonstrated by the work of Horne et al.\textsuperscript{41-43} Further research could investigate the relationship between medicine-related anxiety and outcome expectancies.

Consistent with predictions made by the model, the present study demonstrated that CE had a moderate effect on willingness to use HMR. Perhaps this is not surprising because self-efficacy beliefs may be the most powerful of constructs within SCT.\textsuperscript{25,44,45} Although it would seem that arranging for a single patient interview would appear to be a relatively simple process for the patient, HMR is a relatively new concept and patients may not be able to clearly conceptualize what would occur during an interview. This lack of clarity about the process and the fact that patients may feel insecure about asking the family medical practitioner for an HMR may explain why CE was only moderately important. Although the measurement scale for CE had good factor loadings and good construct reliability, average variance extracted was below the target. It should also be noted that the scale did not include any items to probe the CE required to ask the pharmacist for advice during the HMR interview. Items of this nature were not included because the communication barrier did not appear to limit willingness to ask for advice in the qualitative research.\textsuperscript{20} It is recommended that future research should attempt to improve the measurement of CE in the present context.

The present study found that previously reported uncomfortable feelings about having a known or unknown pharmacist visit the home\textsuperscript{14,20,29} did not significantly influence willingness to use the service. To some extent, this should be a reassuring finding for the pharmacy profession. This finding possibly reflects the trust that patients have in community pharmacists as an information resource, both within Australia\textsuperscript{46} and internationally.\textsuperscript{47} Because the study was not able to develop a reliable scale that included other negative feelings,\textsuperscript{14,20,29} such as that having the HMR indicated reduced personal capability or was a threat to privacy, it is not possible to comment on whether these factors may be influential.

\textit{Limitations}

A limitation of this study was the relatively low response rate (12.5%), which may have resulted...
from the 2-step method for distributing questionnaires. Questionnaires were sent to practicing pharmacists who then had to either contact patients or wait for eligible respondents to call in before distributing the questionnaires. Low response rates occurred despite several reminder calls to pharmacists. The recruitment process did not allow for other strategies to address non-responder bias.

Another limitation of the study relates to the potential bias introduced by pharmacists recruiting respondents. This bias could occur in 2 ways. First, it is possible that pharmacists selectively recruited patients with known favorable attitudes toward HMR or pharmacists’ services generally. Second, only 29% of pharmacists agreed to recruit patients. It is possible that these pharmacists had favorable attitudes. Therefore, the study results may be biased by not obtaining the views of patients who obtain medicines from pharmacists that may not have these favorable attitudes. Further studies could be conducted using a different recruitment strategy. For example, GPs could be contacted to distribute questionnaires. Random telephone calls or postal delivery could also be used to recruit respondents.

Although HMR shares many attributes with other international medication review services provided in the United States, Canada, New Zealand, or the United Kingdom, it cannot be assumed that the findings of the present study would necessarily apply to these services.

Conclusion

For patients who are at risk of experiencing medication-related problems, a lack of willingness to use medication management services is potentially a safety issue. Eligible nonrecipients’ willingness to use HMR was strongly influenced by their expectations that it would provide them with increased medicines knowledge, help them manage their medicines, and reduce their medicine concerns. Consistent with studies around the world, these expectations are relatively low. Therefore, there appears to be significant scope for increasing patients’ willingness to use these services. Given the difficult task of articulating other intangible benefits of these services to eligible patients, this study suggests that patient-directed material about medication management services should highlight the provision of medication information.

Acknowledgments

The authors thank all respondents for their contribution to this study, as well as the community and accredited pharmacists who assisted with recruitment. The authors are grateful to Christiane Klinner who coordinated the project and Simone Goppert who assisted with the preparation of the manuscript.

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**Appendix 1**

**Description of HMR provided to eligible nonrecipients, adapted from an Australian Government consumer brochure**

An HMR, a free service funded by Medicare, provided jointly by your GP and pharmacist, is particularly useful for people who take multiple medicines each day or who have recently spent time in hospital or who are concerned or uncertain about their medicines. After being referred by a GP, the pharmacist usually visits the patient in his or her own home at a mutually agreed time. The pharmacist will look at all medicines that the patient has, discuss any difficulties or concerns the patient may have with using the medicines, and write a report to the GP. The GP will then discuss the results of the HMR with the patient. HMRs help patients and carers to understand better how to use their medicines.

Author's Contributions

Stephen Carter conducted the study, performed the analysis and wrote the manuscript. Lesley White supervised and conducted the study and critically revised the manuscript. Rebekah Moles and Tim Chen critically revised the manuscript.

Stephen Carter

Rebekah Moles

Lesley White

Tim Chen
CHAPTER FOUR

EXPLORING PATIENT’S MOTIVATION TO PARTICIPATE IN AUSTRALIA’S HOME MEDICINE REVIEW PROGRAM

Carter SR, Moles R, White L, Chen TF.

International Journal of Clinical Pharmacy. 2012;

34: 658-66; doi: 10.1007/s11096-012-9661-z
Exploring patients’ motivation to participate in Australia’s Home Medicines Review program

Stephen R. Carter • Rebekah Moles • Lesley White • Timothy F. Chen

Abstract Background Patients at risk of experiencing medicine-related problems do not always appear willing to participate in collaborative medication management services. Little is known about the psycho-social factors which motivate patients to participate in these services. The theory of motivated information management (TMIM) suggests that patients’ willingness to participate may be motivated by their uncertainty and worry about their medicines. Objective The objective of this study was to investigate factors which may motivate patients to participate in a collaborative medication management program. Setting Fourteen semi-structured focus group interviews held throughout Australia provided the data for the study. Eighty participants were recruited by community pharmacists. Participants were recruited into the study if they had experienced Australia’s Home Medicines Review (HMR) program or would be eligible to participate in the program because they were at risk of experiencing medicine-related problems. Methods An interview guide was developed which was informed by TMIM. Focus group data were audio-recorded, transcribed and where necessary, translated into English. Main outcome measure Qualitative data were thematically analysed to identify participants’ expectations about the outcomes of HMR and the factors which may influence these expectations. Results Participants’ most salient outcome expectancies of HMR were that it was a medication-information source which would assist them to manage their medicines. Recipients of the program held overall positive outcome expectancies, whereas nonrecipients’ expectancies varied widely. Consistent with theory, participants who expressed some worry about their medicines, generally held positive outcome expectancies and were willing to participate in HMR. Compared with younger participants, older participants (those aged >74 years) tended to engage less in their thoughts about being at risk, and consequently did not experience worry. Conclusion Worry about medicines is a key factor in motivating participants to engage in medicines information-seeking. Older persons who rely heavily on heuristics appeared less likely to worry about their medicines and willing to participate in medication management services. Age-related reduction in the motivation to participate may have important implications for medication safety. Further examination of this effect is warranted because older persons are at greatest risk of medicine-related problems.

Keywords Australia • Heuristics • Home Medication Review • Medication Review • Medicine information • Medicine-related problems • Motivation • Uncertainty

Introduction

In many developed nations, throughout Europe [1, 2], North America [3] and in Australia [4] the population is ageing and the burden of chronic disease and co-morbidity...
is growing. Multiple medications are often used to manage common chronic diseases [5], resulting in complex medication regimens [6]. Medication-related problems are a significant cause of morbidity in Australia [7]. It is estimated that they result in 2–3 % of all hospital admissions, 50 % of which may be preventable [8]. One option available in Australia to improve medication safety is to provide patients who are at risk of experiencing medication-related problems with a Home Medicines Review (HMR) [9]. HMR is a medication review service provided collaboratively by general practitioners (GPs) and pharmacists which aims to resolve medication-related problems and improve health outcomes [10–12]. An HMR is initiated with a request from the patient’s GP to an accredited pharmacist. The referral may be made directly to the pharmacist or to the patient’s preferred community pharmacy [9]. The pharmacist then conducts a patient interview at the patient’s home or at location which suits the patient. Following the interview, the pharmacist collaborates with the GP, who then discusses a revised medication management plan with the patient. There is evidence that this collaborative program increases patients’ use of appropriate and evidence-based therapies [13–15], and may provide additional safety benefits such as delaying hospital re-admission for patients with heart failure [16].

Patients can have a key role in medication safety through their: involvement in decision-making regarding treatment; adherence to therapy; and self-management strategies [17]. Therefore, it is likely that a key benefit of HMR for patients is the information they receive during the patient interview. A meta-analysis investigating the impact of a range of medication review services carried out by pharmacists found that these programs provide patients with important knowledge and may help adherence [18]. In focus group research, recipients of HMR believed that the service provided them with personalized medicines information and reassurance [19]. Yet it is unclear whether these benefits are expected by eligible non-recipients.

It has been reported that some patients who are at risk of experiencing medication-related problems decline to participate in the HMR program [20, 21]. It is likely that the patient’s GP has a motivating role however, research has found that around 30 % of such patients are ambivalent or unwilling to have an HMR, even if their own GP were to suggest it [22]. This lack of willingness to participate in medication review services has also been demonstrated in studies conducted in the USA [23], and in the UK [24].

An individual’s intent to engage in health information-seeking is a basic step in the process of choosing and participating in medical services [25]. It is also well known that patients prefer to learn about their medicines from interpersonal sources, such as GPs and pharmacists [26]. Therefore, patients’ lack of willingness to participate in the HMR program to discuss their medicines face-to-face is somewhat surprising. It has important implications for patient participation in the HMR program and for medication-safety in general.

Theoretical framework

The theory of motivated information management (TMIM) [27] was selected as the theoretical framework for the study because this theory deals with information-seeking particularly from interpersonal sources. TMIM suggests that an individual’s motivation to engage in information-seeking arises through uncertainty discrepancy [28]. A person experiences uncertainty discrepancy when their current threshold for uncertainty about an important issue is breached. Up until this point, the individual is comfortable with their state of uncertainty. However, after an event occurs which causes them to be no longer be comfortable with their level of uncertainty, they experience anxiety. This anxiety then motivates the individual to focus their thoughts and feelings on managing the anxiety. They weigh-up the expected benefits and costs (outcome expectancies) of engaging in information-seeking. An overall positive evaluation of outcome expectancies then motivates behaviour, although positive communication efficacy also has a role to play. In the context of the present study, we use the term “worries” to mean anxiety related to the possibility of experiencing medicine-related harm.

Aim

The aim of this qualitative study was to investigate psychosocial factors which may motivate patients who are at risk of experiencing medication-related problems to participate in the HMR program.

Methods

Overview

This study was part of a larger study investigating patient and carer attitudes towards the Australian Home Medicines Review (HMR) program this paper reports on the qualitative data which were relevant to the stated aims.

Participants

Fourteen focus groups comprising 88 participants were conducted across Australia. Participants comprised patients at risk of medication-related problems and carers. Participants for 13 of the focus groups (n = 84) were recruited by
community pharmacists during routine contact within the pharmacy. Participants for one focus group comprising women of older age were recruited by invitation during a general meeting of the Council of the Ageing (NSW). Participants were provided with an information statement and consent form. Given the focus of the present study, the data from eight participants who nominated themselves as carers only, were excluded from the analysis, leaving 80 participants. A purposive approach to sampling was adopted so that participants with pre-defined demographic characteristics were recruited. These were: age group, gender, location (metropolitan versus rural), previous participation in the HMR program, and language. Two languages were chosen besides English: Mandarin and Arabic—as these were two of the top five languages other than English spoken at home in Australia [29]. Participants’ demographic details are presented in Table 1. The sample included patients who had experienced an HMR within the last 6 months, and eligible non-recipients (those who were eligible, but who had not yet had an HMR). Eligible non-recipients were recruited if they had at least one of six medication risk factors [9]: taking more than five medicines daily; taking more than 12 doses daily; taking medicines which need particular monitoring, such as warfarin, carbamazepine or digoxin; a change in medication regimen within the past month; hospitalisation within the past 3 months; and having multiple regular prescribers.

Data collection

Qualitative researchers in the field of medication-related problems report that participants may be reluctant to discuss their concerns with researchers [30, 31]. Gordon et al. [30] found this in one-on-one interviews. However, Moen et al. [31] reported that this effect was overcome to some extent during focus groups as people opened up in the group environment. Focus groups allow participants to refine their individual viewpoints by comparing them to other people’s [32]. Therefore, semi-structured focus groups were selected as the most appropriate data collection method. Facilitators used semi-structured discussion guides, which were developed following a comprehensive review of the literature. Questions were refined through consultation with practising and academic pharmacists (Tables 2, 3).

In order to facilitate optimal group interaction, focus groups were arranged to be as homogenous as possible [33]. All focus groups were facilitated by a pharmacist and participants were informed that the facilitator was a pharmacist. Each focus group was digitally recorded and transcribed verbatim. For focus groups conducted in Mandarin and Arabic, the authenticity of the translations was ensured by an iterative process, whereby two bilingual health workers checked and re-checked translations until consensus was achieved. In addition, field notes were recorded during and immediately after each focus group.

Data analysis

Thematic analysis was used for this study [34]. Following several readings of transcripts and field notes, initial coding of the entire dataset was shared between two qualitative analysts with experience in health research. Analysts aimed to draw subthemes relevant to the two major themes, patients’ worries about medicines and their expectations about medicines information sources. To ensure rigor, the first author (SC) independently coded a random sample of six focus groups. During this stage, a series of meetings with the analysts and researchers were held to discuss subthemes, map and refine them, and to achieve interpretative consensus. Next, using the hierarchical thematic structure developed, SC recoded the data to the entire dataset. Finally, meetings of the analysts and the

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Participant characteristics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (n = 80)&lt;sup&gt;a&lt;/sup&gt;</td>
<td>Category</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>36 (45.0)</td>
</tr>
<tr>
<td>Female</td>
<td>44 (55.0)</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
</tr>
<tr>
<td>Under 50</td>
<td>7 (8.8)</td>
</tr>
<tr>
<td>50–65</td>
<td>12 (15.0)</td>
</tr>
<tr>
<td>65–74</td>
<td>33 (41.3)</td>
</tr>
<tr>
<td>75+</td>
<td>22 (27.5)</td>
</tr>
<tr>
<td>Unrecorded&lt;sup&gt;b&lt;/sup&gt;</td>
<td>6 (7.5)</td>
</tr>
<tr>
<td>Location</td>
<td></td>
</tr>
<tr>
<td>Metropolitan</td>
<td>54 (67.5)</td>
</tr>
<tr>
<td>Rural/remote</td>
<td>26 (32.5)</td>
</tr>
<tr>
<td>Language spoken</td>
<td></td>
</tr>
<tr>
<td>English</td>
<td>70 (87.5)</td>
</tr>
<tr>
<td>Arabic</td>
<td>4 (5.0)</td>
</tr>
<tr>
<td>Mandarin</td>
<td>6 (7.5)</td>
</tr>
<tr>
<td>Patient and carer status</td>
<td></td>
</tr>
<tr>
<td>Patient only</td>
<td>65 (81.3)</td>
</tr>
<tr>
<td>Both patient and carer</td>
<td>15 (18.8)</td>
</tr>
<tr>
<td>Home Medicine Review</td>
<td></td>
</tr>
<tr>
<td>Recipient</td>
<td>28 (35.0)</td>
</tr>
<tr>
<td>Eligible non-recipient</td>
<td>52 (65.0)</td>
</tr>
</tbody>
</table>

<sup>a</sup> The present study excluded the data from eight participants who were carers but who themselves were not multiple medicine users. Therefore, the characteristics reported above represent only those of the study sample

<sup>b</sup> The age group of six participants were not recorded due to administrative oversight
researchers were held to refine the labelling of themes. The NVivo 8 programme was used for data management. This study was approved by The University of Sydney Human Ethics Committee.

Results

The data were categorized into subthemes which emerged within each of the two broad themes: (1) Worries about medicines; and (2) Expectations about sources of medicines-information.

Theme 1: worries about medicines

This theme identified that participants vary in their level of uncertainty and worry about their medicines. It was apparent that some participants had little engagement in thoughts and feelings about the possibility of experiencing medication-related problems. However some participants were worried about these problems, especially during episodes which created new uncertainties. There were four subthemes: Making mistakes; Consuming multiple strong medicines is harmful; Needing more or less information; Age-related decline in medication-related worries.

Subtheme: making mistakes

As expected by the researchers, many participants initially interpreted the question “how likely are you to experience problems with your medicines?” as an enquiry about the intrinsic harmfulness of medicines. Others however, interpreted the question as an enquiry about their self-efficacy to follow their GPs’ instructions. When a participant declared that they had made errors with self-management, others tended to report their own experiences.

I’m also like you [another participant]; I doubt myself sometimes whether I took my tablet or not. I would sometimes take my Disprin (aspirin) and write on the Table 2  Focus group interview guide: eligible non-recipients

<table>
<thead>
<tr>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How do you obtain your medicines?</td>
</tr>
<tr>
<td>2. What sort of medicine problems do you experience?</td>
</tr>
<tr>
<td>3. How do you manage them? How do you cope? Do you use dose administration aids? Do you have a carer?</td>
</tr>
<tr>
<td>4. How likely are you to: get sick from your medicines; see a doctor; or need to go to hospital because of them?</td>
</tr>
<tr>
<td>5. How much do you worry about your medicines?</td>
</tr>
<tr>
<td>6. Who do you approach for advice regarding medicines, medicine problems? Where else do you go for information?</td>
</tr>
<tr>
<td>7. Before being asked to participate in this study, had you heard of the term Home Medicines Review?</td>
</tr>
<tr>
<td>I will read to you now some information about Home Medicines Review (HMR)*</td>
</tr>
<tr>
<td>8. In general, how do you think patients will benefit from HMR?</td>
</tr>
<tr>
<td>9. How do you think you would personally benefit? What would you expect to be the health benefits?</td>
</tr>
<tr>
<td>10. Would you want an HMR? Why or why not?</td>
</tr>
</tbody>
</table>

This document includes only those questions designed to elicit perceptions about motivations to participate in HMR. Other questions regarding barriers to participation in HMRs are excluded

a Consumer directed information regarding HMR: Available from the authors

Table 3  Focus group interview guide: Home Medicines Review recipients

<table>
<thead>
<tr>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How do you obtain your medicines?</td>
</tr>
<tr>
<td>2. What sort of medicine problems do you experience?</td>
</tr>
<tr>
<td>3. How do you manage them? How do you cope? Do you use dose administration aids? Do you have a carer?</td>
</tr>
<tr>
<td>4. How likely are you to: get sick from your medicines; see a doctor; or need to go to hospital because of them?</td>
</tr>
<tr>
<td>5. How much do you worry about your medicines?</td>
</tr>
<tr>
<td>6. Who do you approach for advice regarding medicines and medicine problems? Where else do you go for information?</td>
</tr>
<tr>
<td>7. How did you first hear about Home Medicines Review (HMR)? Did you already know about it? What did people say about HMR? What did you expect?</td>
</tr>
<tr>
<td>8. Overall, how do you feel it benefited you? How would it benefit people, generally?</td>
</tr>
<tr>
<td>9. Would you want another HMR? Why or why not?</td>
</tr>
</tbody>
</table>

This document includes only those questions designed to elicit perceptions about motivations to participate in HMR. Other questions regarding barriers to further participation in HMRs are excluded
pack that I took it but I would forget whether I took the Lipitor or not. (FG7, male, age unrecorded, Arabic)

Therefore, the sub-theme “making mistakes” arose because participants recognised that medication-problems could arise because of their own actions. Overall, participants appeared to be not very worried about the implications of making mistakes. They tended to dismiss the importance of making mistakes and discussed these problems without demonstrating verbal and non-verbal signs of worry.

Subtheme: consuming multiple strong medicines is harmful

Some participants were not concerned about the harmfulness of their medicines, which is discussed in subtheme: age-related decline in medication-related worries. Others operated on the heuristic: Medicines are potentially harmful, and people should be wary or “suspicious” of taking them. “Ideally, nobody wants to take medicine”, and if possible, one should “get off it as soon as you can or not take it all.” Many participants felt that they were probably taking “too many” medicines, and they had feelings of mild dread several times a day—whenever they had to take another dose. This attitude was particularly evident among Mandarin-speaking participants.

Some participants were concerned about taking a wide variety of medicines over a long period of time. They were afraid that liver damage, kidney failure, or bleeding stomach ulcers could result in hospitalisation and negative lifelong consequences. Some participants (particularly those who had been recently hospitalized) showed their fear through non-verbal body language by responding with a worried countenance and shrugging their shoulders as if to say: “There’s nothing I can do about it.” Others described coping with their fear by adopting intentional non-adherence, such as: adjusting doses; adjusting timing of doses; omitting doses; self-experimenting to detect which medicine was causing an adverse effect; and rejecting treatment outright.

I go through a process of elimination, I’ll stop taking each drug until I find which one is causing the problem and then I go and see the doctor and try to get it changed. (FG6, male, >74 years, English)

Subtheme: needing more or less information

Participants who felt they lacked basic information said they wanted to learn more about their medicines such as: the purpose or benefit of the medicine; what to expect in terms of effectiveness; side-effects; doses and administration times; and the expected length of treatment required. Participants’ information need was therefore most apparent after changing medications or starting new ones and particularly after leaving hospital. Participants also expressed bewilderment about the necessity of taking medicines for chronic diseases indefinitely. They wanted to know more about the actual decision-making processes that medical practitioners use when selecting medicines and doses.

It beats me how they work sometimes, taking all these tablets, you know A goes here [points to abdomen] and B goes here [points elsewhere]. (FG13, male, >74 years, English)

Some participants felt positive about receiving Written Medicines Information (WMI). However, many (particularly older persons) felt apprehensive about reading long lists of potential adverse effects, and doubted their own ability to correctly attribute adverse effects to their medicines.

When you’ve finished reading them [WMI] you’d be a bit shy about picking up a glass of water… I’m not saying that’s the wrong thing but they do warn you of the dangers of absolutely everything. (FG16, male >74 years, English)

Many participants felt uncertain and worried after receiving risk information during conversations with health professionals, as well as through print and electronic media.

Subtheme: age-related decline in medication-related worries

Compared with younger participants, older participants (those aged >74 years) tended to focus their thoughts less on their medicines; they answered questions without expressing worry. Many older persons relied on heuristics such as the availability heuristic: they believed that it was highly unlikely that they were at risk for medication-related problems because they were unable to recall any problems in the past. Many older persons preferred a passive role in their medicines-taking and actively avoided information such as WMIs.

I think the less you read about the side effects, the better off you are, don’t read them, you’ll become a hypochondriac. (FG6, male, >74 years, English)

They believed that once they had delegated their decision-making to “qualified health professionals”, it was unnecessary for them to worry about medication-related problems. Furthermore, they assumed their medicines were safe since the pharmacists always “double-checked” them.
In contrast, relatively younger persons tended to focus more on being at risk of medication-related problems.

Well actually, I went to hospital yesterday with a migraine and they’ve just gone on to this new e-record thing, they didn’t even ask me what medications I was on… so you know things could be pretty dangerous. (FG13, female, 50–64 years, English)

Theme 2: expectations about sources of information

This theme identified how expectations about the sources of information influenced participants’ decisions to seek medicines information. It demonstrated that information-seeking is clearly motivated by the need to manage worry about experiencing problems. This theme overlaps with Theme: needing more or less information, as some participants perceived that they normally had little opportunity to discuss medication-related problems with health professionals. There were two subthemes: Preference for interpersonal sources; and Home Medicines Review.

Subtheme: preference for interpersonal sources

For many participants there was a clear preference to seek information about medicines from health professionals with whom they had a good relationship. They valued those who were able to listen carefully, demonstrate respect, and take the time to explain things in lay terms. However, participants were often frustrated when their health professionals did not automatically provide them with clear explanations about their medicines. Participants felt uncertain when health professionals simply provided WMIIs instead of taking the time to discuss medicine issues. In contrast, other participants spoke positively about the detailed information their GPs provided, even when the information was confronting. Some patients felt reassured when their GPs provided them with individualized medication lists stating the purpose of each medicine.

Some participants, who wanted to seek information from interpersonal sources, were prevented from doing so due to various barriers. For example, Mandarin-speaking participants appeared to become emotional when talking about how they were forced to make independent decisions due to language barriers.

They always give too much information for us to read. For people like us who have difficulty in reading English, especially the medical terminology, such as the name of medications, it is hard to understand. We even cannot trust what we look up in the dictionary. (FG4, female, age unrecorded, Mandarin)

Arabic-speaking participants discussed the need to travel through the city to find an Arabic-speaking pharmacist to discuss problems. Participants from rural areas spoke about there being not enough GPs in the region, while older persons talked about transport that was difficult and costly. In general, participants talked about the lack of time available with “overworked” GPs and “busy” pharmacists.

Subtheme: Home Medicines Review

Participants’ positive outcome expectancies about participating in HMR were centred on the need to feel reassured about the possibility of experiencing medication-related harm. They expected to receive information about how best to manage their medicines. The majority of participants who had already participated in the HMR program said they wanted another one. They often described pleasant feelings about their experience, such as feeling respected and cared for. They enjoyed the feeling of not being rushed. In three focus groups, several participants had experienced three or four HMRs annually with the same HMR pharmacist each time. These participants spoke glowingly about the relationship that had developed between themselves and the pharmacist(s) and how the pharmacist(s) were very empathetic to their needs.

Those participants who had not experienced an HMR also expected to receive information and to feel reassured, but many did not appear motivated to participate. Participants, who were not worried about the risk of experiencing medication-related problems, appeared the least motivated. It was often the older persons (those aged over 74 years) who were the least motivated. Some of these participants mentioned that they got all the information about medicines they needed from their own community pharmacist or their medical practitioner.

Participants explained that one of the benefits of having an HMR was the opportunity to discuss the consequences of non-adherence. It should be mentioned that participants did not always discuss their intentional non-adherence with their GP. Participants said they would value the independent knowledge that they believed a HMR pharmacist would provide: they believed it would empower them to make more informed decisions.

[The HMR pharmacist] could tell me, with every tablet that I’m taking, what it is doing… just to sit down and have that hour session I think would be great. (FG13, female, age unrecorded, English)

The opportunity that an HMR afforded, to discuss intentional non-adherence, was highly regarded by Mandarin-speaking participants.
If they can not only have a look at what medications I take, but also integrate everything that I take, and give an overall opinion. For example, I take 3 medications for the one disease, whether this is suitable, you [HMR pharmacist] give your own judgment. Otherwise, everyday a full hand of medications… [worried tone] (FG4, male, age unrecorded, Mandarin)

These participants wanted to arrange an HMR at the end of the session, and were disappointed that they needed their doctor’s approval. They then expressed reluctance to ask their GP for the service because they felt “shy” and concerned about “hurting the feelings” of the GP.

… you could discuss this [HMR] with the pharmacist, but not the doctor. It’s very difficult to discuss this with the doctor. Because the medication is prescribed by the doctor himself, he will think ‘I give you this medication, and you don’t trust me...instead you go to find a pharmacist to take charge of me’ [laughter]… they won’t be happy. (FG4, male, age unrecorded, Mandarin)

Discussion

As expected, participants were motivated to participate in HMR by their positive outcome expectancies. They expected that having an HMR would provide them with personalized medicines-information, as well as reassurance—which they may not have been able to receive from their current health providers or non-interpersonal sources. An important motivation to choose HMR to learn about medication-related problems was the preference that many participants (including older persons) expressed for communicating interpersonally.

Although participants in the present study valued good relationships with their GPs, similarly to other studies, many reported poor access to health professionals, communication barriers and system failures [30, 31]. These results align with previous research which suggest that patients feel that consultations with GPs are too brief [31], to discuss: the purpose or benefit of the medicine; what to expect in terms of effectiveness; side-effects; drug-interactions; doses and administration times; and the expected length of treatment required [30, 31]. HMR consultations with pharmacists (which may last for an hour) are therefore very acceptable for discussing medication regimens. HMR is generally provided annually and as such, patients may take a long time to develop trust in a particular HMR pharmacist. Nevertheless, those patients who received repeated annual HMRs with the same accredited pharmacist valued the relationship which developed with that pharmacist.

Timing of medication management services

Consistent with theory, patients’ thoughts and feelings were more focussed on positive outcome expectancies about information sources (including HMR) when they were worried about medication-related problems. This is also consistent with the findings of a Swedish study which concluded that patients who had volunteered to participate in a pharmacist-provided medication safety intervention as “a worried, vulnerable, and information-seeking group”[35]. In the present study, participants reported experiencing worry when they perceived that they had received either too little or too much information—which created uncertainty discrepancy for them. However, many participants did not experience uncertainty discrepancy because they tended not to engage with their thoughts about being at risk of medication-related problems. Therefore, these participants were the least motivated to engage in medicines information-seeking. However, when patients were stimulated to focus their thoughts on being at risk—such as, beginning a new medicine; have their medication regimen changed; or being discharged from hospital [36–38], they experienced uncertainty discrepancy, and the accompanying worry which they had previously not experienced. Therefore, at these critical times, patients may be more motivated to engage in medicines information-seeking, such as HMR.

