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SHARING PRESCRIPTION MEDICINES: AN EXPLORATION OF PATIENTS’ AND HEALTH PROFESSIONALS’ PERSPECTIVES

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A thesis submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in Pharmacy, the University of Auckland, 2016.
"We are not cisterns made for hoarding, we are channels made for sharing."
Billy Graham
ABSTRACT

Background
Prescription medicine sharing has been defined as giving one’s own medicine to someone else (lending) or using someone else’s medicine (borrowing). Medicines can be shared for non-medical purposes (recreational sharing or drug abuse) or for their intended therapeutic benefits (non-recreational sharing, e.g. sharing antibiotics or asthma inhaler to self-treat). Although most forms of sharing are non-recreational in nature, recreational sharing has been the focus of past research. Limited research evidence is available around non-recreational sharing. Therefore, this thesis aimed to explore adults’ non-sharing behaviours and to propose the content of interventions to reduce potential risks and harms of sharing.

Methods
A sequential, exploratory, mixed-methods research design was employed, in which findings from a systematic review, qualitative studies with patients (N=17) and health professionals (N=18) and a theory-based, secondary analysis of qualitative data informed the design and conduct of an online survey (N=233) which measured various dimensions of sharing behaviour.

Results
Participants reported sharing a range of prescription medicines; medicines used to treat pain, allergies, asthma and infections were chief among them. The qualitative research participants reported both real and perceived positive and negative consequences of sharing, and they suggested several factors which might contribute to sharing, including lack of access to healthcare, lack of information about risks of sharing, altruism, forgetting to carry around own medicines, and concern about missing regular doses of medicines. Having the same illness or symptoms as the other person and having leftover medicines were reported as possible opportunities for sharing. The online survey findings showed that female gender, older age, and history of asthma, allergies, sleep problems or chronic pain were the main non-modifiable predictors of sharing behaviours, whereas the modifiable risk factors for sharing included access-related issues, stronger emotional belief about borrowing, higher concern about missing doses, higher concern for the wellbeing of others, stronger beliefs about the benefits and safety of lending. Conversely,
higher perceived risk of harm of borrowing and lending had protective effect on medicine borrowing and lending. Based on the data, different interventions are proposed to reduce potential risks of sharing, including increasing patients and health professional awareness about the risks of sharing, improving access to healthcare, collecting leftover medicines from households, and limiting the supply of prescription medicines to the actual need of the patient.

**Conclusions**

The findings suggest that medicine sharing is a complex behaviour and abolishing sharing practices might not be possible. Therefore, minimising the potential risks/harms of sharing should be a priority whilst also acknowledging the positive attributes of sharing.
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<th>Abbreviation</th>
<th>Definition</th>
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<tbody>
<tr>
<td>APEASE</td>
<td>Affordability, practicality, effectiveness/cost-effectiveness, acceptability, side-effects/safety, and equity</td>
</tr>
<tr>
<td>BCW</td>
<td>Behaviour Change Wheel</td>
</tr>
<tr>
<td>CFA</td>
<td>Confirmatory factor analysis</td>
</tr>
<tr>
<td>CI</td>
<td>Confidence interval</td>
</tr>
<tr>
<td>COM-B</td>
<td>Capability, Opportunity, Motivation – Behaviour</td>
</tr>
<tr>
<td>COX</td>
<td>Cyclooxygenase</td>
</tr>
<tr>
<td>df</td>
<td>Degree of freedom</td>
</tr>
<tr>
<td>EFA</td>
<td>Exploratory factor analysis</td>
</tr>
<tr>
<td>GIA</td>
<td>General inductive approach</td>
</tr>
<tr>
<td>GP</td>
<td>General Practitioner</td>
</tr>
<tr>
<td>HCP</td>
<td>Health care provider</td>
</tr>
<tr>
<td>IF</td>
<td>Intervention function</td>
</tr>
<tr>
<td>KMO</td>
<td>Kaiser-Meyer-Olkin</td>
</tr>
<tr>
<td>MMT</td>
<td>Methadone Maintenance Treatment</td>
</tr>
<tr>
<td>NA</td>
<td>Not applicable</td>
</tr>
<tr>
<td>NR</td>
<td>Not reported</td>
</tr>
<tr>
<td>NSAIDs</td>
<td>Nonsteroidal Anti-inflammatory Drugs</td>
</tr>
<tr>
<td>NZ</td>
<td>New Zealand</td>
</tr>
<tr>
<td>NZ $</td>
<td>New Zealand dollar</td>
</tr>
<tr>
<td>OR</td>
<td>Odds ratio</td>
</tr>
<tr>
<td>OTC</td>
<td>Over the counter</td>
</tr>
<tr>
<td>PCA</td>
<td>Principal components analysis</td>
</tr>
<tr>
<td>PhD</td>
<td>Doctor of Philosophy</td>
</tr>
<tr>
<td>PIS</td>
<td>Participant information sheet</td>
</tr>
<tr>
<td>PPIs</td>
<td>Proton pump inhibitors</td>
</tr>
<tr>
<td>PRISMA</td>
<td>Preferred reporting items for systematic reviews and meta-analyses</td>
</tr>
<tr>
<td>SD</td>
<td>Standard deviation</td>
</tr>
<tr>
<td>UK</td>
<td>United Kingdom</td>
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<tr>
<td>USA</td>
<td>United States of America</td>
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Section 2.3, Chapter 2. Title: Prescription medication sharing: A systematic review of the literature