Decreasing worry with age

Importantly, however, it appeared that worry and therefore motivation to seek medicines information may be lowest among older participants, those at greatest risk of medication-related harm [39]. This finding is consistent with socioemotional selectivity theory [40]. It is believed that “age-related constraints on time horizons” are associated with motivational changes. These changes cause older persons to increasingly focus on positive over negative emotions [40]. As described by Williams and colleagues, the present study found that many older patients seemed to have an optimistic bias (i.e. unrealistic optimism) regarding medication-related problems [41]. Relying on heuristics, some emphatically denied the possibility (for them) of experiencing medication-related problems and did not worry about them. These patients may have been susceptible to problems without realising it. Although all patients use heuristics in decision-making [42], older patients may rely on them more. We found that many older participants often delegated their decision-making as a way of avoiding worry. This was consistent with the findings of Say and Murtagh, where many older participants do not wish to be active in decision-making regarding the choice of medication treatments [43]. Also, Miller et al. [44] found that older patients delegate decision-making and as in our
study, are less likely to read WMI. They found that many older patients are not aware of the potential problems in using non-steroidal anti-inflammatory medicines [44].

Limitations

There are several potential weaknesses of this study. Firstly, the inclusion of carers in the focus groups (whose data was not included in the analysis) may have influenced patients’ responses. However, the researchers found no evidence of this. Secondly, pharmacists facilitated the focus groups, raising the possibility that participants offered socially desirable answers. Participants’ plethora of negative comments argues against this as a significant bias. Finally, focus groups by nature will appeal to those participants who are willing to discuss issues in a public forum. Therefore, it is possible that the views of persons who do not wish to discuss medication-related problems on an interpersonal level may be underrepresented.

Conclusion

Worry, the emotional arousal that is activated when a patient is no longer comfortable with their level of uncertainty about being at risk of medication-related problems, is likely to be a key factor in their motivation to participate in the HMR program. Patients who are aged 75 years and older may be at the highest risk of medication-related problems and should probably be targeted to have an HMR. However, these patients may be the least likely to worry about medication-related problems, the least motivated to participate in HMR and the least motivated to seek medicines information elsewhere. This is due to their tendency to focus on positive emotional goals rather than unpleasant medicines information. Further research is needed on communication strategies that would be most effective in medication-safety interventions for older persons.

The GP plays a powerful role in increasing medication-safety. Many patients will agree to have an HMR simply because their GPs suggest it. For those patients who decline to participate, it is possible that they have difficulty in formulating positive outcome expectancies of HMR. In order to motivate them, GPs could verbally reinforce benefits such as: many HMR recipients report feeling valued and cared for; and that the hour-long patient interview gives them time to ask important questions that they can’t think of during the consultation with their GP. Further, GPs need to be mindful that patients may be more receptive to their suggestions to have an HMR at times when they are at most at risk [36–38], such as when taking a new medicine; having a change to their medication regimen; and being discharged from hospital.

Acknowledgments  We would like to thank all participants for their time and contribution to this study, as well as the community pharmacists who assisted with recruitment. We are grateful to Christiane Klinner who coordinated the project, and to Simone Goppert who assisted with the preparation of the manuscript.

Funding  This project was funded by the Australian Government Department of Health and Ageing, as part of the Fourth Community Pharmacy Agreement Research & Development Program managed by the Pharmacy Guild of Australia.

Conflicts of interest  There are no conflicts of interest in authorship of this article.

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Author’s Contributions

Stephen Carter conducted the study, performed the analysis and wrote the manuscript. Lesley White supervised and conducted the study and critically revised the manuscript. Rebekah Moles and Tim Chen critically revised the manuscript.

Stephen Carter

Rebekah Moles

Lesley White

Tim Chen
CHAPTER FIVE

CONSUMERS’ WILLINGNESS TO USE A MEDICATION MANAGEMENT SERVICE: THE EFFECT OF MEDICATION-RELATED WORRY AND THE SOCIAL INFLUENCE OF THE GENERAL PRACTITIONER

Elements of the conceptual model explored in this chapter

Carter SR, Moles R, White L, Chen TF.

Research in Social and Administrative Pharmacy. 2012;

Consumers’ willingness to use a medication management service: The effect of medication-related worry and the social influence of the general practitioner


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Abstract

Background: Some consumers at risk of experiencing medication-related problems have chosen not to use pharmacist-provided medication management services. Previous research has shown that consumers’ willingness to use the Australian Home Medicines Review (HMR) service depends on the extent to which they believe that they will receive medication information to assist them with self-management.

Objectives: The aim of this study was to develop and test a model of willingness to use HMR among consumers who were eligible to receive the service but have not yet experienced it. Specifically, this study aimed to determine the effects of consumers’ medication-related worry and the social influence of the consumer’s general practitioner (GP) over willingness.

Methods: A cross-sectional postal survey was conducted among 1600 members of Council on the Ageing (NSW, Australia). Respondents were included in the study if they had not experienced an HMR and were taking more than 5 medicines daily or more than 12 doses daily. Measurement scales were developed or were based on previous research. Confirmatory factor analysis was used to test the reliability and validity of the multi-item scales. Multiple regression analysis and structural equation modeling (SEM) were used to test the model.

Results: Surveys received from 390 respondents (24.3%) were analyzed. Respondents held overall low-to-neutral positive outcome expectancy (POE). The SEM analysis revealed that worry had a direct effect on POE ($\beta = 0.35$, $P < .05$) and an indirect effect on willingness ($\beta = 0.22$, $P < .05$). Subjective norms had a direct effect on willingness ($\beta = 0.27$, $P < .05$) but not POE. Worry was higher among those who had experienced a change in the medication regimen within the past 3 months ($\beta = 0.19$, $P < .001$).

Conclusions: Those consumers who were worried about their medicines were more willing to use HMR. The consumer’s GP appeared to exert a significant positive social influence over willingness to use this medication management service.

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Conflict of interest: There are no conflicts of interest in authorship of this article.

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http://dx.doi.org/10.1016/j.sapharm.2012.07.001
Introduction

Preventable adverse events that occur in ambulatory care are a significant cause of morbidity in Australia. It is estimated that adverse events result in 2-3% of all hospital admissions, 50% of which may be preventable. There is increasing interest in medication safety interventions to prevent these problems. For example, the 2007 Institute of Medicine’s report on Preventing Medication Errors recommended that regulatory agencies should provide consumers with increased access to medication information and medication self-management support. Medication management services provided by pharmacists are provided for persons who consume multiple medicines and are at elevated risk of experiencing medication-related problems. There is evidence that these services resolve medication-related problems, which in turn can improve health outcomes. This article investigates one issue, which is fundamentally important to the success of medication management programs—consumer willingness to use them. Although consumers who have experienced an Australian medication management service are quite willing to reuse the service, those who would be eligible but have not yet experienced it are less willing. Research into eligible nonrecipients’ willingness to use medication management services is important because studies conducted with the UK’s Medicines Use Reviews, Australia’s Home Medicines Review (HMR), and the U.S.’ Medication Therapy Management (MTM) show that some are reluctant to use these services. Although procedural aspects of the programs vary, the services share similarities in that the consumer has an in-depth interview with a pharmacist about the consumer’s medicines. Because these services resolve medication-related problems, which in turn can improve health outcomes, a lack of consumer participation is a quality use of medicines issue. Furthermore, enhanced uptake of medication management services may depend on understanding the factors, which influence eligible nonrecipients’ willingness to use them.

The HMR service

The HMR is a quality use of medicines intervention, which aims to resolve medication-related problems and improve health outcomes for those at greatest risk of medicine-related problems. The HMR also aims to increase consumer and caregiver knowledge of medicines. An HMR is provided collaboratively by general practitioners (GPs) and pharmacists. The providers claim for the full cost of service provision from the Australian government. An HMR is initiated with a request from the consumer’s GP to the consumers’ preferred pharmacy or to the GP’s preferred accredited pharmacist. The pharmacist generally visits the consumer and caregiver(s) at their home, for an extended interview regarding medication management issues. Following the visit, the pharmacist sends a written report documenting medication review findings and recommendations to the GP, who then formulates a revised medication management plan with the consumer.

Previous research conducted by the authors of this article has shown that eligible nonrecipients’ willingness to use HMR, is at least in-part, driven by consumers’ expectations, which are centered on the provision of medication information. Given that the past experience is a key determinant of a person’s expectations about a service, it was proposed that eligible nonrecipients’ expectations about medication management services would likely reflect their past experience of pharmacists acting in roles that are familiar to them. Multiple medicine users would have interacted with pharmacists and received medication advice during dispensing or within the hospital ward. Although consumers may be unfamiliar with some of the technical aspects of the service, their expectations of receiving information during HMR would be reasonably tangible and may therefore act to motivate participation.

A theoretical model based on Social Cognitive Theory (SCT) and the Theory of Motivated Information Management (TMIM) have recently been developed by the authors of this manuscript. After providing respondents with a brief description of HMR within a cross-sectional survey, 46% of the variation in eligible nonrecipients’ willingness to use HMR was explained by the model. There were 2 important findings from that study. First, the most important influence on willingness to use HMR was positive outcome expectancy (POE) ($\beta = 0.56$, $P < .001$). The POE was defined as the extent to which consumers...
expect that HMR would provide them with increased medicines knowledge, improve their medicines management capability, and reduce their medicine concerns. Second, the consumers were overall not convinced that HMR would provide these benefits. This second finding is consistent with the findings of a study conducted with the U.S.’ MTM program, which suggested that consumers who are naive to pharmacist-provided medicines management services have low-to-moderate expectations of receiving personal benefit.14 Aiming to improve consumer participation, the previous study recommended that consumer-directed descriptions of medication management services should highlight that HMR is an information source.16

This study builds on previous research by investigating the influence of antecedent variables, which may have influenced willingness either directly or indirectly—by influencing expectations about the outcomes and communication processes involved. In keeping with the proposition that willingness to use HMR is driven by information seeking, this article considers the influence of 2 types of psychosocial factors, which are thought to motivate information seeking in the field of health. First, the theory suggests that a person’s emotional engagement with the topic motivates information seeking.19,20 In this case, worry about health problems that could arise as a result of taking medicines is likely to be important. Second, the theory suggests that a person’s search for information may be influenced by people who are important to that person.21–23 Here, because HMR involves collaboration among the consumer, their GP, and a pharmacist, it is likely that the consumers’ GP would have a significant social influence over their willingness to use HMR.

A better understanding of the influence of consumers’ worry (about health problems that could arise as a result of taking medicines) and perceived social pressure (of the GP) to participate would provide insights to improving the development and implementation of these medication management services. Therefore, the aim of the research was to develop an extended model of consumer willingness to use HMR and to test the model in a group of respondents who were recruited anonymously.

Methods

Model development

Theoretical foundation

Based on previous research,9,16 constructs were adapted to the context of this investigation (Fig. 1). The context explored the willingness to use HMR of an individual who has not previously received HMR but who was presented with information about the service. According to SCT, whether a person is motivated to undertake a particular activity may be influenced by their expectations about the outcome of participating in the activity and expectations about their capacity to undertake the activity.18 Constructs from the TMIM of Afifi and Weiners19 were adapted to the present investigation because it further develops SCT to help explain a person’s motivation to seek information from an interpersonal source. In addition, the model adapts constructs from the Theory of Planned Behavior (TPB)23 to account for the perceived social pressure to use

Fig. 1. Willingness to use Home Medicines Reviews. The + or – symbol refers to the hypothesized direction of influence.
HMR. The model creates links between eligible nonrecipients’ worry (about health problems that could arise as a result of taking medicines), the perceived social pressure to participate, expectations about the outcomes and processes involved in HMR, and willingness to use the service.

Willingness to use HMR

Most of the research conducted with SCT uses behavioral intention as the antecedent variable to actual behavior. In general terms, therefore, the present model includes variables related to intention. However, Gibbons et al. argue that willingness to perform a behavior, that is, intention conditioned on certain premises, may explain more variation in actual behavior than intention alone. Willingness may capture irrational and reactive influences. Consistent with the previous study, willingness to use HMR was defined as to whether the respondent was (1) willing to use HMR if their GP suggested it to them and (2) willing to ask their GP for an HMR if they were concerned about their medicines.

Positive outcome expectancy

This category of beliefs deals with an individual’s focus on behavioral-outcome expectancy. These may be further divided into positive and negative expectancy. Consistent with the previous study, POE was defined as expectations that the HMR would provide medication information, which would assist medicines management, and that a person would feel reassured by receiving this information. It is hypothesized that POE would have a direct and positive effect on willingness to use HMR (hypothesis 1). Although it is possible that negative outcome expectancy—related to the consumers’ potential discomfort of being visited at home—may have a negative effect on their willingness to participate, this category of beliefs were not influential in the previous study, and were therefore not investigated in the present model.

Communication efficacy

The second broad category of beliefs is assessments about an individual’s ability to perform the information-seeking action, self-efficacy. In the present context, self-efficacy evaluations follow those of TMIM’s construct known as communication efficacy (CE). Therefore, CE was defined as a person’s perception of their ability to overcome potential barriers in the communication process, such as making time for; organizing; and if required, asking their own doctor for an HMR. It is hypothesized that CE would have a direct and positive effect on willingness (hypothesis 2).

In SCT, self-efficacy is thought to influence a person’s intention to act both directly and indirectly by increasing outcome expectancy. Maddux et al. and Afifi and Weiner, however, contend that the direction of influence between self-efficacy and outcome expectancy is reversed. That is, that outcome expectancy influences self-efficacy. Both theories offer compelling arguments to support their respective position; however, there remains an element of uncertainty in the true direction of the causal relationship between these constructs and the manner in which the controversy could be resolved. In a cross-sectional study such as this, it is not possible to determine the direction of influence, and the authors share the view of Maddux et al. Afifi and Weiners view that POE influences CE positively (hypothesis 3).

Medication-problem worry

There is increasing interest in the role of emotional states in health behaviors, and in particular with regard to information seeking. Health information seeking is often framed as a coping strategy, which attempts to reduce the cognitive stress and negative affect surrounding uncertainty or perceptions of being at risk. For example, in both the Risk Information Seeking and Processing (RISP) model and the Planned Risk Information Seeking Model (PRISM), negative affect (which arises with risk perception [RP]) motivates information seeking. In the TMIM model, a person’s motivation to engage in information seeking arises when they are no longer comfortable with their level of uncertainty. In that case, the person experiences negative affect (anxiety), which motivates them to consider the outcome expectancy of information seeking. However, rather than investigating the relationship between outcome expectancy and discomfort with uncertainty, the present model explores the relationship between outcome expectancy and the negative affect (worry), which arises with RP. In qualitative research, worry about the safety of medicines appeared to be a key factor in motivating participants to consider the benefits of using HMR. The present model proposes generally that when a person experiences worry about the possibility of experiencing a health problem, they are motivated to consider the positive behavioral outcomes of seeking information about that
health problem. To apply this general effect to the context of this study, 2 constructs were defined. First, \( RP \) was defined as a person’s perception of the likelihood of them experiencing problems as a result of taking their medicines. Second, \textit{medication-problem worry} (MPW) was defined as the specific (and mild) anxiety state, which arises in tandem with this RP. It is proposed that when a person experiences MPW, they are likely to consider that an interpersonal information source such as HMR would be more salient, relevant, and reassuring than if they experienced no such worry. Therefore, it is hypothesized that MPW increases POE (hypothesis 4).

In consideration of the possible relationship between MPW and CE, it should be noted that there is a close relationship between anxiety and low self-efficacy. It is possible that experiencing a high level of MPW may therefore have a detrimental effect on the self-confidence required to perform tasks associated with information seeking. It is hypothesized that medication problem-related anxiety may decrease CE (hypothesis 5).

\textbf{Medication risk factors}

The \textit{RISP} \textsuperscript{21} and the \textit{PRISM} models \textsuperscript{22} place various demographic and situational factors as antecedents to \( RP \) and worry. This article focuses on the potential impact of 3 different \textit{situations} facing a multiple medicine user, which could induce \( RP \) and MPW: (1) while a person adjusts to changes to the medication regimen. During this time the person undergoes a period of “self-monitoring” to detect any physiological response to the change. Prescribers, pharmacists, and nurses often encourage such self-monitoring to avoid preventable adverse effects; (2) while a person adjusts to changes in their overall health after hospitalization. It should also be noted that medication regimens are changed quite frequently during hospitalization and extensive changes increase the risk of further changes in the regimen after discharge \textsuperscript{34}; and (3) when a person is required to implement the instructions of multiple regular prescribers, which could at times be conflicting. \textsuperscript{35} Each of the situations mentioned above: (1) having a change in the regimen within the past 3 months, (2) having been hospitalized within the past month, and (3) having multiple regular prescribers place an individual at increased risk of experiencing medication-related problems.\textsuperscript{5,36} These risk factors may also be used to identify consumers who may benefit from HMR, \textsuperscript{15} and it is hypothesized that these risk factors would increase MPW (hypothesis 6).

\textbf{Subjective norms of the GP}

The final construct in this model concerns the effect of social pressure to use the HMR service. Within SCT, social persuasion is a recognized antecedent to both outcome expectancy and self-efficacy. \textsuperscript{18} Subjective norms, derived from TPB, \textsuperscript{23} is a related construct. Within the context of information seeking, subjective norms operate such that if the subject thinks that someone close to themselves, such as a family member, friend, or carer, would approve of the utilization of the information resource; and if the subject has motivation to comply with the wishes of the close person, then the subject is more likely to seek information.\textsuperscript{21} Subjective norms have been integrated into the \textit{RISP}\textsuperscript{21} and the \textit{PRISM} models,\textsuperscript{22} and they have been shown to be one of the strongest predictors of health information-seeking intent.\textsuperscript{22} In qualitative studies, it was found that some participants who thought HMR would be beneficial were not willing to use a pharmacist-provided service because they could not be sure that their GP approved of the service.\textsuperscript{9} Given the strong relationship between a consumer and their GP, subjective norms of the GP (SNGPs) could have a potentially powerful and direct influence over medication behaviors. For example, SNGPs has increased the likelihood of patient persistence with antidepressant medicines.\textsuperscript{37} In the context of the present study, therefore, SNGP was defined as the perceived social pressure (of the consumer’s GP) to use HMR. Therefore, it is hypothesized that SNGP would have a direct and positive effect on willingness (hypothesis 7). It is also possible that SNGP could influence willingness indirectly. The SNGP could influence a person’s expectations about the outcomes of having an HMR. The implication here is that if a person believes that the GP thinks that HMR is beneficial, and the person felt social pressure to participate, then the person may also believe that it would be personally beneficial. Therefore, it is hypothesized that SNGP would have a positive effect on POE (hypothesis 8). In addition, SNGP could influence a persons’ expectations about their own capability to arrange an HMR and to ask the GP to have an HMR. Therefore, it is hypothesized that SNGP would influence CE (hypothesis 9).

\textbf{Model testing}

The study used a cross-sectional survey design to test the theoretical model.
Sample

The study sample was drawn from membership of Council on the Ageing (COTA, New South Wales, Australia). The COTA is a community group that provides community information and education, and social policy leadership for elderly persons in New South Wales and Australia. The COTA NSW was chosen because many members are elderly persons who were therefore likely to be using multiple medicines. In addition, COTA participates in community programs to improve the quality use of medicines. Respondents were eligible for inclusion in this study if they had not previously received an HMR but were eligible to receive it because they were taking either 5 or more medicines daily or 12 or more doses daily.

Survey

Items included in the survey were derived from the results of previous qualitative and quantitative studies. The survey was assessed for face validity by a panel of 7 expert community pharmacists, consultant pharmacists, and academic pharmacists. The survey was pretested with 15 respondents, which resulted in a refinement of question wording and reduction in the number of variables measured. A short explanation of HMR was provided within the survey, which was adapted from an Australian Government consumer brochure (Appendix 1).

Belief measures

Belief measures used in the study are reported in Table 1. The following belief measures were used in the previous study.

Positive outcome expectancy. The POE was measured with 6 items to which respondents provided their level of agreement on a 5-point Likert scale. This scale previously had good construct reliability (CR = 0.94).

Communication efficacy. The CE was measured with 4 items to which respondents provided their level of agreement on a 5-point Likert scale. Note that these items were reverse coded before further analysis. This scale previously had acceptable CR of 0.75.

Willingness. Willingness to use HMR (W), hereafter called willingness, was measured with 2 items to which respondents provided their level of agreement on 5-point Likert scales. This scale previously had acceptable CR of 0.71.

The following measures were developed for the present study.

Risk perception. The RP was measured with a single 5-point semantic differential scale with available responses ranging from 1 = “very unlikely” to 5 = “very likely.”

Medication-problem worry. In this article, medication-problem worry (MPW) was identified as the frequency with which a person worries about the health problems resulting from taking medicines. It was measured with a single 5-point semantic differential scale with available responses ranging from 1 = “never” to 5 = “always.”

Subjective norms of the GP. The SNGP was adapted from studies conducted with the TPB. Subjective norms have 2 dimensions therefore, 2 question items were included following the results of the qualitative study. Respondents were asked to provide their level of agreement on a 5-point Likert scale to 1 question for each of the 2 dimensions: (1) Subjective normative beliefs—beliefs that their GP would approve of HMR. This was operationalized by asking whether respondents thought that their GP would be happy to be asked for an HMR (if they themselves considered that an HMR was needed); and (2) Motivation to comply—the degree to which their GPs thoughts about HMR mattered to the respondent. As is recommended, the measure for subjective normative beliefs was coded to range between −2 and +2, whereas motivation to comply was coded to range between 1 and 5. The responses were then multiplied to create a single measure of SNGP, a continuous variable that could theoretically vary between −10 and +10.

Sociodemographic data

The demographic information collected in the surveys included gender, age group, education, and postcode. The postcode was used in combination with Australian census data to provide an index of socioeconomic advantage and disadvantage. The index is a continuum of advantage (high values) to disadvantage (low values), which takes into account factors relating to a person’s access to materials and social resources. Medication risk factors were recorded as either present, absent, or unknown.

Data collection

Respondents were recruited through a single mail sent to 1600 members of COTA NSW. No
incentives were offered to respondents or COTA NSW. Approval for the project was given by the University of Sydney Human Ethics Committee. The survey was conducted between November 2008 and March 2009.

Analysis

The PASW version 18.0.03 (SPSS Inc., Chicago, IL; www.spss.com) was used for descriptive statistical analyses, Spearman’s correlation, and linear regression. Confirmatory factor analysis (CFA) and structural equation modeling (SEM) were performed with EQS 6.1 build 97 (Multivariate Software, Inc. Encino, CA; www.mvsoft.com). Hypothesis testing was performed by SEM and by linear regression. Evidence of data non-normality, particularly in the dependent variable, required that structural equation parameter estimates were made using maximum likelihood estimation with robust errors (which is used within the EQS program).

Convergent validity of the constructs was assessed by inspection of the results from CFA. The CFA was performed in the presence of the single-item scales of MPW and SNGP. Standardized factor loadings should exceed 0.50 with statistical significance to demonstrate high convergence on a common point.41 In addition, the average

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Descriptive statistics of belief measures</th>
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<tbody>
<tr>
<td>Construct/item code</td>
<td>Item</td>
</tr>
<tr>
<td>Positive outcome expectancy\textsuperscript{a}</td>
<td>POE1</td>
</tr>
<tr>
<td></td>
<td>POE2</td>
</tr>
<tr>
<td></td>
<td>POE3</td>
</tr>
<tr>
<td></td>
<td>POE4</td>
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<tr>
<td></td>
<td>POE5</td>
</tr>
<tr>
<td></td>
<td>POE6</td>
</tr>
<tr>
<td>Communication efficacy\textsuperscript{a} (reverse score provided)</td>
<td>CE1</td>
</tr>
<tr>
<td></td>
<td>CE2</td>
</tr>
<tr>
<td></td>
<td>CE3</td>
</tr>
<tr>
<td></td>
<td>CE4</td>
</tr>
<tr>
<td>Subjective norms</td>
<td>Normative beliefs: SNGP\textsuperscript{b}</td>
</tr>
<tr>
<td></td>
<td>Motivation to comply: SNGP\textsuperscript{a}</td>
</tr>
<tr>
<td>Risk perception\textsuperscript{c}</td>
<td>RP</td>
</tr>
<tr>
<td>Medication-problem worry\textsuperscript{d}</td>
<td>MPW</td>
</tr>
<tr>
<td>Willingness to use HMR\textsuperscript{a}</td>
<td>W1</td>
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<tr>
<td></td>
<td>W2</td>
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</table>

IQR, interquartile range; SD, standard deviation.
\textsuperscript{a} Responses varied from 1 (strongly disagree) to 5 (strongly agree).
\textsuperscript{b} Responses varied from –2 (strongly disagree) to +2 (strongly agree).
\textsuperscript{c} Responses varied from 1 (very unlikely) to 5 (very likely).
\textsuperscript{d} Responses varied between 1 (never) to 5 (always).
The reliability of the constructs was computed using the formula suggested by Fornell and Larcker. The CR values equal to or greater than 0.7 indicate that the construct of the model is reliable, although coefficients of between 0.5 and 0.8 may be considered acceptable during preliminary investigations. Discriminant validity was assessed through the use of variance-extracted test. The variance-extracted estimates for 2 factors were compared with the square of the correlation between the factors. Discriminant validity is demonstrated if both variance-extracted estimates are greater than the squared correlation. Measurement errors were fixed to \((1 - \text{reliability}) \times \text{variance}\).

Using the method of Westland, the minimum sample size for an appropriate indicator to latent ratio, with 3 latent constructs and 11 indicators, was calculated to be 122. Therefore, the study had sufficient power to perform CFA. Measurement errors were fixed to \((1 - \text{reliability}) \times \text{variance}\).

Using the method of Westland, a sample size of more than 271 was required to detect a minimum effect size of 0.20 with a power of 0.8 and \(P < .05\). Using the same method post hoc, it was estimated that the minimum effect size that could reliably be determined with the sample of 342 (the number of respondents with a complete data set) and the same power and significance settings was 0.18.

A stepwise linear regression analysis was used to test the influence of each of the 3 medication risk factors on MPW. Before performing the regression, the skewness and kurtosis of the variable was calculated. Independent variables were gender (reference category, male), age (reference category, age < 65 years), education level (reference category, year 10 or below), index of socioeconomic advantage and disadvantage, and the 3 risk factors for medication-related problems. The reference category for the risk factors was “no” or “not sure.”

**Results**

Surveys were received from 610 (38.1%) respondents and after excluding those that did not meet the inclusion criteria, 390 remained providing an effective response rate of 24.3%. Descriptive statistics of the sample are provided in Table 2.

**Belief measures**

Means and standard deviations for the belief measures from each group are presented in Table 1.
Medication-problem worry

The median response to the frequency of MPW was “rarely” = 2.

Subjective norms of general practitioner

The median response to the measure of subjective normative beliefs was +1 (range: −2, 2), indicating overall agreement that respondents believed that the GP would be happy to discuss HMR. The median response to the measure of motivation to comply was 4 (range: 1-5), indicating overall agreement that the GPs opinion of HMR was important to the respondent. The measure of SNGP, after multiplying the responses of subjective normative beliefs with that of motivation to comply, ranged between −8 and +10. The median response was +3 indicating that the GP had positive social pressure over the respondent to use HMR.

Willingness

The median score for each of these items was 4, indicating that overall, respondents were willing to have an HMR if suggested by the GP and willing to ask the GP if they had concerns about their medicines.

Confirmatory factor analysis

Missing data analysis revealed that the overall level of missing data was small (<5% for all variables) and only 45 cases were excluded. Examination of the correlation matrix revealed that no relationships were above 0.90; therefore, multicollinearity was not considered problematic. The parameter estimates and the goodness-of-fit indices indicated that overall, the measurement model was a reasonable fit for the data. Apart from the significant Satorra-Bentler \( \chi^2 = 191, df = 69, P < .001 \), model fit indices were reasonable. Model fit statistics: comparative fit index (CFI) = 0.94, Tucker-Lewis Index (TLI) = 0.91, root mean square error of approximation (RMSEA) = 0.072 (90% confidence interval = 0.060-0.084). Standardized and unstandardized factor loadings, construct reliabilities, and average variances extracted are presented in Table 3. The variances of the indicator variables loading onto each latent construct were significant. For each of the constructs, all of the factor loadings were greater than or equal to 0.50, with the exception of 1 item on the CE scale (CE4) for which the loading was 0.48. Construct reliabilities were above the target of 0.7 for the POE (0.95) scale and the CE (0.71) scale, but just below target for the Willingness scale (0.65). Average variance extracted was above the target of 50% for the POE scale (75%), approached 50% for the willingness scale (49%), but was below target for the CE scale (36%). Discriminant validity between each of the constructs was demonstrated, as for each pair of constructs both average variances extracted estimates were greater than the squared correlation.

Structural equation model

The SEM fit statistics indicated that the measurement model was a reasonable fit for the data. Apart from the significant Satorra-Bentler \( \chi^2 = 189, df = 70, P < .001 \), model fit indices were reasonable. Model fit statistics: CFI = 0.94, TLI = 0.92, RMSEA = 0.068 (90% confidence

<table>
<thead>
<tr>
<th>Table 3</th>
<th>Confirmatory factor analysis (n = 390)</th>
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<tbody>
<tr>
<td>Item</td>
<td>Standardized regression weights</td>
</tr>
<tr>
<td>Positive outcome expectancy</td>
<td></td>
</tr>
<tr>
<td>POE1</td>
<td>0.83</td>
</tr>
<tr>
<td>POE2</td>
<td>0.85</td>
</tr>
<tr>
<td>POE3</td>
<td>0.76</td>
</tr>
<tr>
<td>POE4</td>
<td>0.91</td>
</tr>
<tr>
<td>POE5</td>
<td>0.93</td>
</tr>
<tr>
<td>POE6</td>
<td>0.89</td>
</tr>
<tr>
<td>Communication efficacy</td>
<td></td>
</tr>
<tr>
<td>CE1</td>
<td>0.70</td>
</tr>
<tr>
<td>CE2</td>
<td>0.61</td>
</tr>
<tr>
<td>CE3</td>
<td>0.65</td>
</tr>
<tr>
<td>CE4</td>
<td>0.48</td>
</tr>
<tr>
<td>Willingness to use HMR</td>
<td></td>
</tr>
<tr>
<td>W1</td>
<td>0.75</td>
</tr>
<tr>
<td>W2</td>
<td>0.64</td>
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interval = 0.059-0.083). The model predicted 55% of the variation in willingness (W), 12% of the variation in POE, and 24% of the variation in CE.

Fig. 2 provides the results of hypothesis testing. The SEM analysis revealed that POE had a strong direct effect on willingness ($\beta = 0.66, P < .05$). The CE had a moderate direct effect on willingness ($\beta = 0.19, P < .05$). The MPW had a moderate direct effect on POE ($\beta = 0.35, P < .05$), no significant effect on CE, but had an indirect effect on willingness ($\beta = 0.22, P < .05$). The SNGPs had a moderate direct effect on CE ($\beta = 0.48, P < .05$) and no effect on POE. Subjective norms had a direct effect ($\beta = 0.27, P < .05$) but no significant indirect effect on willingness.

**Spearman correlation**

The RP measured as the perceived likelihood of experiencing medication-related problems was highly correlated with the measure of MPW ($\alpha = 0.55, P < .001$).

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![Fig. 2. Structural equation model showing correlation and regression coefficients (*P < .05; ns, indicates no significant relationship).](image-url)
Multiple regression

The measure of MPW score had a skewness of 0.69 and kurtosis of 0.06 and was therefore determined to be an appropriate dependent variable for linear regression. The stepwise regression resulted in a model with the following statistics: adjusted $R^2 = 0.061$, $F = 8.38$, $P < .001$. There were 2 significant categories of predictor variables with significant effects; having a recent change in the medicine regimen increased worry ($\beta = 0.19, P < .001$) and increasing age decreased worry. Compared with the reference category (age below 65 years), those persons aged 75-84 years ($\beta = -0.17, P = .002$), and those 85 years and older ($\beta = 0.11, P = .032$) were significantly less likely to worry.

Discussion

This study demonstrated that 55% of the variation in respondents’ willingness to use HMR may be explained by the hypothesized model. The SEM analysis revealed that willingness was higher among those respondents who had greater: (1) POE—respondents’ expectations that HMR would provide them with increased medicines knowledge, improve their medicines management capability, and reduce their medicine concerns; (2) CE—beliefs about their capability to ask for and arrange an HMR; and (3) SNGPs—the perceived social pressure of the GP to use HMR. Of these factors, the strongest was POE. These findings support the previous-held notion that multiple medicine users view HMR as an information resource and that their willingness to use it is driven by expectations about the services’ capacity to provide medication information.\(^{16}\)

Similar to the previous findings, consumers’ POE was low to neutral.\(^{16}\) There appears to be scope for the profession to increase demand for these services, through lifting expectations of medication management services as information resources. Although the present study findings are consistent with the previous study, the conclusions to be drawn are now more generalizable, bearing in mind the use of 2 different recruitment strategies—recruitment by community pharmacists\(^{16}\) and by anonymous postal survey. In the previous case, community pharmacists recruited respondents and it was possible that pharmacists may have selectively recruited consumers with known favorable attitudes toward HMR or pharmacists’ services generally. In summary, it is now clear that to motivate consumers who have not experienced medication management services to participate, it is important that they realize that their participation results in receiving medication information, which assists them to manage their medicines. When discussing medication management services with consumers, health professionals should use verbal encouragement and written resources to reinforce this issue. It is acknowledged that medication management services provide consumers with a variety of health benefits, including, for example, but not limited to solving medication-related problems, rationalization of medication regimen, monitoring for medication effectiveness/adverse effects, and improved collaboration between health providers. However, describing these intangible benefits to consumers who have not yet experienced medication management is challenging.\(^{45}\)

As predicted by theories of information seeking, respondents were more convinced that they would receive medication information during an HMR and were more willing to use the service, if they were worried about health problems resulting from taking their medicines. This finding supports the conclusions of a Swedish study, which found that consumers who participated rather than avoided a pharmacist-provided medication management intervention were a “worried, vulnerable, and information-seeking group.”\(^{46}\) This is the first article to demonstrate the motivating effect of MPW on medication information seeking. As expected, this specific form of worry was correlated with the respondents’ RPs. That is, the more a respondent thought that it was likely that they may experience medication-related problems, the more often they worried about the health consequences of taking their medicines. In accordance with a study of willingness to prevent medical errors,\(^{32}\) the correlation between MPW and worry was high, and worry was a good predictor of willingness to act.

This article also showed that the respondents’ worry about the risk of experiencing medication-related harm responded to actually being at risk. In this case, those respondents whose medication regimen had changed within the previous 3 months worried more frequently about experiencing health problems from their medicines, than those who had no change. Qualitative studies report that consumers’ worries about taking new medicines are centered in knowledge gaps about the purpose or benefit of the medicine, what to expect in terms of effectiveness, side effects, doses and
administration times, and length of treatment required.\textsuperscript{47,48} When taking new medicines, consumers may be uncertain about attributing symptoms to adverse effects because adverse effects may overlap with disease symptoms.\textsuperscript{49} Patient counseling services provided by medical practitioners and pharmacists encourage patients to self-monitor and it is therefore not surprising that worry about experiencing harm is present after medication changes. In accordance with program guidelines, HMR could be provided to consumers after a significant change in their regimen. This article adds that consumers are more worried about experiencing harm after such changes. Given the link between worry and POE, it is likely that consumers will also be more receptive to suggestion and promotion of medication management services after medication changes. Consumer-directed information about HMR could be provided to multiple medicine users after changes to medication regimen in the same manner that written medicines information (WMI) is provided. It should be noted that the authors do not advocate building positive expectations of medication management services by intentionally increasing MPW. It would probably be easy to increase consumers’ worry about medicines within service information leaflets. This possibly could be achieved by describing in detail the manner in which medicines may cause problems. The WMI leaflets already cause some concern among some consumers.\textsuperscript{50} However, excessively increasing medication-related anxiety could also stimulate nonadherence, as demonstrated by the work of Horne et al.\textsuperscript{51–53} Rather, this new knowledge of the relationship between worry and willingness to use medication management services could be used to appeal to consumers who are worried about their medicines and who may also be nonadherent.

It is noteworthy that it was the oldest of respondents who were the least worried about medication problems. This is consistent with qualitative study, which suggested that older participants were the least engaged in topics relevant to medication risk and were the least willing to have HMR.\textsuperscript{9} It is possible that older persons’ declining experience of MPW may prevent them from focusing on the positive outcomes of participating in medication management services. Such changes may be explained by socioemotional selectivity theory.\textsuperscript{54} It is believed that “age-related constraints on time horizons” are associated with motivational changes. These changes cause older persons to increasingly focus on positive over negative emotions.\textsuperscript{54} In addition, older persons may attribute symptoms, which may be medication adverse effects, to the consequences of aging.\textsuperscript{55} Older persons may require more encouragement to use medication management services than younger persons.

Social influence of the consumer’s GP

It is clear that in Australia, consumers’ willingness to use medication management services depends on their perceptions of what the GP thinks of the service. The SEM analysis revealed that the main effect of the social influence of the GP, measured as subjective norms, was to act directly on willingness to use. The social influence of the GP did not extend to increasing POE. In other words, this social influence was effective, although it had no bearing over whether respondents thought that the HMR was personally beneficial. This result reinforces the powerful effect that a person’s GP has over health-related decisions.

Limitations

Although HMR shares many attributes with other international medication review services provided in the United States,\textsuperscript{14} Canada,\textsuperscript{56} New Zealand,\textsuperscript{57} or the United Kingdom,\textsuperscript{11} it cannot be assumed that the findings of the present study would necessarily apply to these services.

The generalizability of the study may be limited by the relatively low response rate. Before applying the inclusion criteria, only 38.1\% of the COTA members responded. Response rate could have possibly been improved by a repeat mailing; however, limited funding prevented this strategy.

Consistent with predictions made by the model and with previous findings,\textsuperscript{16} the present study demonstrated that CE was associated with increased willingness to use HMR. However, although the measurement scale for CE had good CR, there was 1 factor loading below the target and the average variance extracted was below the target. It is recommended that future research should attempt to improve the measurement of CE in the present context.

The present study defined MPW as the frequency with which a person worries. McCaul and Goetz\textsuperscript{28} have identified 2 dimensions of worry in relation to health behavior—the intensity and the frequency. They suggest that there is no consensus about which is the most influential in modifying behavior. Future research could develop a scale to
probe the intensity of worry experienced. Furthermore, the present research used only single variables to model RP and MPW constructs. Future research could use multiple indicators to tap these latent constructs.

Conclusion

This study makes a significant contribution to the theoretical understanding of health information-seeking behavior. This was the first research to show that the specific worry a person experiences when they consider themselves to be at risk of a health problem is associated with increasing their POE of seeking information about the problem from an interpersonal source. In turn, POE was associated with increased willingness to use the interpersonal source. Specifically, eligible nonrecipient consumers’ worry about medication problems was associated with greater expectations that HMR would provide them with increased medicines knowledge, help them manage their medicines, and reduce their medicine concerns. Consistent with studies around the world, it was shown that consumers who have not experienced medication management services have low expectations of receiving these benefits. This study reinforces the need to explain to prospective consumers that they should expect to receive these benefits. It is likely that eligible nonrecipients would expect more of HMR and be more willing to use it if it were offered after a change in the medication regimen. Furthermore, this study demonstrates that social pressure has a demonstrable effect on willingness to use collaborative medication management services. Many consumers will need to feel that they have the social approval of their GP to participate.

Acknowledgments

The authors would like to thank all respondents for their contribution to this study. They are grateful to Anne-Marie Elias of COTA (NSW), Christiane Klinner who coordinated the project, and to Simone Goppert who assisted with the preparation of the manuscript.

Funding support: This project was funded by the Australian Government Department of Health and Aging, as part of the Fourth Community Pharmacy Agreement Research & Development Program managed by the Pharmacy Guild of Australia.

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### Appendix 1

**Description of HMR provided to eligible nonrecipients, adapted from an Australian Government consumer brochure**

A Home Medicines Review, a free service funded by Medicare, provided jointly by your GP and pharmacist, is particularly useful for people who take multiple medicines each day, or who have recently spent time in hospital or who are concerned or uncertain about their medicines. After being referred by a GP, the pharmacist usually visits the patient in their own home at a mutually agreed time. The pharmacist will look at all medicines that the patient has, discuss any difficulties or concerns the patient may have with using their medicines, and write a report to the GP. The GP will then discuss the results of the HMR with the patient. The HMRs help patients and carers to understand better how to use their medicines.

Author's Contributions

Stephen Carter conducted the study, performed the analysis and wrote the manuscript. Lesley White supervised and conducted the study and critically revised the manuscript. Rebekah Moles and Tim Chen critically revised the manuscript.

Stephen Carter

Rebekah Moles

Lesley White

Tim Chen
CHAPTER SIX

THE WILLINGNESS OF INFORMAL CAREGIVERS TO ASSIST THEIR CARE-RECIPIENT TO USE HOME MEDICINES REVIEW

Elements of the conceptual model explored in this chapter

Carter SR, Moles R, White L, Chen TF.

Health Expectations. 2012;

in press doi: 10.1111/hex.12092
The willingness of informal caregivers to assist their care-recipient to use Home Medicines Review

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Abstract

Objectives Informal caregivers experience daily hassles – a form of persistent stress, as a consequence of caregiving. This study aimed to develop and test a new theoretical model of health information-seeking behaviour, the Knowledge Hassles Information Seeking Model (KHISM). KHISM hypothesized that the knowledge hassles of caregivers – daily stressors experienced while dealing with tasks which require knowledge about the safety and effectiveness of the care-recipient’s medicines – would influence caregivers’ willingness to assist their care-recipient to use an Australian medication management service, Home Medicines Review (HMR).

Methods A cross-sectional postal survey was conducted among 2350 members of Carers (NSW, Australia). Respondents were included in the study if they were involved in medication-related tasks for their care-recipient and were not paid as caregivers. Also, their care-recipient needed to be taking more than five medicines daily or more than 12 doses daily and had not yet experienced HMR. Structural equation modelling was used to test the model.

Results A total of 324 useable surveys were returned yielding a response rate of 14%. Respondents were quite willing to assist their care-recipient to use HMR (willingness). The model predicted 51% of the variation in willingness. Knowledge hassles increased positive outcome expectancy (β = 0.40, P < 0.05) and indirectly increased willingness.

Conclusions The more caregivers experience hassles with medication knowledge, the more they perceive HMR to be a helpful information source and the more willing they are to use it. Targeted marketing centred on HMR as an information source may increase caregivers’ demand for HMR. Further exploration of the phenomenon of knowledge hassles is warranted.
Background

In many developed nations, throughout Europe, North America and in Australia, the population is ageing and the burden of chronic disease and comorbidity is growing. The burden of disease and associated stress is often shared with informal caregivers. For the purpose of this study, informal caregivers (caregivers) are those persons who care for a person who uses multiple medicines and is not paid to do so. They are very likely to be family members. One of the key reasons for reduced caregivers’ quality of life and poor coping strategies is a lack of knowledge about the duties expected of them. One duty that caregivers lack knowledge about pertains to the specific knowledge required to manage the care-recipient’s medicines. Medication regimens have become increasingly complex, as multiple medicines are often used to manage common chronic diseases of ageing. The more complex a care-recipient’s medication regimen, the more stress a caregiver experiences. Better caregiver access to medication information may lower their stress and could help them avoid medication problems. Problems related to the use of medicines are a significant cause of morbidity within Australia. It is estimated that they result in 2–3% of all hospital admissions, 50% of which may be preventable.

This study deals with caregivers’ perceptions of Home Medicines Review (HMR), a medication safety intervention which aims to resolve medication-related problems and improve health outcomes for those at greatest risk of medication-related problems. HMR also aims to increase patient and caregiver knowledge of medicines. HMR is provided collaboratively by general practitioners (GPs) and pharmacists. An HMR is initiated with a request from the patient’s GP to a pharmacist, who may be their preferred community pharmacist or a consultant pharmacist who works independently. Pharmacists who perform HMR must be accredited by an approved credentialing body. The pharmacist generally visits the patient and caregiver(s) at their home, for an extended interview regarding medication management issues. Following the visit, the pharmacist sends a written report documenting medication review findings and recommendations to the GP, who then formulates a revised medication management plan with the patient. Caregivers (whose care-recipients have received the service) report that the medication information they themselves receive during the HMR service is useful and helps to relieve their emotional stress resulting from dealing with medication issues. Even though this program increases patients’ use of appropriate and evidence-based therapies, evaluation commissioned by the Australian government reported that there had been a suboptimal uptake of HMR, particularly among patients at greatest risk including those with dementia. The report suggested that caregivers have a key role in enhancing participation and suggested that both patients and their caregivers need to be better informed of the benefits. The present study deals with the factors that may influence caregivers’ willingness to participate in the processes of HMR (for their care-recipient). Willingness to participate is therefore defined as the willingness of a caregiver to undertake the tasks required to assist their care-recipient to use HMR. In this context, a care-recipient was a person who was eligible to receive HMR but had not previously received the service. Enhancing participation among caregivers could be challenging because research has demonstrated a lack of willingness to participate among patients who have not yet experienced the service. In addition, caregivers of frail, older patients tend not to use many of those services available to them, and further work is needed to understand how to encourage participation.

At present, there is currently no existing theoretical framework which links caregivers' stress with their intentions to participate in health services. Furthermore, there are no quantitative studies that have investigated caregivers’ willingness to participate in HMR. A better understanding of the factors that influence caregivers’ willingness to participate...
would provide insights to improving the development and implementation of medication management services. Specifically, descriptions of HMR intended for caregivers could better promote participation in the service. Therefore, the aim of the research was to develop and test a model of caregivers’ willingness to participate in HMR (for their care-recipient).

**Methods**

The theoretical model for this study was firstly developed then tested in a cross-sectional survey of caregivers.

**Knowledge Hassles Information Seeking Model (KHISM) development**

Based on the literature and qualitative studies, several constructs were adapted to the context of the study. The study explored caregivers’ willingness to participate in HMR, after being presented with information about the service. It is hypothesized that caregivers’ motivations to use HMR are primarily influenced by their expectations of HMR as a medication information source. In other words, their willingness to participate is dependent on medication information seeking. In this context, the Knowledge Hassles Information Seeking Model (KHISM) model creates links between caregiver stress dealing with medication information; expectations about the outcomes and processes involved in HMR; and willingness to participate (Fig. 1).

**Theoretical foundation**

According to cognitive–social theories, whether a person undertakes a particular activity is influenced by their behaviour-outcome expectancy (outcome expectancy) and their self-efficacy expectancy (self-efficacy). These expectancies are essential components of Bandura’s Social Cognitive Theory (SCT), Rogers’ and Maddux’s Protection Motivation Theory (PMT) and Afifi and Weiners’ Theory of Motivated Information Management (TMIM). Of these theories, TMIM most closely suits the present investigation because it deals with information seeking from interpersonal sources.

**Intention – Willingness to participate**

Most of the research conducted with SCT uses behavioural intention as the antecedent variable to actual behaviour. In general terms, therefore, our model includes variables related to intention. However, Gibbons et al. argue that willingness to perform a behaviour, that is intention conditioned on certain premises, may explain more variation in actual behaviour than intention alone. Willingness may capture irrational and reactive influences. Therefore, willingness to participate in HMR forms the dependent variable for this model. Based on a qualitative study and a quantitative study

![Figure 1](https://example.com/figure1.png)

**Figure 1** Knowledge Hassles information-seeking model (KHISM): informal caregivers’ willingness to participate in Home Medicines Reviews. + or – refers to the hypothesised direction of influence.
conducted with patients, willingness to participate was therefore defined as whether respondents would help arrange an HMR for their care-recipient, whether the care-recipient’s general practitioner (GP) recommend it, and whether they would ask the GP for an HMR if they had concerns about their care-recipients’ medicines.

**Outcome expectancy**
Outcome expectancy deals with an individual’s focus on the behavioural outcomes to be derived from information seeking, which in this case is participating in HMR. Outcome expectancy may be further divided into positive expectancy and negative expectancy. This evaluation broadly follows a benefit vs. cost trade-off. In identifying potential positive outcome expectancy for HMR, the literature suggests that patients expect to receive personally relevant medication information that would be reassuring and assist in self-management. Caregivers too had similar expectations in focus group research. Positive outcome expectancy (OE) was therefore defined as a caregiver’s beliefs about the effectiveness of an HMR to correct their knowledge deficiency; improve their medication management capability; and to reduce their anxieties about the safety of their care-recipients’ medication regimen. In SCT, positive outcome expectancy increases intentions to act. In patients, positive outcome expectancy (of HMR) was strongly associated with increased willingness to participate in HMR. While it is possible that negative outcome expectancy – related to the caregivers’ potential discomfort of being visited at home – may have a negative effect on their willingness to participate, this category of beliefs has not shown to be influential in patients and was not therefore investigated in the present model.

**Self-efficacy – communication efficacy**
Self-efficacy deals with an individual’s perception of their ability to perform the information-seeking action. In SCT, self-efficacy increases intention to act. In the present context, self-efficacy most closely follows communication efficacy in accordance with TMIM. Here, communication efficacy centres on a caregiver’s perception of their confidence to overcome potential barriers in the communication process such as making time for an HMR; organizing it and, if required, asking the patient’s doctor to initiate it. In a study conducted with patients, lack of confidence to perform these tasks decreased willingness to participate in HMR, and it is likely the same would hold for caregivers.

In SCT, self-efficacy is thought to influence a person’s intention to act both directly and indirectly by increasing outcome expectancy. Maddux, Afifi and Weiner, however, contend that the direction of influence between self-efficacy and outcome expectancy is reversed. That is, that outcome expectancy influences self-efficacy. Both sides of the debate offer compelling arguments to support their respective theories; however, there remains an element of uncertainty in the true direction of the causal relationship between these constructs, and the manner in which the controversy could be resolved. In a cross-sectional study such as this, it is not possible to determine the direction of influence, and the authors share Maddux, Afifi and Weiner’s view that outcome expectancy influences communication efficacy.

**Daily hassles – antecedent to outcome expectancy and communication efficacy**
In the context of health, information seeking is often framed as a coping strategy, which attempts to reduce the cognitive stress and emotional arousal arising from uncertainty. For example, TMIM, which adapts constructs from SCT and PMT, suggests that an individual’s motivation to engage in information seeking arises when an individual is no longer comfortable with their level of uncertainty. In this case, the person experiences negative affect (anxiety) which motivates that person to consider the outcomes expectancy of information seeking. However, rather than investigating the relationship between outcome

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expectancy and anxiety (arising from discomfort with uncertainty), this model explores the relationship between outcome expectancy and daily hassles. KHISM proposes that when a person experiences daily hassles, specifically related to knowledge processing, they are motivated to consider outcome expectancy of information seeking.

Daily hassles are the ‘irritating, frustrating, distressing demands that to some degree characterize everyday transactions with the environment’. Experiencing hassles can represent an on-going and insidious threat to health. For example, the frequency and severity of daily hassles is a better predictor of psychological distress and somatic disease than major life events such as death in a relative, marital changes and serious financial problems. Past research has shown that experiencing daily hassles with friends, family, environment and life’s practicalities is associated with negative affect. Furthermore, experiencing daily hassles is associated with the tendency to interpret events as threatening and with the tendency to seek out threat-relevant information (known as ‘monitoring’).

It is known that caregivers experience daily hassles as a result of performing tasks related to managing their care-recipients’ medicines. These daily hassles have also been documented among Mexican caregivers who speak the Spanish language at home. Consider the task involved in managing a care-recipient’s complex medication regimen. The caregiver needs to understand the processes involved in the procurement and administration of medicines. These processes may require caregivers to negotiate with prescribers, pharmacists, nurses and the care-recipient. They may need to understand how and when the medicines are taken, monitor for beneficial effects and adverse effects, adjust doses and/or cease medicines. Travis and colleagues have investigated the dimensionality of these daily hassles and have developed the Family Caregiver Medication Administration Hassles (FCMAHs) Scale. In one setting, the FCMAH scale had four dimensions: (i) information seeking/information sharing, (ii) safety issues, (iii) scheduling logistics, and (iv) polypharmacy. In another study, factor analysis revealed that data were best represented by six dimensions: (i) initial information seeking, (ii) safety issues, (iii) advanced information acquisition, (iv) scheduling, (v) daily routine, and (vi) prescription filling.

Knowledge hassles
This study further extends an understanding of the influence of daily hassles on information seeking by proposing that only specific types of hassles, knowledge hassles cause a person to consider the outcomes of information seeking, whereas the other types of hassles will not. Knowledge hassles were defined generally as those daily hassles experienced because of the need to repeatedly process information on a health topic which requires specialized knowledge. KHISM suggests that when a person experiences knowledge hassles, they are likely to consider an interpersonal information source on the health topic particularly relevant and reassuring. In other words as knowledge hassles rise so does positive outcome expectancy.

In this study, the authors compare the effect of other hassles with knowledge hassles. In the present context, knowledge hassles are daily stressors experienced by caregivers while dealing with tasks that require knowledge about the safety and effectiveness of the care-recipient’s medicines, whereas the other hassles are medication administration hassles that result from performing tasks which do not require specialized knowledge. Other hassles include hassles with interpersonal interactions between the caregiver and care-recipient and hassles with maintaining the logistics of supply. In seeking to separate knowledge hassles from other hassles, eight items from FCMAH scale were adapted. The authors chose not to use the whole FCMAH scale to produce a reasonably parsimonious questionnaire. This was also carried out to reduce the cognitive load on the older respondents. For the purpose of this study, four items were selected to represent knowledge hassles: recognizing adverse effects;
knowing whether the medicine is effective; knowing why the medicine is used; and knowing what questions to ask the doctor. Four items were selected to represent other hassles: scheduling medicines into the daily routine; sharing responsibility with the care-recipient; arguing with care-recipient about when to take medicines; and giving medicines on time. Experiencing other hassles would not necessarily have any influence over positive outcome expectancy because seeking information (about medicines) would not resolve these stressors.

In seeking to understand how experiencing hassles may influence communication efficacy, it is clear that there is a close association between experiencing hassles and anxiety. There is also a close relationship between anxiety and low self-efficacy. It is possible that experiencing hassles may therefore have a detrimental effect on the self-confidence required to perform the communication tasks associated with information seeking. Whereas only knowledge hassles should influence positive outcome expectancy, experiencing any hassles may decrease communication efficacy.

**Situational factors that may influence knowledge hassles**

While daily hassles are persistent daily stressors, it is expected that the level of hassles would fluctuate according to certain situations. Knowledge hassles would fluctuate according to a person’s current perception of the specialized knowledge demanded of them at the time. Knowledge hassles would be more stressful during extended episodes of uncertainty. There are three situations in the present context, which would be associated with extended periods of uncertainty and potentially heightened knowledge hassles; (i) while a caregiver adjusts to the demands of changes to the care-recipient’s medication regimen. This could occur quite frequently for care-recipient who use multiple medicines for chronic diseases, (ii) while a caregiver adjusts to changes in the care-recipient’s overall health after hospitalization. It should also be noted that medication regimens are changed quite frequently during hospitalization and extensive changes increase the risk of further changes in the regimen after discharge, and (iii) a caregiver would perceive extra demand on knowledge if they were required to implement the instructions of multiple regular prescribers, which could at times be conflicting. Each of the situations mentioned above: (i) having a change in the regimen within the past 3 months, (ii) having been hospitalized within the past month, and (iii) having multiple regular prescribers, place an individual at increased risk of experiencing medication-related problems. These risk factors may also be used to identify patients who may benefit from HMR.

The KHISM model tests the following hypotheses.

- **Knowledge hassles (but not other hassles) would increase positive outcome expectancy (H1).**
- **Knowledge hassles and other hassles would decrease communication efficacy (H2).**
- **Positive outcome expectancy would increase communication efficacy (H3).**
- **Communication efficacy would increase willingness to participate (H4).**
- **Positive outcome expectancy would increase willingness to participate (H5).**
- **Knowledge hassles would be heightened in the presence of three risk factors for medication-related problems: (i) having a change in the regimen within the past 3 months, (ii) having been hospitalized within the past month, and (iii) having multiple regular prescribers (H6).**

**Model testing**

**Respondents**

During February and March 2009, respondents were recruited through mail-out to 2350 members of a caregiver interest group, based in Sydney, Australia; Carers (NSW). No incentives were offered to respondents or Carers (NSW). Approval for the project was given by the University of Sydney Human Ethics Committee.
Inclusion criteria. The study included informal caregivers of adult persons who had not previously experienced HMR but were eligible because they were taking more than five medicines daily or more than 12 doses daily. Informal caregivers were defined as those who were not paid to provide care, other than receiving government allowances and who provided a certain level of care. Therefore, the study included caregivers who sometimes, often or always were involved in at least one of the following four medication-related caring duties for their care-recipient: Purchase, order or collect his/her medicines; organize how and when he/she takes the medicines; give him/her a dose; or make decisions to increase or decrease a dose, or not take a dose, or discontinue the medicine altogether.

Questionnaire

Caregiver and care-recipient characteristics. The demographic information collected in the questionnaires included the caregivers’ and care-recipients’ gender, age, education and location by postcode. Data were also collected on the relationship status between caregiver and care-recipient, the level of care provided and whether the caregiver was paid to provide care. To determine whether the care-recipient had risk factors for medication-related problems, respondents were asked whether (i) there had been a change in the care-recipients’ medicines or doses prescribed within the past 3 months, (ii) whether the care-recipient had been discharged from hospital within the previous month, and (iii) whether the care-recipient had multiple regular prescribers. These questions had a response format of yes, no and not sure.

Psychosocial measures. Daily hassles. As explained in the model development section, four items were used to measure each of the knowledge hassles (KH) and other hassles (OH) constructs. Respondents were asked to rate each task on a scale from 0 = no hassle at all to 5 = the worst of all hassles as to how much of a hassle it is to help manage the care-recipient’s medicines.