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- the above statement correctly reflects the nature and extent of the PhD candidate's contribution to this work, and the nature of the contribution of each of the co-authors; and
- that the candidate wrote all or the majority of the text.

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 CHAPTER 1. INTRODUCTION

1.1 Background

Medicine sharing, defined as giving medications to someone else (i.e. lending) or taking someone else’s medications (i.e. borrowing),\textsuperscript{1,2} is an important medical and public health issue because of the possible consequences of such behaviours.\textsuperscript{3-5} Medicine sharing has two distinct types; these are recreational and non-recreational sharing. While recreational sharing has been defined as the sharing of abusable medicines to ‘get high’ or feel good, non-recreational sharing has been defined as the sharing of any medicine for its intended therapeutic benefits.\textsuperscript{6} Sharing may be of prescribed or ‘over-the-counter’ (OTC) medicines. This thesis focuses on prescription medicines.

Past research on medicine sharing has tended to focus on recreational sharing (illicit use).\textsuperscript{7-11} However, this is not the only type of sharing that occurs; as research has shown, people also borrow and lend prescription medicines for their intended therapeutic benefits.\textsuperscript{1,2,12} Moreover, it has been suggested that people engaged more frequently in non-recreational sharing than recreational sharing.\textsuperscript{6} However, research on the practice of non-recreational sharing of prescription medicines has not received much attention.\textsuperscript{6} Limited data are available describing the prevalence and practices of non-recreational sharing among adults, and most of the studies were conducted mainly from a ‘medical’ perspective focusing largely on negative consequences of sharing.\textsuperscript{1,2,5,12-16} The psychosocial, cultural and behavioural determinants of sharing have been largely overlooked. This research has adopted both a medical and sociocultural perspective to gain an in-depth understanding of non-recreational sharing behaviours and propose a comprehensive intervention.

A range of prescription medicines have been reported to be shared,\textsuperscript{17} and sharing practices are reported to have potential health risks.\textsuperscript{2-5} First, medicines obtained from another person may interact with other medicines the person is already taking or with existing or undetected medical conditions. Those who share medicines may also misdiagnose their condition and take medicines that may not be appropriate for their problem or that could potentially worsen the illness.\textsuperscript{4} Medicine sharing practices can cause delays in seeking of medical care and may result in the progression of diseases.\textsuperscript{4} Furthermore, borrowing inappropriate medicines can result in sub-optimal treatment and may ultimately result in an erroneous perception of treatment ineffectiveness among patients.\textsuperscript{2,18} In some
instances, unintended consequences of sharing could also be life threatening, even if the occurrence of such instances are infrequent. For example, the acne medicine, isotretinoin, has been reported to be shared by women of child bearing age and the implications for an unanticipated pregnancy is concerning if advice on preventing pregnancy has not been provided to the ‘borrower.’

When health professionals prescribe a medicine, they select among many options based on different criteria. Two patients with a similar health problem may receive different medicines depending on their age, weight, disease progress, presence or absence of other co-morbid conditions, and past medication or allergy history. It is unlikely that those who share medicines are able to assess all these criteria and this may increase the occurrence of unintended side effects or allergies when medicines are shared. For example, findings of a study of 2,773 demographically diverse individuals from USA indicated that a quarter of participants had experienced unexpected allergic reactions or side effects from borrowed medicines. Moreover, those who borrowed medicines reported that they had never received written (54.6%) or verbal (38.2%) medicine instructions, which could increase the likelihood of harmful outcomes from sharing medicine use.