All other psychosocial measures were adapted from a questionnaire conducted with patients. Each of the Likert scales had a response format of 1 = strongly disagree to 5 = strongly agree. The questions were modified such that caregivers’ beliefs, thoughts and feelings were examined in relation to caregiving. For example: If I had a Home Medicines Review, managing my medicines would be easier was reconstructed to: If (the person I care for) had a Home Medicines Review, managing (the person I care for)’s medicines would be easier.

Outcome expectancy (OE). Respondents provided their level of agreement with six items on a 5-point Likert scale. The scale has shown to have good construct reliability (0.94) among patients.

Communication efficacy (CE). Respondents provided their level of agreement with four items on a 5–point Likert scale. Note that these items were reverse coded prior to further analysis. The scale has shown to have acceptable construct reliability (0.75) among patients.

Dependent variable. Willingness to participate (W). Respondents provided their level of agreement with two items on a 5–point Likert scale. The scale has shown to have acceptable construct reliability (0.71) among patients.

The questionnaire was examined for face validity by a panel of seven expert community pharmacists, consultant pharmacists and pharmacy academics. A short explanation of the service was provided which was adapted from an Australian Government consumer brochure (Appendix).

Analysis

PASW version 18.0.03 (SPSS Inc., Chicago, IL, USA, www.spss.com) was used for descriptive statistical analyses, multiple regression and exploratory factor analyses (EFA). Principal components analysis was used with oblimin rotation because the scales were expected to be correlated. Confirmatory factor analysis (CFA) and structural equation modelling (SEM) were
performed with EQS 6.1 build 97 (Multivariate Software Inc., Encino, CA, USA, www.mvsoft.com). Hypothesis testing was performed by multiple regression analysis and with SEM. Evidence of data non-normality in willingness to participate required that structural equation parameter estimates were made using maximum likelihood estimation with robust errors (which is used within the EQS program). All eight items contained within the two hassles scales were subject to an initial EFA to confirm that there were two dimensions. Each of the other multi-item measurement scales was also subject to initial EFA to determine dimensionality and to detect items with low communality (<0.5).\textsuperscript{50} Following this procedure, CFA was performed in the presence of willingness to participate (W).

**Confirmatory factor analysis**

Convergent validity of the constructs was assessed by inspection of the results from CFA. Standardized factor loadings should exceed 0.50 with statistical significance, to demonstrate high convergence on a common point.\textsuperscript{50} In addition, the average variance extracted should equal or exceed 50\%.\textsuperscript{50} The reliability of the constructs was computed using the formula suggested by Fornell and Larcker.\textsuperscript{51} The construct reliability values equal to or greater than 0.7 indicate that the construct of the model is reliable, although coefficients of between 0.5 and 0.8 may be considered acceptable during preliminary investigations.\textsuperscript{50} Discriminant validity was assessed through the use of variance-extracted test.\textsuperscript{51} Constructs were evaluated by comparing the variance-extracted estimates for two factors with the square of the correlation between the two factors. Discriminant validity is demonstrated if both variance-extracted estimates are greater than the squared correlation. Measurement errors were fixed to (1-reliability) \times variance.\textsuperscript{52}

**Structural equation model**

Using the method of Westlund,\textsuperscript{53} it was calculated that the minimum sample size for an appropriate indicator to latent ratio, with five latent constructs and 19 indicators, to be 112. Therefore, the study had sufficient power to perform CFA. Using the method of Westlund,\textsuperscript{53} it was estimated that a sample size of more than 344 was required to detect a minimum effect size of 0.20 with a power of 0.8 and \( P < 0.05 \). Using the same method, \textit{post hoc}, it was estimated that the minimum effect size that could reliably be determined with the sample of 297 (the number of respondents with a complete data set) and the same power and significance settings was 0.22.

**Multiple regression analysis**

A stepwise linear regression analysis was used to test the influence of each of the three situational factors on knowledge hassles. For this procedure, the dependent variable was the summed factor-based score, which was calculated by summing the responses to each of the four knowledge hassle items. The possible range for the factor score was 0–20. Prior to performing the regression, the skewness and kurtosis of the summed factor score was calculated. Independent variables were caregiver characteristics, gender, age, education level, and the three risk factors for medication-related problems. The reference category for the risk factors was ‘no’ or ‘not sure’.

**Results**

Questionnaires were received from 600 respondents and of these, 324 met the inclusion criteria. This provided a 14.4% effective response rate. Descriptive statistics of the sample are provided in Table 1.

**Psychosocial measures**

Means and standard deviations for the psychosocial measures from each group are presented in Table 2. The following provides some descriptive statistics of the belief measures and the results of EFA for each construct.

**Daily hassles**

Overall, respondents reported experiencing low levels of daily hassles related to managing their
care-recipients’ medicines. Yet, a minority of respondents (n = 60, 18.5%) recorded 0 (no hassles at all) to all eight daily hassles items. The median score for three of the four knowledge hassles (KH) items was 1, whereas the median was 0 for the item which dealt with hassles related to knowing why a medicine is being given. The median score for each of the four other hassles (OH) items was 0. Following EFA, eight items loaded onto two factors with eigenvalues above 1 which explained 65.3% of the variation. All items had communalities above 0.5, and all items loaded onto the expected factors. The factor loadings ranged between 0.63 and 0.93, and there were no cross-loadings above 0.3.

### Outcome expectancy
For most variables, the median score was 3, the neutral response. This indicates that overall, respondents were not convinced that an HMR would provide these positive outcomes. All six items loaded onto the one factor with eigenvalues above 1 which explained 76.4% of the variance. All items had communalities above 0.5. The factor loadings ranged between 0.78 and 0.92.

### Communication efficacy
Following reverse coding, the median score for each variable was four, indicating overall high levels of communication efficacy. All four items loaded onto the one factor with eigenvalues above 1 which explained 65.3% of the variance. All items had communalities above 0.5, and all items loaded onto the expected factors. The factor loadings ranged between 0.63 and 0.93, and there were no cross-loadings above 0.3.

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**Table 1 Descriptive statistics**

<table>
<thead>
<tr>
<th>Demographic characteristics</th>
<th>Caregiver Mean (SD), range</th>
<th>Care-recipient Mean (SD), range</th>
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</tr>
<tr>
<td>Spouse</td>
<td></td>
<td>207 (64.3)</td>
</tr>
<tr>
<td>Other family relationship</td>
<td></td>
<td>101 (31.4)</td>
</tr>
<tr>
<td>Unrelated</td>
<td></td>
<td>14 (4.3)</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Metropolitan</td>
<td>272 (84.0)</td>
<td>273 (84.3)</td>
</tr>
<tr>
<td>Rural or remote</td>
<td>52 (16.0)</td>
<td>51 (15.7)</td>
</tr>
<tr>
<td>Education level²</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year 10 or below</td>
<td>107 (33.8)</td>
<td>147 (45.9)</td>
</tr>
<tr>
<td>Year 12 or equivalent</td>
<td>100 (31.7)</td>
<td>113 (36.5)</td>
</tr>
<tr>
<td>University</td>
<td>108 (34.3)</td>
<td>50 (16.1)</td>
</tr>
<tr>
<td>Medication risk factors³</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change in the medication regimen within the previous 3 months</td>
<td></td>
<td>129 (41.0)</td>
</tr>
<tr>
<td>Discharged from hospital within the previous month</td>
<td></td>
<td>44 (13.8)</td>
</tr>
<tr>
<td>Multiple regular prescribers</td>
<td></td>
<td>113 (35.9)</td>
</tr>
<tr>
<td>Frequency of care provided with medicine tasks⁴</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Purchase, order or collect his/her medicines</td>
<td>315 (97.2)</td>
<td></td>
</tr>
<tr>
<td>Organize how and when he/she takes the medicines</td>
<td>273 (84.8)</td>
<td></td>
</tr>
<tr>
<td>Give him/her a dose</td>
<td>235 (73.0)</td>
<td></td>
</tr>
<tr>
<td>Make decisions to increase or decrease a dose, or not take a dose, or discontinue the medicine altogether</td>
<td>56 (17.3)</td>
<td></td>
</tr>
</tbody>
</table>

1Refer to valid responses only, so that the sum of responses may not add up to the total.

2Within Australia, the two categories of high school education level; year 10 and year 12, indicate eleven and 13 years of formal school education, respectively.

3Respondents were divided into two groups, those who answered ‘yes’, or those who answered ‘no’ or ‘don’t know’. The numbers and proportions refer to those who answered ‘yes’.

4Refers to the proportion who responded ‘sometimes’, ‘often’ or ‘always’ to the level of care provided to the care-recipient.
above 1 which explained 48.5% of the variance. Two items had communalities below 0.5, being 0.47 and 0.44 for CE3 and CE4, respectively. These items were retained to provide a multi-item scale for the study. Factor loadings ranged between 0.67 and 0.73.

Willingness to participate
The median score for each of these items was four, indicating that overall, respondents were willing to participate in HMR if suggested by the GP and willing to ask the GP if they had concerns about the care-recipient’s medicines. This two item scale was not subjected to EFA.

Confirmatory factor analysis
Missing data analysis revealed that the overall level of missing data was small (<5% for all variables), and only 27 cases were excluded. Examination of the correlation matrix revealed that no relationships were above 0.90; therefore, multicollinearity was not considered problematic.

The CFA fit statistics indicated that the measurement model was a reasonable fit for the data. Apart from the significant Satorra-Bentler scaled chi-square = 320, d.f. = 160, $P < 0.001$, model fit indices were good for the measurement model. Model fit statistics: $CFI = 0.94$, $TLI = 0.93$, $RMSEA = 0.058$ (90% confidence interval = 0.049, 0.067). Standardized and unstandardized factor loadings, construct reliabilities and average variances extracted are presented in Table 3. The variances of the indicator variables loading onto each latent construct were significant. For each of the constructs, with the exception of communication efficacy, all of the factor loadings were greater than or equal to 0.48, and average variances extracted were greater than or equal to 50%. For these scales, the minimum construct reliability estimate was 0.71. There was some question, however, about the reliability of the CE scale. Two of the items had relatively low factor loadings of 0.42 for CE3 and 0.40 for CE4. In addition, construct reliability (0.62) and average variance extracted (30%)
were below the limit of acceptability by the standards preset. The performance of the scale could not be improved by deleting either item; therefore, these items were retained to provide a multi-item scale for this study. Discriminant validity between each of the constructs was demonstrated, as for each pair of constructs both average variances extracted estimates were greater than the squared correlation.

Structural equation model

The SEM fit statistics indicated that the measurement model was a reasonable fit for the data. Apart from the significant Satorra-Bentler scaled chi-square = 321, d.f. = 162, \( P < 0.001 \), model fit indices were good for the measurement model. Model fit statistics: CFI = 0.94, TLI = 0.93, RMSEA = 0.058 (90% confidence interval = 0.048, 0.067). The model predicted 54% of the variation in willingness (W), 18% of the variation in outcome expectancy (OE) and just 3% of the variation in communication efficacy. Figure 2 provides the results of hypothesis testing. Outcome expectancy (OE) (\( \beta = 0.55, \ P < 0.05 \)) and communication efficacy (\( \beta = 0.50, \ P < 0.05 \)) had strongly positive effects on willingness (W). Knowledge hassles (KH) had a moderate effect (\( \beta = 0.40, \ P < 0.05 \)) on outcome expectancy (OE) but no significant effect on communication efficacy (CE). Knowledge hassles (KH) had weak indirect effects on willingness (W) (\( \beta = 0.19, \ P < 0.05 \)). Other hassles (OH) were correlated with knowledge hassles (KH) (\( r = 0.59, \ P < 0.05 \)) but had no significant effect on other variables in the model.

Multiple regression

The summated knowledge hassle factor score had a skewness of 0.64 and kurtosis of \(-0.47\) and was therefore determined to be an appropriate dependent variable for linear regression. The stepwise regression resulted in a model with the following statistics; adjusted \( R \)-squared = 0.082, \( F = 14.16, \ P < 0.001 \). There

<table>
<thead>
<tr>
<th>Item</th>
<th>Standardized regression weights</th>
<th>Unstandardized regression weights (URW)</th>
<th>Robust SE of URW</th>
<th>Construct reliability</th>
<th>Average variance extracted (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KH1</td>
<td>0.73</td>
<td>1.12</td>
<td>0.06</td>
<td>0.85</td>
<td>59</td>
</tr>
<tr>
<td>KH2</td>
<td>0.57</td>
<td>1.00</td>
<td>0.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KH3</td>
<td>0.63</td>
<td>0.71</td>
<td>0.08</td>
<td></td>
<td></td>
</tr>
<tr>
<td>KH4</td>
<td>0.82</td>
<td>1.00</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OH1</td>
<td>0.73</td>
<td>1.00</td>
<td>0.00</td>
<td>0.79</td>
<td>50</td>
</tr>
<tr>
<td>OH2</td>
<td>0.53</td>
<td>0.84</td>
<td>0.14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OH3</td>
<td>0.46</td>
<td>1.07</td>
<td>0.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OH4</td>
<td>0.68</td>
<td>1.18</td>
<td>0.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OE1</td>
<td>0.79</td>
<td>0.80</td>
<td>0.04</td>
<td>0.94</td>
<td>72</td>
</tr>
<tr>
<td>OE2</td>
<td>0.92</td>
<td>1.00</td>
<td>0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OE3</td>
<td>0.91</td>
<td>1.01</td>
<td>0.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OE4</td>
<td>0.89</td>
<td>0.95</td>
<td>0.03</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OE5</td>
<td>0.84</td>
<td>0.92</td>
<td>0.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>OE6</td>
<td>0.71</td>
<td>0.76</td>
<td>0.05</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE1</td>
<td>0.62</td>
<td>1.00</td>
<td>0.00</td>
<td>0.62</td>
<td>30</td>
</tr>
<tr>
<td>CE2</td>
<td>0.69</td>
<td>1.12</td>
<td>0.19</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE3</td>
<td>0.42</td>
<td>0.70</td>
<td>0.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CE4</td>
<td>0.40</td>
<td>0.65</td>
<td>0.15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>W1</td>
<td>0.81</td>
<td>1.00</td>
<td>0.00</td>
<td>0.71</td>
<td>56</td>
</tr>
<tr>
<td>W2</td>
<td>0.67</td>
<td>0.91</td>
<td>0.11</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

KH, knowledge hassles; OH, other hassles; OE, outcome expectancy; CE, communication efficacy; W, willingness to participate.
were two significant predictor variables ($P < 0.05$); having a recent change in the medication regimen ($\beta = 0.21, P < 0.001$) and age of the respondent ($\beta = -0.16, P = 0.006$).

### Discussion

This study demonstrates that a majority of informal caregivers experience a specific type of daily hassles as a consequence of their role as medication managers. The authors coined the phrase ‘knowledge hassles’ to describe the hassles experienced when dealing with the specialized knowledge of their care-recipients’ medicines’ effects and side-effects. While the overall levels of these hassles were not high, they were clearly influential. As predicted, the higher the level of these hassles, the more personally beneficial for them a caregiver would find HMR and the more willing they would be to arrange an HMR for their care-recipient. This effect was expected by the researchers because caregivers’ positive outcome expectancies of HMR centre on receiving information about medication issues, reassurance about medication-related concerns and improvement of medication management capability. These expectancies cover the same topics as patients and have the same motivating effect on willingness to participate.\textsuperscript{31} Similar to the experience with patients, caregivers’ expectancies were fairly neutral, and they were overall unconvinced that HMR would provide these benefits.\textsuperscript{22,31} These findings align with other research which suggests that many users of pharmacy services do not expect that pharmacists would provide modern pharmaceutical care services.\textsuperscript{54} Because these expectancies are relatively low, there appears to be significant scope for increasing caregiver demand for medication management services.

Alternatively, experiencing ‘other hassles’, the daily hassles resulting from tasks which do not require knowledge of medicines, was not found to be influential. This is the first time that a relationship has been drawn between the specific feelings of being stressed about processing information on a health topic; and a willingness

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Figure 2 Structural equation model. Solid lines indicates significant correlation and regression coefficients ($^*P < 0.05$). The dashed lines indicate no significant relationship. $R^2 = 0.54$. KH = Knowledge hassles, OH = Other hassles, POE = Positive outcome expectancy, CE = Communication efficacy, W = Willingness to participate.
to seek information about that topic. These findings have important implications for pharmacotherapy and for the development of theory of information-seeking behaviour. Further research into knowledge hassles is warranted. If confirmed in other contexts, the assessment of knowledge hassles could be a useful tool in health provider–client communication.

It is noteworthy that it was the oldest of the caregivers who experienced the least knowledge hassles. This is consistent with an observed decline in stress levels with age among Australian caregivers. Such changes may be explained by socioemotional selectivity theory. It is believed that ‘age-related constraints on time horizons’ are associated with motivational changes. These changes cause older persons to increasingly focus on positive over negative emotions. It is possible that older caregivers’ declining experience of daily knowledge hassles may prevent them from focussing on the outcomes of participating in health information services.

Limitations

The main limitation of the study was the potential for bias within the particular group of respondents which may limit the generalizability of the results. These caregivers were recruited because they belonged to a support group, Carers NSW. One of the core goals of this support group is to ‘Develop, promote and distribute information, resources and publications to carers’. Therefore, the respondents recruited for this study may be more likely than others to seek out information about caregiving tasks. Further studies could be conducted among different populations using the measurement scales developed within this study to examine the relationships between the key variables. Another limitation was the relatively low effective response rate (14.4%). This resulted from an overall poor response 600/2350 (25.5%) and the strict inclusion criteria.

Another limitation to the study was that the measurement scale for communication efficacy was not as reliable as had been hoped. It is possible that the construct, communication efficacy is multidimensional and that the present study used an inadequate number of indicators (four) to tap the dimensionality of this latent construct. Despite the modest reliability of the scale, communication efficacy appeared to have a strong influence over willingness to participate. Future studies could use more indicators or alternative indicators to determine the dimensionality of this influential construct.

The measurement scales used for the hassles constructs used only selected items from Travis et al.’s FCMAHS scale. Ideally, the study should be replicated with the complete scale.

Conclusions

This study highlights that some caregivers experience quite a degree of stress dealing with medication information. As expected, this stress is heightened when the medication regimen is changed. Services and support should be provided to these caregivers to assist them in their important and unpaid role as the communities’ hands-on medication managers. Home Medicines Reviews is one avenue for supporting the information needs of caregivers. Building expectations of HMR as an information resource among informal caregivers would likely increase overall consumer demand for this service and may ease the stress and burden of caregiving. General practitioners who sense that informal caregivers seem stressed about medication information will most likely find them quite receptive to suggestions to have HMR, particularly after the medication regimen has changed.

Acknowledgements

We would like to thank all respondents for their time and contribution to this study. We are grateful to Christiane Kliner who coordinated the project.

Conflict of interest

The authors declare no conflict of interest.
Sources of funding

This project was funded by the Australian Government Department of Health and Ageing as part of the Fourth Community Pharmacy Agreement Research & Development Program managed by the Pharmacy Guild of Australia.

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Appendix

Description of HMR provided to eligible non-recipients, adapted from an Australian Government consumer brochure. 49

A Home Medicines Review, a free service funded by Medicare, provided jointly by your General Practitioner (GP) and pharmacist, is particularly useful for people who take multiple medicines each day, or who have recently spent time in hospital or who are concerned or uncertain about their medicines. After being referred by a GP, the pharmacist usually visits the patient in their own home at a mutually agreed time. The pharmacist will look at all medicines that the patient has, discuss any difficulties or concerns the patient may have with using their medicines and write a report to the GP. The GP will then discuss the results of the Home Medicine Review with the patient. Home Medicine Reviews help patients and carers to understand better how to use their medicines.


Author’s Contributions

Stephen Carter conducted the study, performed the analysis and wrote the manuscript.
Lesley White supervised and conducted the study and critically revised the manuscript.
Rebekah Moles and Tim Chen critically revised the manuscript.

Stephen Carter

Rebekah Moles

Lesley White

Tim Chen
PART C

DISCUSSION AND CONCLUSIONS
CHAPTER SEVEN

DISCUSSION

Given the worldwide prevalence of medication-related harm, collaborative interventions which employ the skills of medical practitioners and pharmacists have great potential for improving outcomes. Utilising what is known about the perceptions of consumers when designing and implementing these interventions could improve consumers’ acceptance of them. The overall aim of this thesis was to determine the factors which influence consumers’ willingness to use HMR and caregivers’ willingness to assist their care-recipient to use HMR, prior to service provision.

Chapter One described the development of the theoretical framework which guided the research. The framework set out four phases in the decision-making process regarding consumers’ willingness to use HMR (Figure 2, page 47). The research examined the first three phases of that framework: a) the interpretation phase, where individuals’ thoughts and feelings about medication-related problems are influential; b) the evaluation phase, where individuals’ expectations about the outcomes and processes of HMR are influential; and c) the intention phase, where an individual decides whether they are willing to use HMR. This discussion is organised into these three phases. In terms of the order of presentation however, this section works backwards through the three phases.

7.1 Intention phase – Willingness to use HMR
In order to explore consumers' and informal caregivers' intentions toward HMR this research used the behavioural expectation, willingness. This was in accordance with the recommendation of Gibbons, Houlihan et al. (2009), who have suggested that willingness, which is intention conditioned by specific premises, is likely to explain more variation in human behaviour than intention alone. Therefore, a latent construct named willingness was created for the purpose of quantitative exploration of consumers' behavioural expectations. The items selected for the construct reflect that in order for a person to experience HMR, they need to employ certain communication tasks.

Chapter Two compared responses to the willingness items provided by HMR recipients with those of eligible non-recipients. Compared with recipients, eligible non-recipients were less willing to have an HMR if their GP suggested it and less willing to ask for an HMR if they were having concerns about their medicines. The lower level of willingness to use HMR among eligible non-recipients is consistent with qualitative findings (White, Klinner et al. 2012) and previous Australian government evaluations of the HMR program (Schwartzkoff 2005; Campbell Research and Consulting 2008). Despite this, it was heartening that nearly two-thirds of eligible non-recipients agreed that they were willing to ask their GP for an HMR (if they were concerned about their medicines). There was a high level of consistency in response to this item across three types of respondents: a) patients recruited by community pharmacists (Chapter Three); b) consumers recruited through COTA, NSW (Chapter Five); and c) informal caregivers recruited through CARERS, NSW (Chapter Six). It appears that if consumers' and informal caregivers were informed of HMR, they be willing to ask for it, under the right circumstances. These findings demonstrate the important role that consumers have in driving participation in medication management services.
7.2 The influence of prior awareness on willingness

Previous research intimated that a lack of awareness of HMR was one reason for consumers declining the offer to use it (Yu, Nguyen et al. 2007). Yet, no quantitative study had determined whether a lack of awareness had influenced willingness to use any medication management service. Little was known about the underlying awareness of HMR within the Australian community other than anecdotal reports from qualitative studies (Campbell Research and Consulting 2008; Lee, George et al. 2012). For the first time in Australia, a systematic investigation among eligible non-recipient consumers revealed a low level of awareness of HMR.

Chapter Two reported that the overall level of awareness was 23% - predominantly provided by pharmacists and GPs. Furthermore, compared with eligible non-recipients who were unaware, those who had prior awareness indicated that they would be more willing to have an HMR if their GP suggested it. Combined, these findings highlight the social pressure that health professionals exert on modifying consumers’ intentions to use health services. If health professionals can influence consumers’ willingness by mentioning it during health consultations, it is possible that other forms of promotion will prove positively influential.

Campaigns aimed at improving consumer awareness of HMR have occurred. The National Prescribing Service provides consumer-directed information on their web page, and actively promotes HMR using a peer education campaign in partnership with Council on the Ageing NSW (COTA, NSW) (National Prescribing Service 2012). HMR has been promoted within specific consumer groups. In 2011, Australian’s Veterans’ Mates program promoted HMR to 176,000 veterans and their general
practitioners. The promotional program included the distribution of a brochure to veterans which described the reasons why they should consider having an HMR (Australian Government Department of Veterans' Affairs 2011). The benefit of this type of promotion was demonstrated in a study which showed that the rate of HMR delivery could be increased by providing patient-specific feedback provided to GPs and educational material mailed directly to patients (Roughead, Pratt et al. 2007). Another approach included the provision of an education session for elderly residents of retirement villages of the benefit of HMR. Residents were provided with a risk assessment checklist to take to their GP (Lee, George et al. 2011). Other promotional programs supported by Divisions of General Practice, include the coordinated promotion of HMR to GPs, practice nurses, pharmacists and consumers (Fitzgerald, B et al. 2010).

The finding that awareness of HMR improved willingness to use it highlights the importance of understanding other factors which influence consumers’ decisions regarding HMR. Greater understanding of these factors could help health professionals and health promotion agencies optimise the content of promotional messages regarding HMR.

In order to simplify the text, in the discussion from this point onwards, willingness refers to the underlying latent construct of willingness to use HMR (as described in Section 7.1, page 136) or willingness to use any medication management service in general. Here it is worthwhile to mention that the measurement scale for willingness had good construct reliability in each of the studies which used structural equation modelling (Chapters Three, Five and Six).
7.3 The evaluation phase

This section summarises the research which covered the variables within the evaluation phase, and the relationship between them and willingness.

7.3.1 Positive outcome expectancy

Positive outcome expectancy was defined as consumers’ and informal caregivers’ expectations about the positive outcomes of HMR. Chapter Four presented a qualitative study where it was reported that focus group participants focussed on the idea that HMR would provide an extended patient counselling session. Many believed that HMR would provide them with medication information tailored to their individual needs as well as reassurance. An important motivation to choose HMR was participants’ preference to communicate via an interpersonal mode. Participants said they would value the independent knowledge that an HMR pharmacist would provide: they said it would empower them to make more informed decisions. However, not all participants agreed that such information was necessary or that HMR was needed for them personally. Previous qualitative research reported that although some participants perceived HMR to be a valuable service, they perceived it in terms of benefitting others, who may be older or have cognitive decline (White, Kliner et al. 2012). Consistent with previous studies of HMR (Lee, George et al. 2012) and MTM (Law, Okamoto et al. 2008; Truong, Layson-Wolf et al. 2009; Friedrich, Zgarrick et al. 2010), Chapters Three, Five and Six report that consumers’ and informal caregivers had low to moderate positive outcome expectancy. While positive outcome expectancy
was not high, structural equation modelling revealed that it had a strong influence on willingness in all groups.

The finding that positive outcome expectancy was relatively low yet highly influential indicates that there is significant scope for increasing both consumers’ and caregivers’ willingness. This could be achieved by designing promotional campaigns which aim to increase positive expectations of HMR. It is here that attention is drawn to the consumer-directed information about HMR which was available on the internet at the time the research was conducted. The information available to consumers was evaluated at that time (Appendix B). One of the conclusions drawn in that study was that the information made available to consumers did not focus on the communication opportunity afforded during the HMR interview. Given that many multiple medicine-users report that GP consultations are too short to discuss their medicine concerns (Gordon, Smith et al. 2007; Moen, Bohm et al. 2009), there is an opportunity for descriptive messages about HMR to promote the pharmacists role in addressing patients’ concerns during the relatively long HMR pharmacist consultation.

7.3.2 Negative outcome expectancy

Negative outcome expectancy was defined as an individual’s negative expectations about the communication processes involved in HMR. A qualitative study reported that a minority of eligible non-recipients expressed negative sentiments regarding the processes of HMR (White, Klinner et al. 2012). These sentiments related to uncomfortable feelings about being visited in the home, concern about privacy and confidentiality, and the feeling that having an HMR indicated reduced personal capability. These findings align with a previous qualitative study which investigated
consumers’ attitudes towards USA’s MTM services, where some consumers said they were concerned about confidentiality and privacy (Truong, Layson-Wolf et al. 2009).

The quantitative study of Chapter Two presented descriptive statistics to demonstrate that a minority of eligible non-recipients had negative outcome expectancy. In Chapter Three, research is presented which used structural equation modelling to test the hypothesis that negative outcome expectancy reduces willingness. For that purpose, a measurement scale for negative outcome expectancy was chosen which included two items related to consumers’ uncomfortable feelings about being visited at home by a pharmacist. Using this scale, consumers’ negative outcome expectancy did not have a significant influence on their willingness - when positive outcome expectancy and communication efficacy were included in the model. To some extent, this should be a reassuring finding as it reflects the trust that patients have in community pharmacists as medication information resources, within Australia (Tio, LaCaze et al. 2007) and internationally (Ngorsuraches, Lerkiatbundit et al. 2008).

Nevertheless, medication management services should ideally be designed to minimise consumers’ negative outcome expectancy. GPs and accredited pharmacists who are faced with a lack of willingness should enquire as to whether the reluctance is due to the location of the interview, as the HMR program allows for flexibility in the location. However, best practice guidelines published by the Pharmaceutical Society of Australia recommend that the consumer’s home is the preferred setting for the HMR interview (The Pharmaceutical Society of Australia 2012). These guidelines remind the reader that having the accredited pharmacist interview and observing the consumer in their own home will assist with the identification of aspects of medication management that may not be possible in another setting. This has recently been confirmed in a study by Freeman, Cottrell et al. (2012) Compared with HMR performed in a medical
surgery, those performed in the home uncover more medication-related problems specifically related to the use of a medication aid or device (Freeman, Cottrell et al. 2012). If consumers indicate a choice to have the interview in the GP’s surgery or in the community pharmacy, they should at least be advised that the home is considered best practice.

Due to the fact that the measurement scale for negative outcome expectancy in Chapter Three did not include items related to reduced personal capability, dependency, or compromised privacy, it was not possible to comment on whether these feelings reduced willingness. Nevertheless, consumer-directed information regarding HMR should explicitly state that the consumer's medical record is treated as confidential. Further, descriptions of HMR should use language that engenders feelings of empowerment, rather than failing independence. A study conducted in the UK reported that consumers’ medicines information tend to use language consistent with an “educational” rather than an “empowerment model” (Nicolson, Knapp et al. 2006). Further, a qualitative study of consumer-directed information regarding UK’s Medicine Use Reviews (MUR) (van den Berg and Donyai 2010) concluded that “The educational role of the MUR overshadowed the intended patient empowerment that would take place with a true concordance-centred approach”.

One way to increase consumers’ sense of empowerment surrounding the HMR process may be to inform consumers that they would be provided with a written report at the conclusion. This could simply be the accredited pharmacists report to the GP. In the HMR model, there is no specific directive as to whether the HMR report is provided to the consumer or caregiver. Presumably it is left to the consumers, caregivers, pharmacists and general practitioners to negotiate whether the HMR report is provided to the consumer. It is likely that some of the information provided by the pharmacist to
the GP would deal with the consumer’s adherence behaviour and their capacity to manage their medicines. Some consumers and caregivers may feel demeaned by this. Some of the information may be technically difficult for consumers to understand which in-turn could cause anxiety. If it were mandatory that consumers did receive the HMR report, the pharmacist may have to word the report with this understanding and it is possible that this may influence how the GP dealt with this information. Of course, it is possible for accredited pharmacists and GPs to collaborate in private.

Another alternative may be to provide the consumer with a consumer-directed report, with particular attention given to the language used. This extra step would increase the workload of the pharmacist, but could provide better outcomes for the consumer by reinforcing the verbal information provided. If the provision of a consumer-directed report were mandated and advertised to consumers, consumers’ sense of empowerment may increase. However, it is also possible that some consumers may find the concept of there being two different reports not empowering. It is not known the extent to which consumers are provided with written materials as a part of the HMR. Overall, it would appear that the provision of written materials to consumers and caregivers during the HMR process should be the subject of public policy discussion.

7.3.3 Communication efficacy

Communication efficacy was defined as a person’s perception of having the capability to initiate and proceed through the communication tasks required to participate in HMR. In the current context these perceptions related to making time for an HMR and/or asking a GP to have an HMR. Time constraints were identified as a potential barrier to consumers’ use of MTM (Garcia, Snyder et al. 2009; Truong, Layson-Wolf et
al. 2009) and HMR (Lee, George et al. 2012). However, Chapters Three, Five and Six, reported that few participants agreed that they lacked the time for an HMR or that arranging an HMR would be difficult. Chapter Four reported that some consumers would not ask their doctor for an HMR because they were unsure whether their GP would approve of HMR. Despite this, Chapters Three, Five and Six, reported that few participants agreed that they would have difficulty asking their GP for an HMR. In summary, consumers’ and informal caregivers had high communication efficacy.

Consistent with the conceptual model, communication efficacy had a moderate and significant effect on consumers’ and informal caregivers’ willingness. Perhaps this is not surprising since self-efficacy may be the most powerful of constructs within social cognitive theory (Maddux and Rogers 1983; Schwarzer 1992; Bandura 1997). These findings indicate that efforts should be made to make the process of asking for an arranging HMR as transparent and easy as possible for eligible consumers and their informal caregivers. The two main themes contained with communication efficacy deal with confidence to initiate conversations about HMR and confidence in arranging the interview.

Community pharmacists could initiate conversations with eligible non-recipients using consumer-directed promotional materials. They could explain how the HMR process works and offer to assist consumers overcome communication barriers. This could involve calling GPs, if consumers express a wish to have an HMR. Ideally, consumer-directed promotional material would use language and imagery that encourages dialogue with health providers.

Multiple medicine-users are likely to have multiple morbidities. Many would have to attend medical appointments in multiple locations on a regular basis. Having the
pharmacist interview occur in the consumer’s home obviates the need for the consumer to travel for that purpose, but not necessarily the medical appointment which follows. In addition, time is required for both interviews. Perhaps the best way to overcome the time barrier is for health professionals to deal with this if it arises. Ideally, when GPs enter into discussions with their patients regarding the possibility of having an HMR, they should ensure that the patient understands that accredited pharmacists have a degree of flexibility the timing of appointments. Ideally, accredited pharmacists should ensure that GPs, community pharmacists and their clients understand that such flexibility is available.

7.3.4 Subjective norms of the GP

Chapter Four presented qualitative findings to suggest that some participants who thought HMR would be personally beneficial were not willing to use it because they were not sure that their GP would approve. Therefore, the conceptual model was extended in Chapter Five to include the social influence of the GP. For that study, the social influence of the GP was adapted from the construct named subjective norms in the Theory of Planned Behavior (Ajzen 1991). While subjective norms have been shown to influence information-seeking intent (Liu, Doucette et al. 2005; Kahlor 2010), this was the first research to use subjective norms to explore consumers’ intentions to use medication management services.

Subjective norms operate in two dimensions (Ajzen 1991). The two dimensions were operationalized for the present research thus; a) subjective normative beliefs –

\[ \text{__________________________} \]

\[^a\] Willingness is considered to be intention qualified on certain premises (Section 1.5.4)
consumers’ thoughts that the GP would approve of them using HMR, and b) motivation to comply - consumers’ motivation to comply with the wishes of the GP. In the study of Chapter Five, most respondents agreed with both propositions. This indicated that the subjective norms of the GP had an overall positive influence on willingness. Using structural equation modelling analysis, it was shown that subjective norms of the GP increased respondents’ willingness even though it had no bearing over whether they thought that the HMR was personally beneficial. This result reinforces the powerful effect that a person’s general practitioner has over health related decisions.

It is possible however, that in the future consumers’ motivation to comply with the GPs wishes may decline. As elucidated by Buetow, Jutel et al. (2009), “the modern patient” sees less social distance between themselves and their GP. Driven by greater access to medical information, and supported by a worldwide trend towards more autonomy in health, more consumers may not care what their GPs think about HMR and may demand access to it.

At present, it is likely that some form of GP endorsement of HMR such as promotional messages within GPs surgeries would increase consumers’ intentions to ask their GP about the service. This could be achieved with posters or brochures about the service, or perhaps on GP network television commercials. Community pharmacists could assist in this regard by knowing the sentiments of their local GPs towards the HMR program and explaining to eligible non-recipients that their GP has positive views about HMR, if that is the case.
7.4 The interpretation phase

The conceptual model shows that a person’s thoughts and feelings (cognitions and emotions) about the possibility of experiencing harm motivate them to consider the outcomes and processes of information-seeking (Section 1.5.6, page 52). And as explained, it is emotional arousal or negative affect which is central to this process. It was therefore predicted that, an individuals’ negative affect generated by the possibility of experiencing medication-related problems, would increase their positive outcome expectancy. However, negative affect could reduce communication efficacy. The net effect on willingness was tested for both eligible non-recipient consumers (Chapter Five) and the caregivers of eligible non-recipient consumers (Chapter Six) using different measures of negative affect.

7.4.1 Medication-problem worry

In the case of consumers, the negative affect measured was a specific (and mild) form of worry, medication-problem worry. It was defined as the worry a person feels when they consider themselves to be at risk of experiencing medication-related problems. In the study of Chapter Five, structural equation modelling revealed that medication-problem worry had a moderate effect on positive outcome expectancy, but no significant effect on communication efficacy. Therefore, medication-problem worry had an indirect positive effect on willingness to use HMR.

In summary, consumers who are more worried about the possibility of experiencing medication-related problems are more likely to believe that they would personally
benefit from the information received during HMR, more likely to feel reassured by this information and more willing to undertake the communication tasks required to use HMR.

A possible relationship between consumers' thoughts and feelings about the problems resulting from consuming medicines and their willingness to use medication management services has been alluded to in the past and this was discussed in Section 1.4.5.6 (page 34). There were two studies which examined this relationship in detail and they provide somewhat conflicting results. One study showed that consumers with higher values for the “specific concerns” construct from the Beliefs about Medicines Questionnaire (BMQ) (Horne, Weinman et al. 1999) were more likely to have volunteered to use a Swedish medication management service (Montgomery, Kälvemark Sporrong et al. 2010). Another study however, found that having higher values for “specific concerns” was not associated with perceptions of personal benefit from patient counseling activities or other MTM activities (Doucette, Witry et al. 2007).

It is important here, to highlight how consumer's thoughts and feelings about experiencing medication-related problems was estimated in those studies (Doucette, Witry et al. 2007; Montgomery, Kälvemark Sporrong et al. 2010) and compare that with the methods used in Chapter Five. The conceptual model separates cognition from emotion (Section 1.5.6, page 52) so that in Chapter Five, risk perception (cognition) and worry (emotion) were modelled and measured separately. The “specific concerns” construct of Beliefs about Medicines Questionnaire (BMQ) elicits consumers’ affective representations of their concerns about the possible harm they may experience from taking medicines (Horne, Weinman et al. 1999). However, as explained the construct also elicits cognitive representations (Horne, Weinman et al. 1999). The specific concerns construct has been very useful at predicting non-adherence behaviour.

7.4.2 Knowledge hassles

The study reported in Chapter Six was undertaken because it was recognised that informal caregivers have a key role in assisting some of the most vulnerable members of the community to access HMR. In Chapter Six the conceptual model (Section 1.5.6.3, page 56) was extended to encompass the willingness of informal caregivers to assist their care-recipient to use HMR (willingness). The phrase “knowledge hassles” was coined to describe a specific form of negative affect which motivates informal caregivers to consider the outcomes and processes of HMR. Knowledge hassles were defined as the daily stressors informal caregivers experienced whilst dealing with tasks which require knowledge about the safety and effectiveness of the care-recipients’ medicines. Using structural equation modelling it was demonstrated that there was a strong relationship between experiencing knowledge hassles and positive outcome expectancy ($\beta = 0.40, p<.05$). Furthermore, knowledge hassles had no significant effect on communication efficacy. Therefore, knowledge hassles had a significant indirect effect on willingness ($\beta = 0.19, p<0.05$). This is the first research to draw a relationship between the specific feelings of being stressed about processing information on a health topic; and a willingness to seek information about that topic.

Building expectations of HMR as an information resource among informal caregivers would likely increase overall consumer demand for HMR. GPs who sense that informal
caregivers seem stressed about medication information will most likely find them quite receptive to suggestions to have HMR. Informal caregivers, by definition, are often involved in collecting medicines from pharmacies. Pharmacists who sense that informal caregivers appear stressed about complicated medication regimens should also consider whether the care-recipients’ GP may be interested in requesting an HMR.

7.4.3 The effect of having medication risk factors

The studies of Chapter Five and Six used multiple regression analysis to explore the relationship between the presence of three medication risk factors and negative affect, whilst taking demographic factors into account. The three risk factors examined were; having a recent change in the medication regimen (within the previous three months), a change having been discharged from hospital within the previous month, and b) having multiple regular prescribers.

The results obtained were consistent for consumers and informal caregivers. Having a recent change in the medication regimen increased medication-problem worry in consumers and knowledge hassles in informal caregivers. In accordance with program guidelines, HMR could be provided to eligible consumers after a significant change in their regimen (Australian Government Department of Human Services 2011). These findings add that consumers and their caregivers may be more receptive to suggestion and promotion of medication management services after medication changes. Consumer-directed information about HMR could be provided to multiple medicine-users after changes to medication regimen in a similar manner to the way written
medicines information is provided (The Pharmacy Guild of Australia 2009). It should be noted that the consumer-directed brochure entitled “8 reasons for having a Home Medicines Review” published by Australia’s Veterans’ Mates program listed having a new medicine as the first reason (Australian Government Department of Veterans’ Affairs 2011).

### 7.4.4 Demographic factors

In Chapter Five, it was the oldest of the consumers who experienced the least medication-problem worry. This was consistent with the focus group study of Chapter Four where older participants were the least engaged in topics relevant to medication risk, appeared the least worried about medication problems and were the least willing to have HMR. In Chapter Six, it was the oldest of the caregivers who experienced the least knowledge hassles. This is consistent with an observed decline in stress levels with age among Australian caregivers (Cummins, Hughes et al. 2007). Such changes in consumers and caregivers may be explained by socioemotional selectivity theory (Lockenhoff and Carstensen 2007). It is believed that “age-related constraints on time horizons” are associated with motivational changes. These changes cause older persons to increasingly focus on positive over negative emotions (Lockenhoff and Carstensen 2007). In addition, older persons may attribute symptoms which may be medication adverse effects to the consequences of ageing (Shiyanbola and Farris 2010). It is possible that older persons’ declining experience of negative affect regarding the possibility of experiencing medication-related problems may prevent them from focusing on the positive outcomes of participating in medication management services.
It is also possible that the decreased negative affect with increasing age relates to the fact that the consumers and their caregivers who participated in the study were not a random segment of the population. Studies in this area using randomised samples appear warranted.

### 7.5 Methodological strengths and limitations

#### 7.5.1 Study Sample

One of the gaps identified in the literature review of consumers’ perceptions of medication management services (Section 1.4.6.2, page 39) was the lack of studies undertaken among consumers who were systematically identified as being eligible to use medication management services. Therefore, the findings of many studies lacked generalisability because the samples were underrepresented by those who would be eligible for medication management services. One of the strengths of the thesis was that the research reports on the perceptions of non-recipients who were systematically identified as being eligible to receive HMR.

Eligibility criteria form an integral component of the processes of medication management services. Eligibility criteria need to be defined for the purposes of promotion and administering the service and for conducting research into consumer perspectives. The eligibility criteria provided below was obtained from the Australian Government Department of Human Services website: (Australian Government Department of Human Services 2011)
A general practitioner must assess that a review of a patient living at home is clinically necessary to ensure the quality use of medicines or to address a patient’s needs. Examples of risk factors include patients:

- currently taking five or more regular medications
- taking more than 12 doses of medication per day
- with significant changes to their medication regimen in the last three months, including recent discharge from hospital
- taking medication with a narrow therapeutic index or required therapeutic monitoring
- with symptoms suggestive of an adverse drug reaction
- having difficulty managing their own medicines because of literacy or language difficulties, impaired sight
- attending a number of different doctors, both general practitioners and specialists

Eligibility for HMR is therefore guided by the patient having risk factors for medication misadventure. Therefore, for the study reported in Chapter Two, community pharmacists were asked to recruit non-recipients with at least one of five risk factors (adapted from items 1, 2, 3, 4, and 7 from the above list). These items were selected because pharmacists may be aware of these risk factors as a consequence of regular dispensing and counselling activities. These items were included within each of the surveys for the thesis in order to determine whether the presence of these risk factors influenced willingness to use HMR. Such inclusion was justified because Levy demonstrated that patients could reliably self-record them (Levy 2003). For those studies which used structural equation modelling (Chapters Three, Five and Six) it was felt that the research should be conducted only among non-recipients who were using multiple medicines (defined as more than five medicines daily or twelve individual doses daily). This allowed for the researchers to compare the results obtained using different recruitment strategies (See Section 7.5.2, page 155).
A limitation of the thesis was that the views of persons with certain disabilities may be underrepresented because their disabilities prevent them participating in focus groups or completing surveys. This limitation was acknowledged in an Australian study investigating risk factors for medication misadventure (Pit, Byles et al. 2008). In that study, just 70% of the study population were able to complete the questionnaire by themselves or with the assistance of a caregiver (Pit, Byles et al. 2008). As stated by Levy (2003), the usefulness of any self-reported tool will always be limited by familiar and expected exclusion criteria included vision impairment, dementia, illiteracy or severe psychiatric conditions. This limitation highlights the necessity of obtaining the perceptions of informal caregivers of eligible non-recipients who care for individuals such as these.

A strength of the thesis was that the perceptions of informal caregivers who care for the some of the most vulnerable members of the community were obtained. Another strength was the systematic approach used to identify informal caregiver members of Carers, NSW who were actively involved in medication management tasks for an eligible non-recipient. In addition to identifying respondents whose care-recipients were using multiple medicines, a previously developed screening tool (Travis, Bernard et al. 2003) was used to identify informal caregivers who were actively involved in medication management tasks and were not paid to provide caregiving tasks.

7.5.2 Dealing with selection bias

The literature review identified that the results from studies where the recruitment process involved pharmacists approaching their patients may have been influenced by selection bias (Section 1.4.3.1, page 16). A limitation of the thesis was that the
community pharmacy-based recruitment strategy used in Chapters Two, Three and Four meant that sampling bias could reduce the generalisability of the findings. It is possible that pharmacists selectively recruited patients with known favourable attitudes towards HMRs or pharmacists’ services generally. Furthermore, only 29% of pharmacists who were contacted by the researchers agreed to recruit patients. It is possible that these pharmacists had favourable attitudes, and that their attitudes were reflected in the responses of respondents. Finally, it is also possible that the generalisability may be reduced by social desirability bias. That is, because consumers had a prior relationship with the pharmacist, they may have provided responses which they thought would be viewed favourably.

The findings of the thesis are strengthened by the fact that the views of consumers who were recruited anonymously were obtained. Respondents were recruited by postal methods in the studies of Chapters Five and Six. For these studies, the sample was members of consumer organisations (COTA NSW and Carers NSW, respectively). These organisations were selected because their members (or the members’ care-recipients) were identified as having a good chance of being older persons who may therefore be using multiple medicines (Moen, Antonov et al. 2009). In these studies, the member’s name and postal address only was used by the member organisation to contact respondents. No other data regarding the members of the organisations was obtained.

The process of obtaining data from various samples allowed for the measurement scales for positive outcome expectancy, communication efficacy and willingness to use HMR, to be validated and the relationships between these key variables to be analysed. Therefore, the potential for selection bias to confound interpretation of the relationships between the variables was minimised. The relationships between these
key variables were consistent across each of the studies which used structural equation modelling (Chapters Three, Five and Six).

A limitation of the postal strategy was that members of the consumer organisations may be more interested in medication information than most eligible non-recipients. Dutta Bergman (2005) suggests that a person’s tendency to seek health information may be positively influenced by a person’s health consciousness. It is quite likely that members of consumer organisations have higher levels of health consciousness than members of the general public. It is uncertain how health consciousness may have influenced the relationships explored in this thesis.

7.5.3 Information regarding HMR provided to respondents

In order to study consumer perceptions of medication management services among those who have not yet experienced it, respondents must be presented with some information about the service. According to social cognitive theory, the content of this information could have an impact on respondents’ expectations of the outcome to be derived, their self-efficacy expectations and their future intentions (Bandura 1997). In the literature review it was mentioned that many studies did not report the content of information regarding medication management services which was provided to respondents (Section 1.4.3.3, page 22). Furthermore, few studies provided a rationale for the content provided to respondents.

A strength of the research conducted for this thesis was that respondents in all qualitative and quantitative studies were provided with the same validated message regarding HMR. Furthermore, within each of the manuscripts which make up the
thesis, the description of HMR provided to respondents was included as an Appendix. In addition, the rationale for the content was provided in each manuscript. The content was valid because it was adapted from a consumer-directed brochure provided by the Australian Government Department of Health with almost no alteration (Australian Government Depart of Heath and Ageing).

Here it is noted that a limitation of the study was that only a single description of HMR was provided to respondents, yet as explained within the study of Appendix B, consumers may be exposed to an array of information available regarding HMR, particularly on the internet. Appendix B reports on a qualitative study using content analysis of relevant information available on websites at the time the data was collected for this study. Future studies may choose to vary the message provided to respondents in order to determine which attributes of HMR is the most likely to increase positive outcome expectancy and willingness. An extension of such research could use discreet choice experiments.

7.5.4 Measurement issues

Structural equation modelling using maximum likelihood estimation was used to explore the relationships between the constructs of the conceptual model in the studies of Chapter Three, Five and Six. The findings of the thesis were strengthened by the fact that each of the studies broadly followed Schreiber’s (2008) core reporting practices for structural equation models. As is recommended, (Schreiber 2008) attention was paid to the distribution of the data. When the data were not normally distributed, as in Chapters Five and Six, maximum likelihood estimation with robust
errors was used (Bentler 2006). Estimates provided in this manner are generally free of bias, even in the presence of non-normal data (Curran, West et al. 1996).

A strength of the research was that power analysis was performed to ensure an adequate sample size for structural equation modelling (Schreiber 2008). Using the post-hoc method of Westland (2010), it was shown that there were an adequate number of responses for each of the studies to reliably estimate minimum effect sizes of approximately 0.20.

A limitation of the thesis however, was that each of the studies reported that the structural model data was a reasonable but not a good fit for the data. In the absence of other publications in the area of interest, the statistics chosen for reporting were those suggested (2008); Chi-square or Satorra - Bentler scaled Chi-square, Comparative fit index (CFI), Tucker-Lewis index (TLI) and Root mean square error of approximation (RMSEA) with 90% confidence intervals. In regard to the values of CFI, TLI, Schreiber suggested that the values of each of these should exceed 0.95 to indicate evidence of good fit (Schreiber 2008). Less stringent thresholds (CFI ≥ 0.90, TLI ≥ 0.90) have been advocated elsewhere as evidence of reasonable fit. (Holmes-Smith, Cotte et al. 2006). In regard to RMSEA, values exceeding 0.06 with 90% confidence interval less than 0.08 indicate evidence of good fit (Schreiber 2008), whereas a threshold value of 0.08 has been advocated elsewhere as evidence of reasonable fit (Holmes-Smith, Cotte et al. 2006). In each study, the Chi-square and the Satorra – Bentler scaled Chi-square was significant, but that was to be expected. In the studies of Chapters Three, Five and Six, CFI values ranged between 0.94 and 0.96 and TLI values ranged between 0.92 and 0.94. In the studies of Chapter Three, Five and Six, the RMSEA with 90% confidence intervals were 0.065 [0.053 – 0.080], 0.068 [0.059 – 0.083, and 0.057 [0.048 – 0.066] respectively.
One of the strengths of the research was that each study examined the measurement model (confirmatory factor analysis) before proceeding to structural equation modelling. Such an approach is recommended by Hair, Black et al. (2006) when the nature of the research is at a preliminary or development stage. Performing the confirmatory factor analysis prior to structural equation modelling allows for problems to be identified with measurement scales before hypothesis testing (Hair, Black et al. 2006). Confirmatory factor analysis also provides the data to calculate and report the reliability of the measurement scales and perform tests of discriminant validity.

A strength of the thesis was that, with the exception of the communication efficacy scale which is discussed below, all construct reliability values approached or exceed the 0.7 threshold (range 0.65 – 0.95) and the variance extracted approached or exceeded the 50% threshold (range 49% - 75%) (Hair, Black et al. 2006). Discriminant validity between each pair of constructs in Chapters Three, Five and Six was demonstrated.

However, a limitation of the thesis was that there were problems with the measurement scales for communication efficacy in each of the studies. Items on this scale generally had relatively low to moderate factor loadings (range 0.40 – 0.70), low to moderate construct reliability (range 0.62 – 0.75) and the average variance extracted did not reach the 50% threshold (range 30 - 44%). Furthermore, it should be noted that the scale did not include any items to probe the communication efficacy required to ask the pharmacist for advice during the HMR interview. Items of this nature were not included because this communication barrier did not appear to limit willingness to ask for advice in previous qualitative research (White, Carter et al. 2011) and in Chapter Four. It is recommended that future research should attempt to improve the measurement of communication efficacy in the present context. This could
possibly be achieved by using more items to tap more dimensions of communication efficacy or possibly re-wording of the items.

Another limitation of research was the limited number of indicators for the negative outcome expectancy measurement scale. Based on a qualitative study (White, Carter et al. 2011), Chapter Three developed a measurement scale for negative outcome expectancy which included negative sentiments towards HMR. These included four items related to uncomfortable feelings about having a known or unknown pharmacist visit the home, feelings of compromised privacy and feelings of reduced personal capability. Exploratory factor analysis revealed that two of the four items did not load well onto the common factor. Subsequently, a two item scale was used which included two items related to uncomfortable feelings about having a known or unknown pharmacist visit the home. While this item had reasonable construct reliability (0.69) and acceptable variance extracted (0.53%), the scale does not fully explain all of the negative sentiments. It is recommended that future research should attempt to improve the measurement of negative outcome expectancy. This could possibly be achieved by using more items to tap more dimensions of negative outcome expectancy or possibly re-wording of the items.

In Chapter Five, medication-problem worry was defined as the frequency with which a person worries. McCaul & Goetz (2010) have identified two dimensions of worry in relation to health behaviour - the intensity and the frequency. They suggest that there is no consensus about which is the most influential in modifying behaviour. Future research could develop a scale to probe the intensity of medication-problem worry experienced. Furthermore, only a single variable was used to measure medication-problem worry. Future research could explore the elements or dimensions of this emotional response.
A strength of the research was the new finding that consumers’ medication-problem worry remained elevated for three months after changes to the medication regimen. Furthermore, caregivers’ knowledge hassles were also elevated during this time. A limitation of the study was that the presence of having had a recent medication regimen change was measured with a simple binary variable. Either an eligible non-recipient had experienced a change within the previous three months or not. Future studies could explore in more detail the time-course of changes in negative affect associated with changing medication regimens. Furthermore, the nature of the regimen change may be significant. Future research in this area could record more details about the change in the medication regimen such as; the class of the new (or ceased) medication or ceased medication, whether the change was an increase or decrease in dose, or whether the change had been the result of an adverse event.
CHAPTER EIGHT

CONCLUSIONS AND FUTURE DIRECTIONS

8.1 Conclusion

The overall aim of this thesis was to determine the factors which influence consumers’ willingness to use HMR and caregivers’ willingness to assist their care-recipient to use HMR, prior to service provision.

Overall recipients were very satisfied with, and willing to re-use HMR; they reported HMR provided them with increased medicines knowledge which helped them manage their medicines and reduce their medicine concerns. Eligible non-recipients were however, less willing to use HMR than recipients. The most obvious conclusion to draw from this finding is that the more HMR is performed throughout the community, the higher the overall level of willingness to use it will be. For the rest of the Conclusion, consumers refer to eligible non-recipients and caregivers refer to informal caregivers.

It is encouraging that a clear majority of consumers were willing to ask their GP for an HMR, if they were concerned about their medicines. Similarly, caregivers were willing to ask their care-recipients’ GP for an HMR, if they were concerned about their care-recipients medicines. These findings demonstrate that consumers and their caregivers have an important role in driving participation in medication management services.
For the first time it was shown that consumers who were aware of a medication management service were more willing to use the service than those who were not aware. This indicates that the more consumers know about HMR, the more likely it is that consumers will drive participation. While some consumers’ awareness of HMR had been generated by word-of-mouth and health promotion activities, the majority of awareness had arisen because HMR had been mentioned to them by GPs and pharmacists. These findings highlight the important role that health professionals have in persuading consumers to participate in health interventions. These findings are also encouraging because it is possible that other forms of exposure to the concept of HMR will improve consumer and caregiver participation.

Consistent with previous research (White, Carter et al. 2011), the most concrete of consumers’ and caregivers’ expectations of the benefits of HMR (positive outcome expectancy) centred on learning about their (or their car-recipient’s) medicines during the interview with the pharmacist. This positive outcome expectancy was the most important factor influencing consumers’ and caregivers’ willingness to participate in the HMR program. Overall however, consumers’ and caregivers’ positive outcome expectancy was not high. The major implication of this is that consumer-directed and caregiver-directed information about HMR should focus on it as an information resource that targets the needs of the individual. At the same time, the choice of language and imagery used to describe HMR should ensure that the benefits of consumer education engender feelings of empowerment and autonomy.

The results of this thesis indicate that for both consumers and caregivers, negative affect regarding the possibility of medication-related problems increased their
willingness to use, or willingness to assist a care-recipient to use, HMR respectively. In the case of consumers themselves, the negative affect measured was the worry a person feels when they consider them to be at risk of medication-related problems. In the case of caregivers of eligible non-recipients, the negative affect measured was knowledge hassles – daily stressors experienced whilst dealing with tasks which require knowledge about the safety and effectiveness of the care-recipients’ medicines. In both cases, the level of negative affect was raised for three months after the eligible non-recipient had experienced a change in the medication regimen. Patients are at elevated risk of experiencing medication-related harm after having their medication regimen changed. Their level of negative affect (and the level of their caregivers’ negative affect) increases in response to these changes. Individuals from both groups will be more willing to want to participate in medication management services during this time. Health providers should ensure that wherever possible, multiple medicine-users and their caregivers are offered the opportunity to participate in medication management services when the medication regimen is altered.

A common theme running through this thesis was that it was the oldest of consumers and caregivers, who experienced the least negative affect related to medication issues. Compared with younger persons, older persons are at greater risk of experiencing medication-related harm (Oladimeji, Farris et al. 2008). Older consumers and caregivers may require additional encouragement to use medication management services because they may not feel worried about being at risk of experiencing medication-related problems or feel hassled dealing with medication knowledge.

Finally, the results of this study show that consumers’ willingness to use the collaborative HMR service depends on their perceptions of what the GP thinks of the
service. It is likely that the success of the HMR program depends on GPs active involvement in the promotion and delivery of the service.

8.2 Future directions

The research in this thesis presents a significant body of work which has provided substantial knowledge regarding consumers’ willingness to use medication management services. There are three main opportunities for future research in pharmacy services and in the broader area of information-seeking behaviour.

First, the conceptual model developed and tested during this research could be adapted to investigate the willingness of consumers to use other medication management services, such as USAs’ Medication Therapy Management (MTM) or the UK’s Medicine Use Reviews (MUR). Locally, the Australian government has recently introduced a government funded service called MedsCheck (Australian Government Department of Human Services 2012) MedsCheck provides an in-pharmacy review of a consumer’s medicines, focusing on education and self-management and aims to:

- Identify problems that the consumer may be experiencing with their medicines;
- Help the consumer learn more about their medicines including how medicines affect medical conditions;
- Improve the effective use of medicines by consumers; and
- Educate consumers about how to best use and store their medicines.

Similar to the processes of UK’s MUR, community pharmacists are responsible for enrolling their patients into the MedsCheck program. Unlike HMR, the enrolment process for MedsCheck does not depend on a GP. Therefore, it would wise for
community pharmacists to learn more about the factors which influence consumers’ willingness to use MedsCheck and caregivers’ willingness to assist their care-recipient to use MedsCheck. The conceptual model could be applied to that situation with little need for change. Positive outcome expectancy would remain the virtually the same but other constructs such as communication efficacy and willingness would require minor adaptation. These adaptations could be achieved by conducting pilot studies using qualitative methods before proceeding to survey research.

The second area ripe for research is for intervention studies to be conducted to determine the effect of increasing consumers’ expectations of pharmacy services. The thesis improved our understanding of consumers’ expectations of HMR and the factors which may influence these expectations. The thesis demonstrated that consumers have overall low expectations of medication management services in general, and specifically of HMR. The findings of the thesis could be used to guide the production of consumer-directed content aimed at increasing expectations. Intervention studies could be conducted to determine whether increasing consumers’ expectations of medication management services actually increases consumer participation. This could be achieved by providing groups of consumers with information with variable content regarding HMR and measuring their positive outcome expectancy and willingness to use the service. This could be followed by observation to see whether the content influenced participation.

This thesis covered some patient-related factors which influenced willingness. Another area for research would to investigate which other factors may influence willingness. It was demonstrated that the consumer’s GP had an important role. Future research could determine whether for example, the communication skills of the consumer’s
GP’s influences willingness to use the service. Another possibility is that consumer’s regular pharmacist may have a role in influencing willingness.

Finally, further research is warranted to understand the full potential of “knowledge hassles”. It has been known for some time that experiencing daily hassles is associated with the tendency to interpret events as threatening and with the tendency to seek out threat-relevant information. This research took a deeper look at this relationship. This is the first time that a relationship has been drawn between the specific feelings of being stressed about processing information on a health topic; and a willingness to seek information about that topic. These findings have important implications for pharmacotherapy and for the development of theory of information-seeking behaviour. If confirmed in other contexts, the assessment of knowledge hassles could be a useful tool in health provider – client communication.
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APPENDIX A

CONSUMER PERSPECTIVES OF THE AUSTRALIAN HOME MEDICINES REVIEW PROGRAM: BENEFITS AND BARRIERS

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Research in social and administrative pharmacy 2012;
8(1); 4-16; DOI: 10.1016/j.sapharm.2010.11.003
Original Research

Consumer perspectives of the Australian Home Medicines Review Program: Benefits and barriers

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Abstract

Background: The Australian Home Medicines Review (HMR) is a free consumer service to assist individuals living at home to maximize the benefits of their medicine regimen and prevent medication-related problems. It consists of a pharmacist reviewing a person’s medicines and collaborating with the general practitioner to optimize the individual’s medicine management. The uptake of this service has remained below the projected use, although the program has shown to successfully identify medication-related problems and improve drug knowledge and adherence of the patient.

Objectives: This study investigates the perceived benefits and barriers of the patients regarding the HMR service who have used the service and who are eligible for it but have never used it.

Methods: Consumer perceptions were drawn from 14 semistructured focus groups, with patients and carers belonging to the general HMR target population and consumer segments that have been postulated to be underrepresented with regard to this service.

Results: The major benefits reported were acquisition of medicine information, reassurance, feeling valued and cared for, and willingness to advocate medication changes to the general practitioner. Perceived barriers were concerns regarding upsetting the general practitioner, pride and independence, confidence issues with an unknown pharmacist, privacy and safety concerns regarding the home visit, and lack of information about the program. Participants agreed that the potential benefits of the service outweighed its potential barriers.

Conclusions: It is expected that direct-to-consumer promotion of HMRs would increase the uptake of this valuable service. It would be necessary to ensure that the process and benefits of the service are communicated clearly and sensitively to eligible patients and their carers to obviate common consumer misconceptions and/or barriers regarding the HMR service. Furthermore, any direct-to-consumer promotion of the service must enable patient/carer self-identification of eligibility.

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Keywords: Medication; Users’ experiences of health care; Focus groups; Patient education; Risk perceptions

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1551-7411/S - see front matter © 2012 Elsevier Inc. All rights reserved.
doi:10.1016/j.sapharm.2010.11.003
Introduction

In 2001, the Australian Government established the Home Medicines Review (HMR) Program to assist patients living at home to maximize the benefits of their medicines and prevent medication-related problems. An HMR is a free consumer service provided jointly by doctors and pharmacists specifically for patients who take multiple medicines each day; have recently spent time in hospital; see multiple general practitioners (GPs) and/or specialist doctors; or are concerned, confused, or uncertain about their medicines. The service is initiated by the patient’s usual GP who generates a referral to the patient’s local pharmacist. The latter organizes a specially trained pharmacist to conduct an interview with the patient, preferably in the patient’s home. During the approximately 1-hour long visit, the patient’s medicines are discussed and inspected. The pharmacist summarizes his/her findings in a report to the GP, who then discusses any recommendations with the patient and may make appropriate changes to their medication regime. The involvement of a carer in this process is optional and depends on the individual relationship between the patient and carer.

The HMR and similar international programs have been found in multiple studies to successfully identify clinically significant medication-related problems, improve the drug knowledge and adherence of the patient, improve patient health, and potentially enhance the relationships between the GP, pharmacist, and patient. It is, therefore, in the public interest that this cognitive pharmacy service is effectively used by patients who are at the highest risk of medication misadventure. However, recent research confirmed that those in greatest need of an HMR are the least likely to receive this service.

Although numerous studies have investigated the attitudes of pharmacists and GPs, the health care providers involved in the HMR program, and strategies have been proposed to increase the uptake of the program by these stakeholders, the literature on consumer perspectives is relatively sparse. Only a few studies have investigated the perceptions and/or satisfaction of HMR patients, all resulting in the conclusion that service recipients are generally very pleased and well satisfied with the HMR service and that they “recognize the benefits arising from the process.” However, no specific data exist on the perceived benefits and barriers from the perspective of HMR recipients versus those of eligible nonrecipients, nor on the role of carers, particularly informal carers, in the uptake and provision of HMRs, who have been found to attend approximately 34% of all HMR interviews.

Likewise, there is a lack of research on the perceptions of specific consumer groups that are underrepresented as HMR recipients, some of which are believed to be at a higher risk of experiencing medication problems than the general HMR target groups. Based on a pharmacist survey, Schwartzkoff identified these underserved groups to be older males, people of diverse cultural and language backgrounds, those living in remote or rural (isolated) areas, Aboriginal and Torres Strait Islanders, young people with chronic illnesses and/or other serious health problems, and customers of smaller (e.g., 1-pharmacist) community pharmacies. Schwartzkoff et al. explained that older males are less willing to seek and accept health care assistance and that “younger patients were rarely asked to consider having an HMR,” it has been very difficult for small (particularly 1-pharmacist) pharmacies making HMR home visits, community pharmacies in rural locations often find it difficult to deal with HMR referrals, and indigenous people and communities of diverse cultural and language backgrounds are “consistently identified as disadvantaged in access to health services.”

A more recent study commissioned by the Australian Government argues that certain patients in the period immediately after hospital discharge, indigenous consumers, culturally and linguistically diverse consumers, palliative care patients, and noncompliant or nonadherent consumers, all being at highest risk of medication misadventure, appear to have rarely received an HMR.

This article examines and compares the perceptions of HMR recipients toward the HMR program with those of eligible nonrecipients and investigates the attitudinal differences between the overall HMR target population and the underrepresented segments identified by the

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a Patients who have had an HMR in the recent past.
b Patients who have never had an HMR but would qualify for this service according to the Australian Government’s eligibility criteria and risk factors.
Schwartzkopf study. Additionally, attention is given to the attitudes of carers of both HMR recipients and eligible nonrecipients.

**Methods**

**Data gathering**

A total of 14 focus groups were conducted with 87 HMR-eligible patients and carers who were recruited through voluntarily participating pharmacists throughout Australia. The pharmacists approached potential participants either while dispensing medicines for them or on the occasion of an HMR visit. In addition, carers were recruited from a support group for family carers. Assurances were given regarding anonymity and confidentiality. All participants agreed in writing to the research content and process, including audiotaping of the focus groups. Respondents were given an AS$50 reimbursement to cover their costs and time for attending a focus group. Ethics approval was obtained from the University of Sydney Ethics Committee.

Semistructured focus group discussions were chosen as the most appropriate method of data collection. It has been shown that focus groups offer researchers a powerful investigative potential, especially in the areas of consumer behavior, patient-provider collaboration, health literacy research, and disease and medication management. Specifically, the group discussion format can stimulate the exchange of ideas, assist participants to refine their individual viewpoints by comparing them with other people’s opinions, help participants develop their thoughts and beliefs, and stimulate the articulation of attitudes. Moreover, focus groups can provide a protecting place that gives participants a sense of community, which makes them more comfortable in expressing their opinions. Participants are more likely to bring up and discuss concerns and negative thoughts in focus groups than in other data collection methods.

Moderated by HMR-experienced pharmacist researchers who were experienced in qualitative research, the semistructured focus group sessions were opened by a brief statement of the purpose of the focus group and an invitation to discuss how respondents obtain their medications, what kind of medicine problems they tend to experience, and how they manage these. The relationships of the participating patients and carers to their pharmacists and GPs were then explored. After this introductory discussion, the HMR program was explained to eligible nonrecipient groups, and participants were asked about their opinions of this service and whether or under which circumstances they would consider using it. Themes discussed were the character and qualification of the HMR pharmacist, the influence of the HMR on the relationship with the patients’ local community pharmacist and GP, the potential effects of the HMR on the patients’ current medication management, the disclosure of the patients’ medical records to the reviewing pharmacist, privacy and safety issues in relation to the home visit, and the participants’ ideas regarding HMR follow-up activities as well as their overall thoughts and feelings concerning this service.

In addition to the above points, the HMR recipient groups were also asked about their expectations and potential concerns regarding the HMR service during the initiation phase of the HMR (before the HMR visit) and whether and how these attitudes changed during and after the HMR interview. In addition, the HMR recipient groups were encouraged to talk about any actual changes resulting from the HMR visit and subjective outcomes, such as health and quality-of-life changes. They were asked about their overall satisfaction with the service, about any suggestions they could think of for improving the service, and whether they would have another HMR in the future and/or recommend it to friends and family.

In all groups, it was investigated whether participants would actively ask their GP for an HMR referral. The focus group sessions were concluded with a facilitator’s summary of the discussion and the respondents thanked for their time and involvement. Each focus group took between 30 and 70 minutes, depending on the number of participants and their level of interest in the topic.

**Participants**

In total, 87 consumers participated in 14 focus group discussions held in 4 states of Australia.
The groups included 69 patients and 18 carers as well as 8 respondents who identified as both patients and carers. Of the 14 focus groups, 8 consisted of eligible non-recipients (patients and carers) and 5 consisted of HMR recipients (patients and carers). In addition, there was 1 carer-only focus group consisting of 2 carers of HMR recipients and 4 carers of eligible non-recipients.

For the purpose of this study, patients were defined as persons who had had an HMR in the past 6 months (HMR recipients) and those who had never had an HMR but were eligible for this service according to the Australian Government’s eligibility criteria and risk factors for HMRs\(^\text{6}\) (eligible non-recipients). Carers were defined as persons who provide support to someone with a disability, mental health problem, chronic condition, or who is frail aged. They could be family members, friends, or employees who care for the patient for between a few hours a week or all day every day.

The average number of participants per focus group was 6, with a range of 3-10. The age of the participants ranged from 33 to 91 years. Forty-five percent were male, and 55% were female. A definition of each consumer segment and the number of focus groups conducted for each are listed in Table 1. Carers and patients participated in 12 of 14 focus groups with an approximate carer-to-patient ratio of 1:3. No specific focus group was held with younger chronically ill HMR recipients because of a lack of suitable and interested patients.

**Analysis**

All focus group discussions were audiotaped and transcribed verbatim with tracking of individual speakers. In addition, the moderators’ assistants made detailed session notes on seating order, body language, and indications of group mood. Each focus group session was debriefed by the involved research team members, with the impressions of agreement and controversy discussed and the findings summarized in an abridged report. Thematic analysis was used to analyze the data involving a 3-step process\(^\text{12}\): (1) Using NVivo 8 (QSR International [Americas] Inc., Cambridge, MA, USA), codes were generated and collated into tentative themes, which were checked back across the entire data set; (2) the codes were connected into categories and subcategories and relationships established between categories to find themes; and (3) the themes were mapped and defined and names for each theme generated. Discrepancies between researchers were resolved in team discussions involving the chief investigator and the 2 coresearchers.

**Results**

The benefits and barriers of HMRs perceived by recipients and eligible non-recipients of the investigated consumer groups are described in the following sections. Many of the attitudes are shared by the various respondent groups (recipients/eligible non-recipients, patients/carers, and general HMR target groups/low-use segments). The results, therefore, cover the common views, and where disparate perceptions were raised by specific subgroups, these are noted. A summary of the perceived HMR benefits and barriers including additional participants’ quotes are depicted in Table 2.

**Perceived benefits of HMRs**

Participants identified 4 key benefits of having an HMR: acquisition of personalized information and advice regarding medications; reassurance regarding medications and coordination of their care; feeling valued and cared for by a healthcare provider; and enhancing the patient-provider and pharmacist-GP relationships. Sorting out the medicines cabinet and ensuring that the medical

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\(^\text{6}\) HMR eligibility requirements as set out by the Australian Government (http://www.health.gov.au/internet/main/publishing.nsf/Content/ppsac-hmr). Patients who may benefit from a HMR include those:

- taking 5 or more regular medications;
- who are confused or worried about their medicines (or forget to take their medicines);
- taking more than 12 doses of medication per day;
- who have had a significant change to their medication regime;
- with literacy or language difficulties, dexterity problems, impaired sight, or those with cognitive difficulties such as dementia;
- seeing a number of different doctors, including GPs and specialists;
- recently discharged from hospital.
records of the GP are up-to-date were reported as secondary benefits. The following sections describe each of these attitudes in detail.

**Information acquisition**

The first unprompted benefit raised by participants in every focus group was the opportunity to acquire personalized information and advice regarding medications. Most respondents reported that the medication instructions that they received from their health care providers (doctors and pharmacists) were sometimes vague and/or inadequate. Printed medicine information sheets distributed by pharmacists were largely seen as being too general, confusing, and “fear mongering,” rather than being a valuable source of information. Other sources of medicine information such as the Internet and organizations such as the National Prescribing Service were mentioned as being helpful but were not considered to be sufficiently specific to the individual’s health circumstances. Therefore, participants regarded the HMR as an ideal opportunity to better understand the correct dosage and administration method and the effects of each prescribed medicine in relation to their individual disease states as well as to dispel any confusion, such as that caused by brand substitution. A need for more information about possible medication interactions and side effects was also raised, and thus, overall, the respondents saw a need to identify inappropriate or detrimental medication therapy.

**Reassurance and coordination of care**

HMR recipients reported that the HMR visit gave them a strong sense of “peace of mind” that their drug regimen was adequate, coordinated, and up-to-date. A lack of reassurance from prescribing doctors and dispensing community pharmacists and an awareness of increasing (usually age related) cognitive difficulties coping with the prescribed medication regimen were described.

Having [the HMR-pharmacist] check on me [was important] because I’m getting a bit old.

Likewise, eligible nonrecipients of all consumer segments considered “reassurance” to be a key benefit of an HMR. This was often driven by

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Table 1

<table>
<thead>
<tr>
<th>Consumer segment</th>
<th>Definition of consumer segment</th>
<th>Number of HMR recipient focus groups</th>
<th>Number of eligible nonrecipient focus groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Older males</td>
<td>Male patients aged 75y and older</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Younger patients</td>
<td>Patients younger than 65y, who have a chronic illness and/or other serious health problems</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>People living in remote and rural areas of Australia</td>
<td>Patients and carers who belong to the PHARIA categories 2-6. Pharmacies located in these areas are eligible for the Rural Pharmacy Maintenance Allowance</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Customers of smaller pharmacies</td>
<td>Patients and carers whose regular community pharmacy usually has only 1 pharmacist on duty at any one time</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>General HMR target population</td>
<td>Patients and carers who are not included in any of the above segments</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

HMR recipient (general): When I started taking tablets, I had no idea what I was taking or what for ... I’ve had my home review and I’ve just asked about side effects to some of the medication that I’ve been taking and [the HMR-pharmacist] explained that to me, which was good.

However, some respondents, particularly customers from smaller pharmacies, mentioned that they already received extensive and satisfactory medication advice from their local pharmacist.

When [the pharmacist] is giving you the [medications] they go through it, even though you’ve got the stuff ... time after time, they will still go through it with you.

[In response to the facilitator’s question if they worried about the interactions between medications]: Well, I don’t because that’s where I leave it to the pharmacist.

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Table 2
Perceived benefits and barriers of the HMR—participants’ voices

<table>
<thead>
<tr>
<th>Benefit/Barrier</th>
<th>HMR recipients or their carer</th>
<th>Eligible nonrecipients or their carer</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Benefits</strong></td>
<td></td>
<td></td>
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</tbody>
</table>
| Information acquisition                  | *I actually had my medicines in the wrong spot at one time and [the HMR-pharmacist] just said … put them in the wardrobe in a cooler spot.* (General).  
*The pharmacist gave us a lot of information and it was fantastic.* (Remote and rural) | *Well, you—at least you’d learn what you’re actually taking and what it is for.* (General)  
*You would get a more thorough evaluation of what type of, what you’re taking and … what other things might be interacting with what you’re taking maybe.* (Younger chronically ill)  
*Excellent idea [the HMR], yes. Especially taking a few tablets, you might be taking them at the wrong time. They can clash with each other.* (General) |
| Reassurance and coordination of care     | *[The HMR gives us] a little bit more confidence in taking our medication. Before we were a bit apprehensive taking it because of not knowing if [the medicines] counteract each other. I thought it [the HMR] was very interesting because it had always worried me about the amount of pills and things.* (General) | *Each specialist you go to only treats what he treats and he might give you a medication which will interact in a bad way with another drug from another specialist. They very rarely contact each other, the specialists. In the end you have all these doctors and you need someone like the pharmacist to tie it all together.* (General)  
*[I was] going to the diabetes center …, and they changed blood pressure medication. And as soon as I went back to the other doctor, he says no, we won’t do that … So I go to the specialist center and then he decides no, we’ll do something else. You go back up in and say well why did he change it? I said, well, I don’t know … and you’re caught in sort of a war of doctors sometimes.* (Younger chronically ill) |
| Feeling valued and cared for             | *[The reviewing pharmacist] came in, not judging whatever medication you’re on. She was there just to help you, to make sure that you were happy with your medication, to make sure you knew everything about [them].* (General) | *I think it [the HMR] gives you a sense overall of knowing that there’s somebody out there that really gives a damn.* (General) |
| Enhancing communication and relationships | *[The HMR-pharmacist] didn’t think the two [medications] together were quite right so when we went to the doctor, she changed her medication around because the chemist had sent her a note … I think that’s a really good idea.* (Older Male)  
*Even after the tablet review [HMR], he’ll [the pharmacist] always ask you is there anything perhaps that he could put down to alert the doctor to.* (General)  
*Well, I felt I knew my new doctor better [after the HMR] because he got a [medication review] report from the pharmacist.* (Remote and rural) | *It’s opening up the communication between the pharmacist and yourself, and the doctor so that if there are any complications arising from the prescribed medicines, that you’re taking you can pass it on to your pharmacist who then passes it on to your doctor.* (General) |

(Continued)
a fear of taking too many or too much medication and, thus, experiencing side effects. Additionally, eligible nonrecipients from the various segments hoped that the HMR would help them coordinate an overall picture of their medications when seeing multiple GPs and specialists and using different pharmacies.

Carers appreciated that the HMR would help them share their responsibility for the patient’s medicines, hence relieving some of the carer’s emotional stress.

**Carer of HMR recipient:** We have feed in from all the doctors and because I know a little bit I do just correlate [the information] … [but the HMR is] just taking all that more pressure off me.

**Feeling valued and cared for**

Many respondents were extremely keen about (eligible nonrecipients) and pleased with (HMR recipients) the opportunity to receive undivided attention from a health care provider and spend a relatively long time talking with a pharmacist who would listen nonjudgmentally and address their questions and concerns. The concept that a health care professional would help them through a variety of highly personal, often worrying health and medication issues was immensely powerful and engendered participants’ emotions of feeling valued and cared for. Interestingly, the older male HMR recipients placed a high value on the reviewing pharmacist’s professional and interpersonal skills.

**I think** [the reviewing pharmacist] would need to be more experienced. A senior. They would need to understand people as well as the effects of the medications.

**Enhancing communication and relationships**

A perception of the respondents’ strengthened relationships with the local pharmacist and GP, and between the pharmacist and GP, was another
core benefit, specifically, but not solely identified by HMR recipients. Although a few respondents stated that their doctor and pharmacist had always collaborated well, the common view prior to having an HMR was that the relationship between GP and pharmacist was superficial or virtually nonexistent:

Carer: I don’t think the doctor has communication with the pharmacy ... What I’m saying is that once your doctor gives you the prescription you can go to any pharmacist so the doctor is not aware where you’re going.

Carer: I think the doctor and the pharmacist, each of them are trying to protect their patch and ... I don’t know whether they’re going to sort of happily interact with one another.

The HMR was perceived as a conduit to improving these relationships.

Other benefits
Secondary perceived HMR benefits were the practical advantages of sorting out the patient’s medicines on hand, disposing of unnecessary or expired medications, and keeping the doctor’s records of the patient’s medications up-to-date. The identification of prescribing and other errors was very rarely mentioned spontaneously as a perceived benefit of an HMR and even when raised by the facilitator, there was little support for this because of the extremely high levels of trust in both the GP and the pharmacist. Even on prompting, the possible advantage of saving money was not seen as a benefit of HMRs. On prompting, the possibility of an HMR leading to greater independent living was considered valid by only 2 groups (older males and remote and rural HMR recipients).

Perceived barriers to HMRs
Among those who never had an HMR (eligible nonrecipients), possible barriers that would deter them from having an HMR were noted. Concerns focused (in decreasing order of frequency) on the fear that the HMR could cause deterioration in their relationship with their GP, the belief that they do not need an HMR, having the HMR with an unknown pharmacist, and privacy issues. In addition, eligible nonrecipients regretted that lack of HMR knowledge had prevented them from receiving this valuable service.

Concern about upsetting the GP
A significant proportion of respondents felt that GPs ranked higher than pharmacists in the health care hierarchy. They believed that GPs might, therefore, be reluctant to accept medication recommendations made by pharmacists and become upset with the patient for having or asking for an HMR.

HMR recipient A (general): I don’t think the GP would like suggestions from the pharmacist. HMR recipient B: Most doctors will take, uh ... HMR recipient A: They take offence.

Some customers of smaller pharmacies perceived the pharmacist to be in a good position to conduct the HMR and give the GP formal feedback because they were seen to have more up-to-date and specialized medication knowledge and be less influenced by drug companies than GPs. Participants from the general HMR target group were split about their trust in the pharmacist’s ability and authority to give the GP medication feedback.

Respondents from several consumer segments highlighted that better promotion of the HMR program to GPs could help alleviate negative attitudes that GPs might have toward the service, thus enhancing the likelihood of the HMR being offered to patients at risk. One respondent even suggested that the HMR service was so beneficial that it should be compulsory for doctors to offer them to their patients. Another patient summarized the core role that GPs play in the HMR program by stating: We need to work on the doctors and get the doctor to (promote HMRs) (HMR recipient, customer of small pharmacy).

Pride and independence
Respondents who perceived that they had no need for an HMR believed that they knew enough about their medications and are in control of them but would be open to have an HMR in the future, particularly if their cognitive abilities deteriorated.

Eligible non-recipient (younger chronically ill): Some people might see [having an HMR] as an admission that they’re getting more dependent, so the younger age groups don’t want to do it, but the older age groups have learned to live with that feeling of maybe slightly more dependency, and it’s not an issue for them.

One carer of an HMR recipient was careful not to tell friends or family about the HMR experience in order that she and her husband whom she cared for were not seen as dependent or inferior.

I haven’t told any relatives or any friends of my husband’s peccadilloes because I’m frightened they will see him as a devalued person.
However, most other HMR recipients were pleased to discuss the service with others without reservations.

**Unknown pharmacist**

Discussing the scenario of an unknown pharmacist conducting the HMR, several eligible nonrecipients perceived this as a barrier to a satisfactory HMR. These respondents felt less comfortable with the thought of an unfamiliar pharmacist conducting the HMR and would not as readily entrust personal information to them as they would to their regular pharmacist. Some also thought that an unknown pharmacist would be less credible to the patient’s doctor.

*Eligible non-recipient (older male):* Well, there would be a barrier between you and the chemist if you don’t know them.

Other eligible nonrecipients and HMR recipients, on the other hand, regarded an external pharmacist as a welcome opportunity to gain a second opinion to check on any medication problems that their local pharmacist or GP did not pick up and to steer clear from a potential conflict of financial interest that their local community pharmacist might have.

*Eligible non-recipient (younger chronically ill):* Even if you had two qualified people, having a second person looked at, it might be a benefit to pick up one thing that someone else couldn’t see.

*Carer:* Well, I think they [unknown pharmacists] are objective and I see it as a check on the [local] pharmacist and the doctor in case, you know, they overlook something.

**Home privacy and safety concerns**

Particularly some younger chronically ill patients expressed concerns regarding the HMR being conducted in the patient’s home. They felt more comfortable having the HMR in a neutral place, conceding that the review would be more thorough if it was done in the patient’s home. Older males, participants from the general target groups, and customers from smaller pharmacies were only apprehensive of allowing the HMR pharmacist into their home if the pharmacist was not previously known to them. In such cases, identification, such as a prior phone call to announce their arrival at a particular date and time and a uniform or badge, would alleviate their safety concerns.

Most eligible nonrecipients, however, seemed to feel at ease with the home visit and perceived that the medicines review was best conducted in the patient’s usual living environment.

*Eligible non-recipient (general):* I’d rather have [the HMR] in the home. I wouldn’t want anyone else to see my big bag of goodies!

Interestingly, none of the HMR recipients had any home privacy concerns. They found the patient’s home to be an ideal venue because it made them feel comfortable without time restraints.

*HMR-recipient (remote and rural):* You feel more comfortable in your own home. ... it’s more personal. You’re also not time-limited either, whereas in the pharmacy you can see all the people lining up.

*HMR-recipient (general):* Being at home is a different atmosphere ’cause if you go to the chemist and you’re asking [questions], there’s people around you and listening, there’s not the same feeling.

Carers of HMR recipients valued the home visit because of the physical difficulties of transporting elderly sick patients to different places.

**Desire for more information before and subsequent to the HMR**

A number of HMR recipients wished they had been better informed about the HMR process before having the HMR. Some, for example, thought a nurse would conduct the HMR; another person was upset to learn that the HMR pharmacist was informed about her medical diagnoses without her consent. Others were confused about the role of the HMR pharmacist, speculating that they were merely monitoring the patient’s medication adherence.

*When [the pharmacist] came, I thought ‘I wish I knew she was going to say this, I would’ve like prepared differently’.*

Likewise, many HMR recipients did not know that the HMR pharmacist issued a post-HMR report to the GP. Several respondents were disappointed that they were not informed of this and wanted to receive a copy of the report to understand the pharmacist’s recommended actions, to feel in control of the HMR outcomes, to be able to refer back to it for future reference, and/or to be informed about the content of the communication between pharmacist and GP. Participants from the younger age groups particularly wanted to ensure that the post-HMR advice from their GP was consistent with the pharmacist’s recommendations.
Eligible non-recipient (younger chronically ill):
It'd be interesting to see the original report rather than have it filtered through the doctor ... Because the doctor might filter what he reads and even subconsciously, so you can say, well, what did he mean when he said this and whatever, put him on the spot.

Furthermore, the need for an up-to-date medication list of what to take as well as when and how was repeatedly raised by participants of various consumer segments.

Eligible non-recipient (general): I actually presumed there was going to be a written ... statement to say, you know, if you're taking something in the morning you should be taking at night, he [the HMR-pharmacist] can just write down: 'make sure you take such and such at night', just in simple one-syllable words and you're there, and your family can see that too when they come.

Most participating eligible nonrecipients regretted that they had not known about the existence of the HMR program before participating in this study and suggested that this valuable service should be promoted more widely.

Some carers of HMR recipients felt completely excluded from the HMR process. They regretted that they were not invited, hence were not present at the medication review, and that they did not receive any feedback on the HMR results, which compromised their ongoing care for the patient.

[The patient] told [the pharmacist] that [the carer] didn't care for her properly. I didn't know what had been written about us [the carer] ... [as the pharmacist] said "due to privacy I can't show you that form" ... But then the thing what upset me was, what if what she said was true. What if I wasn't looking after her properly? Nobody followed it up.

Overall, it was observed that HMR recipients, although some of them had had major reservations prior to having their first HMR, were highly satisfied with their HMR experience and desirous of having another HMR if appropriate. Eligible non-recipients were split between those who wanted an HMR or would be happy to have one if their GP requested it for them and those who did not see a personal need for having an HMR (at the present time) in spite of recognizing the benefits that the HMR service provides and perceiving it as a valuable service for others. No respondent perceived the service to be of no value. The congruence of attitudes toward the HMR between eligible nonrecipients and HMR recipients before receiving the service demonstrates that there is no evident difference between the groups with respect to their willingness to participate in an HMR.

Discussion

Although this study’s finding of the high consumer satisfaction levels with the HMR is consistent with the results from earlier studies,1,8,9 the insights that this study gained into specific problems that patients and carers perceived regarding accepting or asking for an HMR are new. These concerns need close examination because they could influence whether the service is taken up by high-risk patients or refused with the resultant risk of the patients experiencing adverse drug events.

The most prominent concern voiced by all types of participants was the worry that their participation in an HMR could upset the GP, which meant that there was the possibility of patients rejecting having an HMR even before discussing this with their doctor. The role of the GP as being the gatekeeper to the uptake of HMRs has been identified in several studies, one of which suggested, “the HMR referral is GP generated rather than led by patient demand.”15 Similarly, it has been argued that the HMR uptake will remain low without a change in the level of support for the program by GPs.8 In addition to these findings, this study reveals the direct link that exists between the consumer awareness of the GP’s power position and its negative implications for the HMR uptake in the patients’ minds, specifically in situations where the HMR was suggested to the patient by someone other than the GP.

Another concern that could impede the uptake of the HMR was the reported lack of transparency about the HMR process, which points to an absence of a thorough patient education process regarding the purpose, benefits, and procedural steps of the HMR at the time of its initiation. The implications of underinformed consumers who may hold incorrect assumptions regarding a health service that they can choose to accept or reject are concerning. As Fogg12 notes: “What a person thinks is the purpose of a medication review is likely to influence their perception of its appropriateness and usefulness.” It is thus suggested that adequately addressing the service benefits and potential recipient concerns at the time of the service initiation could not only help patients.
to have a clear and positive picture of what to expect but also obviate any reservations related to issues of pride and independence, an unknown pharmacist, and/or domestic privacy.

Another concern that emerged from this study is the perception held by some carers of being left out of the medication review process and, related to that, the carers’ uncertainty about their care recipient’s medication issues. Similar problems have been identified by Smith et al.\textsuperscript{16} who found that approximately 5% of the carers who participated in their study wanted more information on routine medication details. Although the carers in the study by Smith et al.\textsuperscript{16} reported problems of not being informed about their care recipients’ medication changes, they were at the same time aware of the prescribers’ dilemma in juggling information disclosure to carers with the care recipients’ right to privacy. Other studies found that managing medication contributed to the stress of caring,\textsuperscript{17} carers generally expressed stronger information needs and required different types of information than patients,\textsuperscript{18} and the provision of specific information to carers was vital in the process of developing competency as a carer.\textsuperscript{19,20} The undermet information need of carers has shown to cause widespread dissatisfaction of the carers\textsuperscript{21-23} and added to the carers’ difficulty in defining their caring position in relation to the care recipient and their health care professionals.\textsuperscript{21} In light of this existing research, our study findings are a timely reminder that it is necessary to review the role and status of carers in the provision of HMRs to care recipients.

The disinclination of older male eligible non-recipients to seek medication advice and their skepticism about how they could benefit from an HMR is another noteworthy issue. An integrative literature review that critically analyzed 124 studies on help-seeking behavior in the context of sex supports the assumption that masculinity beliefs of white middle-class men are significant variables influencing their health risk appraisal and help-seeking behavior. The review reported that men were poor attendees for preventative medicine, consistently ignored symptoms of ill health, and avoided or delayed seeking professional help from the health services for fear of “appearing weak, hypochondriacal (sic), or lacking in masculinity.”\textsuperscript{24} Such sex-specific ideologies could be an important factor in a man’s decision to accept or seek an HMR, but further research is required to investigate the variations between men of differing socioeconomic status, age, and ethnicity. It is critical that any promotional messages for the HMR service emphasize that having an HMR is not an admission of inferiority or lack of independence.

Finally, inferences can be drawn from the perceptions of customers of smaller pharmacies, who appeared better informed about their medications and exhibited relatively higher levels of self-confidence with managing their medicines, higher awareness levels of the HMR program, and better relationships with their local pharmacist than other groups. Although this finding needs to be verified through further research, it highlights the value and importance of the day-to-day consulting and advisory role of community pharmacists, particularly with regard to patients who would benefit from enhanced medication advice but do not belong to the most at-risk HMR target groups.

In summary, it is expected that direct-to-consumer promotion of the HMR program could greatly increase the uptake of this valuable service. Care must be taken that any promotional messages clearly communicate details about the HMR purpose, process, and benefits as well as the patient eligibility criteria to obviate misconceptions and/or barriers regarding the service and prevent the misuse of the service by those who are not at (highest) risk of medication misuse.

**Study limitations**

There are several limitations of this study. First, the participants of the carer-only focus group were recruited from a carer support group. Consumers attending support groups are likely to be more highly educated, desire more information, and/or use more adaptive coping strategies.\textsuperscript{25} It might, therefore, be possible that the views of the carer-only group were more sophisticated or detailed than those of the average carer or that any concerns that more aware and/or maturated carers might have already processed remained unreported. However, the comments from the mixed patient-carer focus groups, where the carers were not recruited through a carer support group, are largely congruent with the comments of the carer-only group.

Second, studies based on focus group research are limited by the social contexts in which they are situated, potentially causing problematic silences and/or exaggerated speech.\textsuperscript{26} However, such potential drawbacks may have been outweighed by the opportunities that the group sessions offered.
Specifically, the unfolding group dynamics helped participants to explore and clarify their own perspectives, stimulated the exchange of experience in a relaxed atmosphere fostering mutual disclosure, and highlighted the values shared by patients who are at risk of medication misadventure.27

Third, patients who were offered but refused to have an HMR were not specifically recruited for this study, and neither did the study include patients who are housebound because of their physical inability to attend a focus group. However, it is assumed that housebound patients would usually have a carer, and the inclusion of carers in this study could have, therefore, to some extent mitigated the exclusion of housebound patients. The perceptions of patients who refused an HMR would be a valuable addition to this research. Furthermore, research with larger patient samples and quantitative research would be beneficial to verify correlations, for example, between patients’ attitudes toward HMRs and their relationships with doctors and pharmacists.

Conclusion

Although individuals who had experienced the HMR were overall highly satisfied with the service, a number of barriers to the use of the HMR program were identified regarding that might be addressed by means of direct-to-consumer promotion. Care must be taken that in any such promotional messages, the purpose of the HMR, its procedural steps, and its benefits are clearly communicated to the public to prevent the occurrence of common misconceptions and/or barriers regarding the service. Attention has to be given not to exclude carers of HMR-eligible patients from the medication review process and to address older male patients in a sex-sensitive manner. Additionally, it is of utmost importance that any marketing strategies include a precise and easily understandable definition of the HMR eligibility criteria to capture the most at-risk HMR target population and decrease the probability of noneligible patients requesting an HMR from their GP.

Acknowledgment

This project was funded by the Australian Government Department of Health and Ageing as part of the Fourth Community Pharmacy Agreement Research and Development Program managed by the Pharmacy Guild of Australia.

References

APPENDIX B

HOME MEDICINES REVIEW WEBSITE INFORMATION:
CONSISTENCY OR CONFUSION?

SR Carter
L White
Australian Pharmacist 2010;
29(10); 882-888
Home Medicines Review website information: consistency or confusion?

Abstract

Introduction: Since consumer awareness and understanding is a significant component of the success of the Home Medicine Review (HMR) program, the publicly available information regarding the benefits and eligibility criteria is of interest. The objective of this study was to compare and contrast the information regarding HMRs made available for consumers from a variety of sources, using the most easily accessible channel, the internet.

Methods: A thorough internet search of health professional and consumer directed information about HMRs was conducted. A content analysis of all information relevant to HMRs on two health professional sites and five consumer-directed sites was performed and comparisons were made.

Results: Four themes were derived from the analysis: 1) Rationale for HMR, 2) HMR objectives, 3) Patient counselling, and 4) The use of medication risk factors in statements about eligibility criteria. Comparing a variety of professional and consumer resources about HMRs, the present study found a lack of consistency between resources in HMR information in three main areas: 1) the medication risk factors, which are used to define those persons who may receive benefit from and be eligible for HMRs, 2) the use of subjective patient perceptions of negative experiences with, or emotions about medicines, which, if used, could empower consumers to self-identify for the program, and 3) the description of positive elements of communication during the HMR interview, such as the extended length of the interview with the pharmacist and the opportunity to have questions answered by the pharmacist.

Conclusions: Consumer-directed resources may lack salience because medication-related problems, the resolution of which underpins the program, are conceptually vague and the various descriptions of the need for HMRs omit specific details about the nature of the problems such as timing of administration, drug interactions, or that prescribed medications may, for a variety of reasons, be inappropriate. In order to improve message consistency and salience for consumers, future research and discussion is needed in order to optimally describe HMR benefits through the use of objective risk factors, subjective or perceptual factors, descriptions of medication-related problems and communication opportunities afforded.

Introduction

With the objectives of improving medication management, maximising therapeutic benefit of medicines and reducing adverse events, Home Medicines Reviews (HMRs) are provided by general practitioners and pharmacists for patients who are at risk of medication misadventure. Growing steadily since 2001, the HMR program provides approximately 4,000 services per month throughout Australia. The service is expected to grow, as funding for the HMR program as been allocated by the Fifth Community Pharmacy Agreement; however, in order to ensure that the program is cost effective, HMRs should only be provided to the consumers for whom benefit is most likely.

The Australian Government Department of Health and Ageing (The Department) has assisted the
industry to manage participant selection by providing health professionals with a list of risk factors for medication misadventure within descriptions of service benefit and consumer eligibility guidelines. Eligibility for an HMR is constructed on the premise that the patient is at risk of harm because of a medicines management issue, rather than the patient being at risk because of a demographic factor, the presence of a particular disease state or overall health status. The Department has recently refined health professional information regarding HMRs, and this will be referred to in this paper; however, between 2001 and 2009, the following examples of risk factors were provided:2

1. Currently taking 5 or more regular medications;
2. Taking more than 12 doses of medication/day;
3. Significant changes made to the medication regimen in the last 3 months;
4. Medication with a narrow therapeutic index or medications requiring therapeutic monitoring;
5. Symptoms suggestive of an adverse drug reaction;
6. Sub-therapeutic response to treatment with medicines;
7. Suspected non-compliance or inability to manage medication related therapeutic devices;
8. Patients having difficulty managing their own medicines because of literacy or language difficulties, dexterity problems or impaired sight, confusion/dementia or other cognitive difficulties;
9. Patients attending a number of different doctors, both general practitioners and specialists; and/or
10. Recent discharge from a facility/hospital (in the last 4 weeks).

Inclusion of most of these risk factors was evidence-based in that experimental studies demonstrated a relationship between the risk factor and adverse events, for example unplanned hospital admission. Whilst a detailed description of the origin of each risk factor is beyond the scope of this paper, risk factors 1,2,3,4,7, and 9 appear to have been adapted from the study by Koecheler.3 There is considerable evidence that physical or cognitive problems (risk factor 8) and hospital discharge (risk factor 10) are associated with medication-related problems. Having symptoms suggestive of an adverse reaction (risk factor 5) and sub-therapeutic response (risk factor 6), by definition, indicate that medication misadventure is present.

The issue of whether or not HMRs have been successfully targeted to those most in need was discussed in a recent Australian government-commissioned qualitative evaluation of the HMR program.4 The authors suggested that there was an inconsistent uptake of the service across the community among those patients most ‘at risk’ of medication misadventure and concluded that HMRs should be targeted to those ‘at risk’ of medication misadventure, including Indigenous consumers, culturally and linguistically diverse consumers and palliative care patients. The concept that a demographic characteristic or particular disease state was a predisposing risk factor that could be used to target HMRs is innovative in that apart from functional and cognitive disabilities, disease and/or demographic descriptors were not previously mentioned. Also excluded from consideration was the presence of coexisting multiple diseases, that is, multimorbidity,5 despite this being a risk factor demonstrated in Koecheler and colleagues’ study.3

Since consumer awareness and understanding is a significant component of the success of the HMR program, the publicly-available information regarding the benefits and eligibility criteria is of interest. The objective of this study was therefore to compare the information regarding HMRs made available for consumers from a variety of sources, using the most easily accessible channel, the internet.

Method

A thorough internet search was conducted during May 2010. Firstly, health professional-directed information was sought in two key Australian Government websites, those of the Australian Government Department of Health and Ageing (the Department),6 the department responsible for Community Pharmacy Agreement services and Medicare Australia (Medicare),7 the agency responsible for remunerating GPs and pharmacists to perform the service, using the search term ‘Home Medicines Review’. Secondly, a search for consumer-directed information about HMRs was conducted. In order to replicate how a consumer would search for information concerning HMRs, the government websites above were investigated, searching in consumer sections. In addition, a simple internet ‘Google’ search with the term ‘Home Medicines Review’ was conducted. Within the first seven sites to appear in the ‘Google’ results, information intended for health professionals was discarded and links to consumer information were investigated. All information pertaining to HMRs was saved as text files and a content analysis of information, available at the time of access, was conducted using themes derived from the data. Preliminary codes resulted from discussions between the authors. Subsequent analysis was performed independently by the two authors who met regularly to discuss and resolve differences to reach consensus and a final coding structure.

Results

In addition to the two government websites which provided information to health professionals which were freely accessible to the public, five websites with consumer-directed information regarding HMRs were identified. The consumer-directed material included the Australian Government Department of Health and Ageing brochure (Publication Approval Number 2927)8 also available in hardcopy, the Department’s consumer website Help with Health – Medication Management.9 The Pharmacy Guild of Australia’s consumer website,9 the NPS’s consumer website, the NPS’s consumer website, and Seniors.gov website.

Content analysis revealed four themes: 1) Rationale for HMR, 2) HMR objectives, 3) Patient counselling, and 4) The use of medication risk factors in statements about eligibility criteria.

Theme 1. Rationale for HMR

With the exception of one consumer site, each resource mentioned or implied that the need for an HMR was premised on the existence of

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medication problems which lead to adverse events, for example:

- If medicines aren’t used properly, or if the wrong ones are used together, the results can be serious. Each year more than 140,000 Australians have to go to hospital with problems caused by their medicine. (NPS consumer website)

The Department’s consumer site had a message that ‘medicines can occasionally make you sicker’. In most consumer-directed material, there was little detail about what actually goes wrong with medicines or how that happens, for example the quotation above does not specify whether the issue of medication-related problems may be the result of the prescriber’s choice of medicines or the consumer’s (mis)use. The most thorough explanation of how these problems may occur was found on the Department’s consumer website, Help with Health – Medication Management, which introduced the concept of age-related changes causing changes in sensitivity to medicines:

- Age-related changes in the body can also increase older people’s sensitivity to the effects of medication. (Department’s consumer website).

Theme 2. HMR objectives

There was a high degree of consistency in information regarding the objectives of the program. On most sites, there were statements suggesting or implying that HMRs aimed to detect problems, prevent adverse events and increase potential benefits of medicines, for example:

- It has been shown that, in up to 69% of these cases, the problem (adverse events) can be avoided. (Pharmacy Guild consumer website).

The Medicare site for health professionals and the NPS consumer-directed site provided the most detailed information regarding benefits of the program. In all documents, a statement was made that HMRs ‘assist people of any age to manage their medicines better while they are living at home.’

Theme 3. Patient counselling

Whilst most information resources discussed the potential for information transfer between patient and health professionals, there was a high level of inconsistency in the descriptive detail of what patient counselling occurred during an HMR. For example, the Medicare site provided almost no detail about the extent of patient counselling, although the provision of counselling may be inferred. With regard to the consumer-directed information, the only resource that mentioned that a pharmacist provides information about medicines, and gave the patient an opportunity to ask questions, was the Department’s consumer-directed site.

The pharmacist will talk to you about how you take them and any difficulties or uncertainties that you may have. (Department’s consumer website).

The Pharmacy Guild and the NPS sites mentioned that the GP would discuss medications, and the NPS site provided significant detail, but these resources did not specifically state that the pharmacist provided an opportunity for counselling, and neither did they suggest that the HMR provided a chance to ask questions of either health professional.

The GP will discuss any recommendations with you and may make appropriate changes to your medication regimen. (Pharmacy Guild consumer website).

Two resources, the Medicare consumer site and the Seniors site did not specifically mention that an HMR provided patients with information.

Theme 4. Eligibility criteria

In all documents, risk factors for medication misadventure were used to either guide health professionals and regarding patient eligibility or to guide consumers as to whether they may expect to receive a benefit as a result of an HMR. Table 1 presents a summary of the information contained within each document pertaining to medication risk factors. In each document, the use of risk factors is prefaced and the preceding statement is also included in the table.

Multiple medications

The risk associated with polypharmacy was broached by each information resource, yet there was inconsistency regarding the representation of polypharmacy. Within health professional information, polypharmacy was represented by the patient taking five or more medications daily or taking greater than twelve doses daily. Some consumer sites used non-numerical approaches including ‘a number of medicines’ and ‘multiple medications’, and others used ‘taking more than five medicines daily’. No consumer site referred to taking more than 12 doses daily.

Discharge from hospital

All sites, except the Department’s consumer site, referred to hospital discharge.

Memory, cognition and management ability

The Department’s health professional site included references to non-compliance as a result of forgetfulness and there was a separate entry for dementia. However, neither forgetfulness nor dementia was mentioned by Medicare. All consumer-directed information either mentioned forgetfulness directly or mentioned problems in terms of difficulty managing medicines. Patient management difficulties may be caused by limited health literacy, sight and language and the Department’s health professional and Medicare sites explicitly mentioned these factors, whilst the consumer-directed sites did not. The Department also specifically included manual dexterity, but this was not mentioned elsewhere. No information resource dealt with the issue of intentional non-adherence.

Multiple prescribers

Both the health professional-directed information resources referred to having multiple regular prescribing doctors however this was referred to in only one consumer-directed resource, the Pharmacy Guild consumer site.

Significant changes in medication regimen

Both the health professional-directed information resources referred to having a significant change in medication regimen, yet this was not referred to in any consumer-directed information.
Table 1. Information contained within each resource pertaining to risk factors for medication misadventure

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Medicareb</th>
<th>Department of Health and Ageing#</th>
<th>Department’s consumer brochure. Publication Approval Number 2927c</th>
<th>Department’s consumer website – Help with health – Medication managementd</th>
<th>Pharmacy Guild Consumer*</th>
<th>NPS#</th>
<th>Seniorsg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preface</td>
<td>A general practitioner must assess that a review of a patient living at home is clinically necessary to ensure the quality use of medicines or to address a patient’s needs. Examples of risk factors include patients:</td>
<td>Patients who may benefit from a HMR include those</td>
<td>You might benefit from a home medicines review if:</td>
<td>It is important that medicine is used safely and wisely. If:</td>
<td>You could benefit from a HMR if:</td>
<td>The HMR is particularly useful for people who:</td>
<td>Home Medicines Reviews assist people of any age to manage their medicines better. If you are:</td>
</tr>
<tr>
<td>Risk Factors</td>
<td>currently taking five or more regular medications</td>
<td>taking 5 or more regular medications</td>
<td>You take a number of medicines</td>
<td>you take a number of medicines</td>
<td>you take more than five medicines in a day</td>
<td>take more than five medicines per day</td>
<td>using multiple medications</td>
</tr>
<tr>
<td></td>
<td>taking more than 12 doses of medication per day</td>
<td>taking more than 12 doses of medication per day</td>
<td>as above</td>
<td>as above</td>
<td>as above</td>
<td>as above</td>
<td>as above</td>
</tr>
<tr>
<td></td>
<td>recently discharged from hospital</td>
<td>recently discharged from hospital</td>
<td>You have recently been discharged from hospital or from care</td>
<td>You have recently spent time in hospital</td>
<td>have recently spent time in hospital</td>
<td>have been recently discharged from hospital or other care facility</td>
<td></td>
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<td></td>
<td>taking medication with a narrow therapeutic index or require therapeutic monitoring</td>
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<td></td>
<td>with symptoms suggestive of an adverse drug reaction</td>
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</tr>
<tr>
<td></td>
<td>forget to take their medicines</td>
<td>Do you always remember to take your medicines? [Orientation message]</td>
<td>sometimes forget to take their medicines</td>
<td>do not always remember to take their medicines</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>those with cognitive difficulties such as dementia</td>
<td>You are having difficulty with your medicines</td>
<td>you are having difficulty managing them</td>
<td>having difficulty managing their medication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>having difficulty managing their own medicines because of literacy or language difficulties, impaired sight</td>
<td>You are having difficulty with your medicines</td>
<td>you are having difficulty managing them</td>
<td>having difficulty managing their medication</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>attending a number of different doctors, both general practitioners and specialists</td>
<td>seeing a number of different doctors, including GPs and specialists</td>
<td>see more than one GP or specialist</td>
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<tr>
<td></td>
<td>with significant changes to their medication regimen in the last three months</td>
<td>have had a significant change in their medication regimen</td>
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<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Confusion

Confused about their medicines

Worry

worried about their medicines

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a, b, c, d, e, f and g refer to websites which are provided at the end of the reference list.
Symptoms suggestive of an adverse reaction

Only the Medicare website referred to symptoms suggestive of an adverse reaction.

Medicines with a narrow therapeutic index or which require therapeutic monitoring

Only the Medicare site referred to medicines with a narrow therapeutic index or requiring therapeutic monitoring.

Emotional factors – confusion and worry

The Department’s health professional site referred to patient confusion and worry about medicines whereas the Medicare site does not. Of the consumer-directed material, both the Pharmacy Guild and the NPS referred to confusion and these sites also mentioned negative emotional states, in terms of worries and concerns respectively.

Discussion

A significant problem for consumer-directed information resource development is the description of patient benefit of the HMR program, since in order to increase the personal relevancy of many disease specific information resources, it is traditional to provide background statements regarding one's personal risk of experiencing the disease. However, in the situation of encouraging participation in HMRs, it is not appropriate to provide information about disease-specific risk, rather treatment-specific risk is the relevant issue, and the method by which this information is disseminated requires sensitivity. Whilst it would be wise to inform consumers of potential problems so that they would ask about the service, conversely it is important not to unnecessarily increase patients’ concerns about medicines or to undermine confidence in the healthcare system. It should be noted that increasing patient concerns about medicines may increase intentional medication misadventure. These statements appeared however to have been treated so sensitively that they possibly lack salience for the lay person. Overall, there was a lack of description about the preventable practical problems which may lead to medicines misadventure. With the exception of one resource, there was no reference to dose issues, timing issues, appropriateness or age-related changes in sensitivity, such that consumers may not understand how problems occur during the management of complex medication regimens.

Analogous to the provision of risk factors for diseases within disease-specific information resources, most HMR resources presented a range of treatment risk factors pertaining to medicines misadventure, in order to assist the reader to personally identify with the message. In addition, some professional and consumer-directed HMR resources suggested that either the health practitioner or consumer may rely on a range of subjective experiences regarding medication consumption in order to determine whether the service would be beneficial. With regard to the provision of risk factors, four types of objective risk factors were identified: polypharmacy, recent regimen change, having multiple regular prescribers and medicines with a narrow therapeutic window which require monitoring. We found that there was a lack of consistency in the presentation of objective risk factors for medication misadventure in statements regarding patient eligibility for the program. Each of these types of risk factors warrant inclusion in consumer information resources and ideally, these risk factors would be used consistently throughout all resources. Whilst comment about all classes of risk factors may be useful, the remainder of the discussion focuses on the use of polypharmacy, regimen change and subjective factors.

Polypharmacy

The most frequently included risk factor in the information resources studied was polypharmacy, yet this was promoted to consumers in a subjective manner. The objective, evidence-based risk factor is taking five or more medicines daily or more than 12 doses per day. Most consumer-directed resources avoided the use of numbers, using vague terminology such as ‘multiple’ or ‘a number’ of medicines. A significant issue for policy in this area is that increasing age is associated with an increase in the average number of medicines taken, and furthermore consumer expectations about whether the number of medications that a person took would be described as multiple also increases with age. Further work is required to consistently define polypharmacy or multiple medication use as a valuable criterion for HMR eligibility.

Regimen change

Introducing new medicines adds to the complexity of a medication regime, and this contributes to overall patient concerns and dissatisfaction with professional services. Not surprisingly, many patients become non-adherent to medicines early in the course of treatment, and for the consumer of multiple medicines, regimen changes occur routinely. Koechler, et al. published an association between having frequent changes in medication regimen (four times during the preceding 12 months) and medication misadventure. This risk factor was adapted for use in HMR material by requiring there to have been a significant change in medication regimen within the preceding three months. Regimen change or new medicines, however, did not appear in any consumer-directed material. Since this risk factor would be relatively easy for consumers to understand, it is suggested that it be considered for immediate inclusion in all resources.

Medication regimen change is a common feature of hospitalisation for people who take multiple medications and the resultant potential for confusion may contribute to a high rate of medication-related problems. It is therefore not surprising that being discharged from hospital within the last month is a recognised risk factor for medication misadventure. Hospital discharge was utilised in most resources, albeit with consumer-directed material referring to the time period as ‘recent’ rather than as one month.

Subjective factors

There is a need for policy-makers to address the high degree of inconsistency in both health...
professional and consumer-directed resources with regard to the inclusion of subjective patient perceptions of negative experiences with, or emotions about, medicines. These factors included statements regarding patients’ medicines management capability, memory, cognition and worry about medicines and symptoms suggestive of adverse effects.

The inclusion of these subjective factors in consumer-directed information would appear to engage patients and carers to utilise gained expertise with medication.20 This paper proposes that subjective factors deserve mention in all paper proposes that subjective or experiential factors, subjective or experiential factors and descriptions of medication-related problems and communication opportunities.

References

Websites

c. www.guild.org.au/uploadedfiles/Medication-Management_Reviews/Consumers/Consumer_Information/HMR%20Brochure%20English.pdf [Accessed: 5th May 2010, This link, whilst still active as at 21st May, has been removed from the Pharmacy Guild site].

Author's Contributions

Stephen Carter conducted the study, performed the analysis and wrote the manuscript. Lesley White supervised the study and critically revised the manuscript.

Stephen Carter

Lesley White
DESCRIPTION OF JOURNALS

**International Journal of Pharmacy Practice (IJPP)**

The International Journal of Pharmacy Practice (IJPP) is the official journal of the Royal Pharmaceutical Society which is the professional body for pharmacists and pharmacy in England, Scotland and Wales. It is a peer reviewed, international journal. It is one of the leading journals publishing health services research in the context of pharmacy, pharmaceutical care, medicines and medicines management. It has been published since 1991. Currently it does not have an impact factor.

**Research in Social and Administrative Pharmacy (RSAP)**

Research in Social and Administrative Pharmacy (RSAP) is a peer-reviewed pharmacy practice journal which publishes original scientific reports and comprehensive review articles in the social and administrative pharmaceutical sciences. It has been published since 2005 and the current impact factor is 2.35.

**International Journal of Clinical Pharmacy (IJCP)**

International Journal of Clinical Pharmacy (IJCP) provides a medium for the publication of articles on clinical pharmacy and related practice-oriented subjects in the pharmaceutical sciences. The scope of the journal is clinical pharmacy, its research and its application in pharmaceutical care. It has been published since 1979 and up until 2010 was known as Pharmacy World Science. The current impact factor is 1.036.
Health Expectations

Health Expectations is peer-reviewed journal publishing original research, review articles and critical commentaries on all aspects of public participation in health care and health policy. The Journal provides a multi-disciplinary and international forum in which researchers from a variety of backgrounds can present their work to other researchers, policy makers, health care professionals, managers and consumer advocates. It has been published since 1998 and the current impact factor is 2.315.

Australian Pharmacist

Australian Pharmacist is the official journal of the Pharmaceutical Society of Australia. It is primarily a professional journal for practicing pharmacists. It contains pharmacy education and practice features, peer-reviewed research papers, health and pharmacy news and information about PSA activities, as well as paid advertising and promotional material. It has been published since 1981 and it currently does not have an impact factor.
QUESTIONNAIRE

Please help us to understand more about people’s views on Home Medicines Reviews (HMRs) by filling out this short survey.

You were asked to participate in this study because your pharmacist thinks your experience with having had a Home Medicines Review within the last six months would help us.

A Home Medicines Review (HMR) is a free service provided jointly by your doctor (GP) and pharmacist. After being referred by a GP, the pharmacist usually visits the patient in their own home and reviews their medicines.

All information is anonymous and completely confidential.

Please answer ALL questions IN THE ORDER PROVIDED.

After completing the questionnaire, please post it back to us in the attached reply-paid envelope. If you are interested in the study results or have any questions or concerns, please do not hesitate to contact us.

Our contact details are:

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Phone (02) 9351 5097, e-mail c.klinner@pharm.usyd.edu.au

Stephen Carter, PhD Candidate
Phone (02) 9351 5097, e-mail s.car4376@usyd.edu.au

Thank you for your co-operation!

Home Medicines Reviews
Previous HMR
1. For each of the following statements please tick (ꞌ) one circle.

<table>
<thead>
<tr>
<th></th>
<th>No</th>
<th>Yes</th>
<th>Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Do you currently take five or more regular medications (please include all medicines including &quot;over-the-counter&quot; medicines, herbs and vitamins)?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>b) Do you take more than 12 medication doses each day?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>c) Do you take any of the following medicines: Warfarin, Lithium or Digoxin?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>d) Have any of your medicines - or the instructions about how to take them - changed in the last three months?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>e) Have you been in hospital within the last month?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>f) Does more than one doctor prescribe medications for you on a regular basis?</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

2. How likely do you think it is that you will experience medicine-related problems? Please tick (ꞌ) one circle only.

<table>
<thead>
<tr>
<th>Very unlikely</th>
<th>Somewhat unlikely</th>
<th>Neither/Nor</th>
<th>Somewhat likely</th>
<th>Very likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

3. How often do you worry about possible health problems that could result from taking your medicines? Please tick (ꞌ) one circle.

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

4. How long ago did you have your last Home Medicines Review? Please tick (ꞌ) one circle only.

<table>
<thead>
<tr>
<th>Less than 2 weeks</th>
<th>2 - 4 weeks</th>
<th>1 - 2 months</th>
<th>3 - 4 months</th>
<th>5 - 6 months</th>
<th>More than 6 months</th>
<th>Not Sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

5. Who first suggested the Home Medicines Review to you? Please tick (ꞌ) one circle only.

- ☐ My GP
- ☐ My pharmacist
- ☐ Family/friends
- ☐ Other, please specify: __________________________

6. How many Home Medicines Reviews have you ever had? Please tick (ꞌ) one circle only.

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ more than 3
- ☐ not sure

7. To what extent does a family member, friend or carer help you make decisions about your medicines? Please tick (ꞌ) one circle only.

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>
8. Please indicate your level of agreement with the following statements about your most recent Home Medicines Review. Please tick (•) one circle only per statement.

<table>
<thead>
<tr>
<th>The pharmacist who did the Home Medicines Review</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>b) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>c) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>d) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>e) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>As a result of the Home Medicines Review</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>f) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>g) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>h) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>i) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>j) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>k) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>l) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>m) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>n) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>o) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>p) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>q) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>r) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>s) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>t) ____________</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>
9. For the following statements please indicate your opinion. Please tick (✓) one circle only per statement.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>I prefer that the visiting pharmacist be of the same cultural background as I am.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>b)</td>
<td>The privacy of my medical records may be harmed by the process of a Home Medicines Review.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>c)</td>
<td>If my GP asked me for another Home Medicines Review, I would feel like he/she’s checking up on my ability to cope at home.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>d)</td>
<td>If I asked my GP for another Home Medicines Review, he/she would feel that I am losing confidence in him/her.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>e)</td>
<td>My GP doesn’t need more information from another Home Medicines Review.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>f)</td>
<td>My pharmacist doesn’t need any information from another Home Medicines Review.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>g)</td>
<td>Having my regular pharmacist come to my home would make me feel uncomfortable.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>h)</td>
<td>Having a pharmacist that I haven’t met before come to my home would make me feel uncomfortable.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>i)</td>
<td>Arranging a Home Medicines Review was difficult for me.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>j)</td>
<td>I don’t have time for another Home Medicines Review.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>k)</td>
<td>Bringing up the subject of another Home Medicines Review with my GP would be difficult for me.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>l)</td>
<td>My GP would be happy for me to ask for another Home Medicines Review if I needed one.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>m)</td>
<td>It matters to me what my GP thinks about Home Medicines Reviews.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

10. Many people find a way of using their medicines which suits them. This may differ from the instructions on the label or from what their doctor had said. Here are some ways in which people have said they use their medicines. For each statement please tick (✓) one circle which best applies to you.

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
11. How often do you seek information about medicines from each of the following?  
Please tick (✓) one circle for each line.

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) General Practitioner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Specialist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Pharmacist</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Nurse</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) Internet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f) Magazines or books</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g) Family or friends</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h) Television</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i) Seminars, talks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>j) Brochures or posters</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>k) Leaflets that come with the medicines or printed by the pharmacy</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>l) Other, please specify</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

12. What gender are you?  
- Male  - Female

13. What age range are you?  
- 18 - 24  
- 25 - 39  
- 40 - 54  
- 55 - 64  
- 65 - 74  
- 75 - 84  
- 85 - 94  
- 95 or over

14. What is the postcode of your home address?  
Postcode ______

15. From what cultural background are you?  
- Anglo-Saxon
- Non-English speaking background. My country of origin is:  
  _________________________________
- Aboriginal/Torres Strait Islander

16. What is your highest level of education?  
- Below Year 10  - Year 12  - Undergraduate Degree
- Year 10  - TAFE (or equivalent)  - Post Graduate Degree/Diploma

Thank you for assisting with our research!
QUESTIONNAIRE

Please help us to understand more about people’s views on Home Medicines Reviews (HMRs) by filling out this short survey.

You probably aren’t sure what the term Home Medicines Review means, that’s ok, it will be explained within the survey. You were asked to participate in this survey because your pharmacist thinks your experience in taking medicines would help us.

All information is anonymous and completely confidential.

Please answer ALL questions IN THE ORDER PROVIDED.

After completing the questionnaire, please post it back to us in the attached reply-paid envelope. If you are interested in the study results or have any questions or concerns, please do not hesitate to contact us.

Our contact details are:

Christiane Klinner, Research Project Manager  
Phone (02) 9351 5097, e-mail c.klinner@pharm.usyd.edu.au

Stephen Carter, PhD Candidate  
Phone (02) 9351 5097, e-mail scart4376@usyd.edu.au

‘Thank you for your co-operation!’

Home Medicine Reviews  
No Previous HMR
1. For each of the following statements please tick (✓) one circle.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Do you currently take five or more regular medications (please include all medicines including &quot;over-the-counter&quot; medicines, herbs and vitamins)?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) Do you take more than 12 medication doses each day?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Do you take any of the following medicines: Warfarin, Lithium or Digoxin?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Have any of your medicines - or the instructions about how to take them - changed in the last three months?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) Have you been in hospital within the last month?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f) Does more than one doctor prescribe medications for you on a regular basis?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. How likely do you think it is that you will experience medicine-related problems? Please tick (✓) one circle only.

<table>
<thead>
<tr>
<th>Very unlikely</th>
<th>Somewhat unlikely</th>
<th>Neither/Nor</th>
<th>Somewhat likely</th>
<th>Very likely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. How often do you worry about possible health problems that could result from taking your medicines? Please tick (✓) one circle.

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Often</th>
<th>Always</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. Had you heard of the term “Home Medicines Review” (or HMR) before being asked to fill in this survey?

<table>
<thead>
<tr>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. From whom have you heard of the Home Medicine Review program? Please tick (✓) all answers that apply.

Family/friends ..........✓ My pharmacist ..........✓ My GP ......................✓
Others .....................✓ Please specify:  

6. How do you recall the Home Medicine Review being mentioned? Please tick (✓) one circle.

<table>
<thead>
<tr>
<th>Very negatively</th>
<th>Negatively</th>
<th>Neutrally</th>
<th>Positively</th>
<th>Very positively</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. To what extent does a family member, friend or carer help you make decisions about your medicines? Please tick (✓) one circle only.

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
8. Please read the following paragraph about what a Home Medicine Review is.

A Home Medicine Review, a free service funded by Medicare, provided jointly by your General Practitioner (GP) and pharmacist, is particularly useful for people who take multiple medicines each day, or who have recently spent time in hospital or who are concerned or uncertain about their medicines. After being referred by a GP, the pharmacist usually visits the patient in their own home at a mutually agreed time. The pharmacist will look at all medicines that the patient has, discuss any difficulties or concerns the patient may have with using their medicines and write a report to the GP. The GP will then discuss the results of the Home Medicine Review with the patient. Home Medicine Reviews help patients and carers to understand better how to use their medicines.

We are interested in your opinions for the purposes of research only. You will not be offered a Home Medicine Review because you completed this survey. This survey is totally anonymous.

Please indicate your level of agreement with the following statements. Please tick (✓) one circle per statement.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>If I had a Home Medicine Review, managing my medicines would be easier.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>If I had a Home Medicine Review, I would have fewer concerns about the long term effects of my medicines.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>If I had a Home Medicine Review, I would be less concerned about the effects of combining different medicines.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>If I had a Home Medicine Review, I would feel more confident that my medicines are helping me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e)</td>
<td>If I had a Home Medicine Review, I would understand more about my medicines.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f)</td>
<td>If I had a Home Medicine Review, I could take fewer medicines.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g)</td>
<td>If I had a Home Medicine Review, I could save money on my medicines.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h)</td>
<td>A Home Medicine Review would assist me to live independently at home for longer.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i)</td>
<td>If my GP suggested it, I would have a Home Medicine Review.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>j)</td>
<td>If I had concerns about my medicines I would ask my GP for a Home Medicine Review.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>k)</td>
<td>Arranging a Home Medicine Review would be difficult for me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>l)</td>
<td>I don't have time to have a Home Medicine Review.</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>m)</td>
<td>If I were to have a Home Medicine Review, I prefer that the visiting pharmacist be of the same cultural background as I am.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>n)</td>
<td>The privacy of my medical records may be harmed by the process of a Home Medicine Review.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Strongly Disagree</td>
<td>Disagree</td>
<td>Neutral</td>
<td>Agree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>---</td>
<td>------------------</td>
<td>---------</td>
<td>---------</td>
<td>-------</td>
<td>----------------</td>
</tr>
<tr>
<td>o)</td>
<td>If my GP asked me to have a Home Medicine Review, I would feel like he/she’s checking up on my ability to cope at home.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>o/j</td>
<td>I would feel good about my GP checking up on my ability to cope at home.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>p)</td>
<td>If I asked my GP for a Home Medicine Review, he/she would feel that I am losing confidence in him/her.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>q)</td>
<td>My GP doesn’t need more information from a Home Medicines Review.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>r)</td>
<td>My Pharmacist doesn’t need more information from a Home Medicines Review.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>s)</td>
<td>Having my regular pharmacist come to my home would make me feel uncomfortable.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>t)</td>
<td>Having a pharmacist that I haven’t met before come to my home would make me feel uncomfortable.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>u)</td>
<td>I am confident that if I needed a Home Medicine Review I could ask my GP for it.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>v)</td>
<td>Bringing up the subject of a Home Medicine Review with my GP would be difficult for me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>w)</td>
<td>My nearest family member (or closest person) would think that I should have a Home Medicine Review if it was suggested by a GP.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>x)</td>
<td>My nearest family member (or closest person) would think that I should ask my GP for a Home Medicine Review.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>y)</td>
<td>My GP would be happy for me to ask for a Home Medicine Review if I needed one.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>z)</td>
<td>It matters to me what my GP thinks about Home Medicine Reviews.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>zB)</td>
<td>The best person to do the Home Medicines Review is the pharmacist who normally dispenses my prescriptions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. Many people find a way of using their medicines which suits them. This may differ from the instructions on the label or from what their doctor had said. Here are some ways in which people have said they use their medicines. For each statement please tick (+) one circle which best applies to you.

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
10. How often do you seek information about medicines from each of the following?
   Please tick (✓) one circle on each line.

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) General Practitioner</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>b) Specialist</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>c) Pharmacist</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>d) Nurse</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>e) Internet</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>f) Magazines or books</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>g) Family or friends</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>h) Television</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>i) Seminars, talks</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>j) Brochures or posters</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>k) Leaflets that come with the medicines or printed by the pharmacy</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>l) Other, please specify</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

11. What gender are you?
   ○ Male  ○ Female

12. What age range are you?

   |   |   |   |
   | 18 - 24........○ | 55 - 64 ....○ | 85 - 94 ......○ |
   | 25 - 39........○ | 65 - 74.......○ | 95 or over...○ |
   | 40 - 54 .......○ | 75 - 84 ........○ |

13. What is the postcode of your home address?
   Postcode_____

14. From what cultural background are you?
   ○ Anglo-Saxon
   ○ Non-English speaking background. My country of origin is: ______________________
   ○ Aboriginal/Torres Strait Islander

15. What is your highest level of education?

   |   |   |   |
   | Below Year 10 | Year 12 | Undergraduate Degree |
   | Year 10 | TAFE (or equivalent) | Post Graduate Degree/Diploma |

Thank you for assisting with our research!
QUESTIONNAIRE

Please help us to understand more about people’s views on Home Medicines Reviews (HMRs) by filling out this survey.

You probably aren’t sure what the term Home Medicines Review means, that’s ok, it will be explained within the survey. You were asked to participate in this survey because your experience in caring for someone who takes medicines will help us.

All information that you provide is anonymous and completely confidential.

Please answer ALL questions IN THE ORDER PROVIDED.

After completing the questionnaire, please post it back to us in the attached reply-paid envelope. If you are interested in the study results or have any questions or concerns, please do not hesitate to contact us.

Our contact details are:

Christiane Klinner, Research Project Manager
Phone (02) 9036 7679, e-mail c.klinner@pharm.usyd.edu.au

Stephen Carter, PhD Candidate
Phone (02) 9351 5097, e-mail scar4376@usyd.edu.au

Thank you for your co-operation!

Home Medicines Reviews
Carer - No Previous HMR
1. For each of the following statements please tick (✓) one circle.

<table>
<thead>
<tr>
<th>Regarding [the person you care for], to the best of your knowledge.</th>
<th>No</th>
<th>Yes</th>
<th>Not sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) ...does he/she currently take five or more regular medicines (please include all medicines including “over-the-counter” medicines, herbs and vitamins)?</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>b) ...does he/she take more than 12 medicine doses each day?</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>c) ...does he/she take any of the following medicines: Warfarin, Lithium or Digoxin?</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>d) ...have any of his/her medicines or the instructions about how to take them - changed in the last three months?</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>e) ...has he/she been in hospital within the last month?</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>f) ...does more than one doctor prescribe medicines for him/her on a regular basis?</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>g) ...does he/she use a pharmacy prepared dose administration aid such as a Webster-pak™ or “dose box”?</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

2. How likely do you think it is that [the person you care for] will experience medicine-related problems? Please tick (✓) one circle only.

<table>
<thead>
<tr>
<th>Very unlikely</th>
<th>Somewhat unlikely</th>
<th>Neither/Nor</th>
<th>Somewhat likely</th>
<th>Very likely</th>
</tr>
</thead>
<tbody>
<tr>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

3. How often do you worry about possible health problems that [the person you care for] may have as a result of taking his/her medicines? Please tick (✓) one circle.

<table>
<thead>
<tr>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>

4. With regard to looking after [the person you care for]’s medicines, how often do you?

<table>
<thead>
<tr>
<th>How often do you?</th>
<th>Never</th>
<th>Rarely</th>
<th>Sometimes</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Purchase, order or collect his/her medicines?</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>b) Organise how and when he/she takes the medicines?</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>c) Give him/her a dose?</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>d) Make decisions to increase or decrease a dose, or not take a dose, or discontinue the medicine altogether?</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>e) Attend his/her consultations with the regular GP?</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>f) Discuss the administration of his/her medicines with his/her regular GP?</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
<tr>
<td>g) Discuss the choice of his/her medicines with his/her regular GP?</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
<td>o</td>
</tr>
</tbody>
</table>
5. We are interested in how much of a hassle it is for you to help manage [the person you care for]'s medicines. Please rate the following tasks from 0 = “No hassle at all” to 5 = “The worst of all hassles”. Please circle one number on each line only.

<p>| | | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a) Knowing what questions about medicines to ask the doctor.</td>
<td>No hassle at all</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>b) Recognising adverse (bad) effects.</td>
<td>No hassle at all</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>c) Working the times that I give medicines into my daily routine.</td>
<td>No hassle at all</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>d) Arguing with [the person you care for] about medicines.</td>
<td>No hassle at all</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>e) Sharing the responsibility with [the person you care for] for giving the medicines at the correct times.</td>
<td>No hassle at all</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>f) Knowing whether a medicine is having the desired effect.</td>
<td>No hassle at all</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>g) Giving medicines on time.</td>
<td>No hassle at all</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>h) Understanding when tablets can be cut in half, crushed, mixed, dissolved etc.</td>
<td>No hassle at all</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>i) Planning ahead, so we don’t run out of medicines.</td>
<td>No hassle at all</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>j) Managing prescriptions written by different doctors.</td>
<td>No hassle at all</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>k) Knowing why a medicine is being given.</td>
<td>No hassle at all</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

6. Please choose the response which best describes your thoughts regarding the following questions. Please tick (*) one circle on each line only.

<p>| | | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Make decisions on his/her own easily</td>
<td>Some difficulty making decisions on his/her own</td>
<td>Great difficulty making decisions on his/her own</td>
<td>Never makes decisions on his/her own</td>
<td></td>
</tr>
<tr>
<td>a) How well does [the person you care for] make decisions regarding tasks of daily life?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Always understood</td>
<td>Some difficulty being understood</td>
<td>Great difficulty being understood</td>
</tr>
<tr>
<td>b) How well does [the person you care for] make himself/herself understood?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Always understands others</td>
<td>Some difficulty understanding others</td>
<td>Great difficulty understanding others</td>
</tr>
<tr>
<td>c) How well does [the person you care for] understand others?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
7. Had you heard of the term "Home Medicines Review" (or HMR) before being asked to fill in this survey?
   ○ Yes  ○ No. If NO, please go to question 10.

8. From whom have you heard of the Home Medicines Review program?
   Please tick (✓) all answers that apply.
   Family/friends ............... ○ My pharmacist .......... ○ My GP ....................... ○
   The person you care for..... ○ Others .......... ○ Please specify: ______________________

9. How do you recall the Home Medicines Review being mentioned? Please tick (✓) one circle.
<table>
<thead>
<tr>
<th>Very negatively</th>
<th>Negatively</th>
<th>Neutrally</th>
<th>Positively</th>
<th>Very positively</th>
</tr>
</thead>
<tbody>
<tr>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

10. Please read the following paragraph about what a Home Medicines Review is.
    A Home Medicines Review, a free service funded by Medicare, provided jointly by your
    General Practitioner (GP) and pharmacist, is particularly useful for people who take multiple
    medicines each day, or who have recently spent time in hospital or who are concerned or
    uncertain about their medicines. After being referred by a GP, the pharmacist usually visits
    the patient in their own home at a mutually agreed time. The pharmacist will look at all
    medicines that the patient has, discuss any difficulties or concerns the patient may have with
    using their medicines and write a report to the GP. The GP will then discuss the results of the
    Home Medicines Review with the patient. Home Medicines Reviews help patients and carers
    to understand better how to use their medicines.
    We are interested in your opinions for the purposes of research only. Neither you nor [the
    person you care for] will be offered a Home Medicines Review because you completed this
    survey. This survey is totally anonymous.
    Please indicate your level of agreement with the following statements. Please tick (✓) one circle on each line only.

<table>
<thead>
<tr>
<th>If [the person I care for] had a Home Medicines Review...</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>b) ... managing his/her medicines would be easier.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>c) ... I would have fewer concerns about the long term effects of medicines on him/her.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>d) ... I would be less concerned about the effects on him/her of combining different medicines.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>e) ... I would feel more confident that the medicines are helping him/her.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>f) ... I would understand more about his/her medicines.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>g) ... working the times that I give medicines into my daily routine would be easier.</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>
### APPENDIX D – SURVEY INSTRUMENTS

#### 11. Please indicate your level of agreement with the following statements. Please note that GP refers to [the person you care for]'s regular General Practitioner.

Please tick (✓) one circle on each line only.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>If the GP suggested it, I would help [the person I care for] arrange a Home Medicines Review.</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>If I had concerns about [the person I care for]'s medicines, I would ask the GP for a Home Medicines Review.</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>Arranging a Home Medicines Review for [the person I care for] would be difficult for me.</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>I would like to be present during [the person I care for]'s Home Medicines Review.</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e)</td>
<td>I don't have time for [the person I care for]'s Home Medicines Review.</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f)</td>
<td>If [the person I care for] were to have a Home Medicines Review, I prefer that the visiting pharmacist be of the same cultural background as [the person I care for].</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g)</td>
<td>The privacy of [the person I care for]'s medical records may be harmed by the process of a Home Medicines Review.</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h)</td>
<td>If the GP asked [the person I care for] to have a Home Medicines Review, I would feel like the GP was checking up on my ability to cope with caring for [the person I care for] at home.</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
12. Please indicate your level of agreement with the following statements. Please note that GP refers to [the person I care for]’s regular General Practitioner.

Please tick (✓) one circle on each line only.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>a)</td>
<td>If I asked the GP for a Home Medicines Review for [the person I care for], the GP would feel that I am losing confidence in the GP.</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b)</td>
<td>The GP doesn’t need more information from a Home Medicines Review.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c)</td>
<td>The pharmacist where [the person I care for]’s medicines are dispensed doesn’t need any information from a Home Medicines Review.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>d)</td>
<td>Having [the person I care for]’s regular pharmacist visit his/her home would make me feel uncomfortable.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>e)</td>
<td>Having a pharmacist that we haven’t met before visit [the person I care for]’s home would make me feel uncomfortable.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>f)</td>
<td>Having a pharmacist that we haven’t met before visit [the person I care for]’s home would make me feel uncomfortable.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>g)</td>
<td>I am confident that if [the person I care for] needed to have a Home Medicines Review, I could ask the GP.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>h)</td>
<td>Bringing up the subject of a Home Medicines Review with the GP would be difficult for me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>i)</td>
<td>The GP would be happy for me to ask for a Home Medicines Review if I thought [the person I care for] needed one.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>j)</td>
<td>It matters to me what the GP thinks about Home Medicines Reviews.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>k)</td>
<td>The best person to do the Home Medicines Review is the pharmacist who normally dispenses [the person I care for]’s prescriptions.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
13. How often do you seek information about medicines from each of the following?  
Please tick (✓) one circle on each line only.

<table>
<thead>
<tr>
<th></th>
<th>Never</th>
<th>Rarely</th>
<th>Occasionally</th>
<th>Often</th>
<th>Always</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) General Practitioner</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>b) Specialist</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>c) Pharmacist</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>d) Nurse</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>e) Internet</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>f) Magazines or books</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>g) Family or friends</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>h) Television</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>i) Seminars, talks</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>j) Brochures or posters</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>k) Leaflets that come with the medicines or printed by the pharmacy</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>l) Other, please specify □□□□□□□□□□□ □□□□□□□□□□□</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

Please answer the following questions about you AND the person you care for.

<table>
<thead>
<tr>
<th>Yourself:</th>
<th>The person you care for:</th>
</tr>
</thead>
<tbody>
<tr>
<td>14. Gender: ○ Male ○ Female</td>
<td>○ Male ○ Female</td>
</tr>
<tr>
<td>15. Age: ☐ years</td>
<td>☐ years</td>
</tr>
<tr>
<td>16. Postcode of home address: ☐</td>
<td>☐</td>
</tr>
<tr>
<td>17. Cultural background: ☐ Anglo-Saxon</td>
<td>☐ Anglo-Saxon</td>
</tr>
<tr>
<td>☐ Non-English speaking background. The country of origin is:</td>
<td>☐ Non-English speaking background. The country of origin is:</td>
</tr>
<tr>
<td>☐ Aboriginal/Torres Strait Islander</td>
<td>☐ Aboriginal/Torres Strait Islander</td>
</tr>
<tr>
<td>18. Highest level of education: ☐ Below Year 10</td>
<td>☐ Below Year 10</td>
</tr>
<tr>
<td>☐ Year 10</td>
<td>☐ Year 10</td>
</tr>
<tr>
<td>☐ Year 12</td>
<td>☐ Year 12</td>
</tr>
<tr>
<td>☐ TAFE (or equivalent)</td>
<td>☐ TAFE (or equivalent)</td>
</tr>
<tr>
<td>☐ Undergraduate Degree</td>
<td>☐ Undergraduate Degree</td>
</tr>
<tr>
<td>☐ Graduate Degree</td>
<td>☐ Graduate Degree</td>
</tr>
<tr>
<td>☐ Don’t know</td>
<td>☐ Don’t know</td>
</tr>
<tr>
<td>19. Do you live in the same household as [the person you care for]?</td>
<td>☐ Yes ○ No</td>
</tr>
<tr>
<td>20. Your relationship to [the person you care for] is:</td>
<td>○ Spouse ○ Parent ○ Child ○ Sibling ○ Another relation</td>
</tr>
<tr>
<td>21. Are you being paid to be a carer for [the person you care for]? Please tick (✓) each circle that applies.</td>
<td></td>
</tr>
<tr>
<td>☐ Yes, carer payment/allowance from the Government.</td>
<td></td>
</tr>
<tr>
<td>☐ Yes, by a non-Government source.</td>
<td></td>
</tr>
<tr>
<td>☐ No, I am not paid to care for him/her.</td>
<td></td>
</tr>
</tbody>
</table>
Please send the completed survey back to the University of Sydney in the enclosed reply-paid envelope.

Many thanks!

Professor Lesley White
University of Sydney

If you have lost or cannot find the reply-paid envelope, please ring us on (02) 9036 7679 (Christiane) or (02) 9351-5097 (Stephen).
APPENDIX E

ETHICAL APPROVAL
23 July 2008

Professor L White
Faculty of Pharmacy
Pharmacy Building – A15
The University of Sydney

Dear Professor White

Title: Increasing patient demand for home medicines reviews: a marketing plan
Ref No.: 07-2008/10672

The Executive Committee considered your requests dated 4 July 2008 and 14 July 2008 (see attached) to modify the above protocol. The Executive Committee found that there were no ethical objections to the modifications and therefore recommends approval to proceed.

Special Condition of Approval

Please forward certified translations of the public documents to be translated.

Chief Investigator / Supervisor’s responsibilities to ensure that:

(1) All serious and unexpected adverse events should be reported to the HREC as soon as possible.

(2) All unforeseen events that might affect continued ethical acceptability of the project should be reported to the HREC as soon as possible.

(3) The HREC must be notified as soon as possible of any changes to the protocol. All changes must be approved by the HREC before continuation of the research project. These include:-

- If any of the investigators change or leave the University.
- Any changes to the Participant Information Statement and/or Consent Form.
(4) All research participants are to be provided with a Participant Information Statement and Consent Form, unless otherwise agreed by the Committee. The Participant Information Statement and Consent Form are to be on University of Sydney letterhead and include the full title of the research project and telephone contacts for the researchers, unless otherwise agreed by the Committee and the following statement must appear on the bottom of the Participant Information Statement. Any person with concerns or complaints about the conduct of a research study can contact the Senior Ethics Officer, University of Sydney, on (02) 9351 4811 (Telephone); (02) 9351 6706 (Facsimile) or gbriody@usyd.edu.au (Email).

(5) Copies of all signed Consent Forms must be retained and made available to the HREC on request.

(6) It is your responsibility to provide a copy of this letter to any internal/external granting agencies if requested.

(7) A report and a copy of any published material should be provided at the completion of the Project.

Yours sincerely

[Signature]

Professor D I Cook
Chairman
Human Research Ethics Committee

cc: Ms Christiane Klinner, Faculty of Pharmacy, Room N515, Pharmacy Building – A15, The University of Sydney

Ms Lindy Swain, Northern Rivers University Department of Rural Health, PO Box 3074, Lismore NSW 2480

Mr Stephen Carter, Faculty of Pharmacy, Room N515, Pharmacy Building – A15, The University of Sydney

Encl. Copy of Approved Request for Modification Forms