Past research has also reported the sharing of antibiotics and antiretrovirals. In a survey of 746 randomly sampled Lithuanian adults, 6% of the respondents reported sharing antibiotics with friends or relatives for the purpose of self-medication. In another survey, of 2,043 adults recruited from Lloyd’s pharmacies across the UK in year 2010, 14% reported sharing prescription medicines over the five years preceding the survey and antibiotics were the second most frequently shared medicines. Several other studies have reported the sharing of antibiotics in both developed and developing countries, including New Zealand (NZ). Similarly, antiretroviral medicines sharing among HIV/AIDS patients has been documented and the sharing of antimicrobials may have contributed towards the development of drug resistance. The issue of antimicrobial resistance is a public health concern, with easily spread of resistant microorganisms, it may result in treatment failure, shift to more expensive regimens, and increase in public health expenditure.

In many countries, sharing prescription medicines is illegal, and the original packaging of some prescription medicines contains a warning statement, for example: “law prohibits the transfer of the medicine to any person other than the patient whom it was prescribed.”
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The purpose of this label is to inform people not to take the medicines without consulting health professionals. However, this warning does not stop people from sharing medicines. There may be instances where medicine sharing could be beneficial, for example, sharing asthma inhalers during emergency situations or borrowing contraceptive pills to avoid pregnancy. Sharing may also be a coping strategy in resource limited settings, and has also been shown to be associated with caring, altruism and other interpersonal factors. Thus, in the case of prescription medicine sharing, there appears to be an intricate interplay between the potential risks and harms on the one hand, and potential benefits on the other.

Although medicine sharing is a global phenomenon, most research around non-recreational medicine sharing is from the USA. In New Zealand, there are gaps in the research as to the extent of the practice, and risk factors associated with medicine sharing. In a study that assessed medication consumption of 559 senior New Zealanders (≥ 65 years), sampled from the general population, 1.6% (n=9) individuals reported sharing prescription medicines. However, it is not clear how the authors defined and measured medicine sharing. Apart from reporting prevalence rates, the authors also did not provide a detailed description of sharing behaviours. A qualitative study also reported medication sharing using data obtained from 11 people representing four Māori households situated in Hamilton. In that study, which focused on social dynamics surrounding the procurement and consumption of medication, the authors noted that once in the hands of whānau (whānau is an extended family group which may span three to four generations), medications are considered just like other belongings and shared among whānau members or social networks. In another study, Hodgetts et al. conducted focus group discussions with seven Māori health workers and reported that ‘prescribing’ for others and sharing prescription medicines were common among Māori. However, the above qualitative studies were not primarily designed to assess sharing behaviours and did not investigate in detail the circumstances for sharing medicines. Gascoyne et al more broadly examined prescription medicine sharing behaviours among adults in Auckland. The study employed a cross-sectional survey design and recruited 642 adult customers from 10 community pharmacies. Approximately 24% reported having lent medicines to someone else, while 25% reported having borrowed someone else’s medicines. Although the study uncovered many new ideas, it provided little information on psychosocial and behavioural factors that may influence medicine sharing. The cross-sectional nature of the
study also limited in-depth understanding of factors affecting sharing behaviours. Overall, given its potential negative health consequences, more research on medicine sharing behaviours is warranted.

1.2 The research aims

This thesis was inspired by Lloyd’s pharmacies’ reports on widespread medicine sharing practices in UK (discussed in section 1.1) and aims to shed light on adults’ prescription medicine sharing behaviours in NZ. The research offers insight into a new approach to addressing the potential risks of sharing, where the focus is minimising harm rather than trying to stop people from sharing medicines. The research employed a mixed methods, sequential, exploratory design.44 A systematic review and three studies were conducted in order to address the following research aims;

1. To understand patients and healthcare providers experiences and attitudes towards medicine sharing
2. To understand how adults decide to share medicines, including reasons for sharing medicines
3. To describe prescription medicine sharing behaviours, including the extent of sharing, types of shared medicines and the consequences of sharing
4. To identify factors that may contribute to medicine sharing and to examine the strength of the association between identified factors and medicine sharing behaviours
5. To identify characteristics of interventions that may reduce the potential risks and harms of medicine sharing using a ‘harm reduction’ approach.

1.3 Research questions

The research process was guided by the central research questions: “Why do adults lend or borrow prescription medicines and how do they decide whether or not to do so?” This research sought to cast light on sharing behaviours from medical and socio-cultural perspectives. In addition, the research had the following sub-research questions:

1. What are the experiences and views of patients and healthcare professionals about medicine sharing?
Chapter 1 Introduction

2. What are the characteristics of individuals who do and do not share medicines?

3. Which factors contribute to medicine sharing behaviours? What is the strength of the contribution of such factors to medicine sharing?

4. Do medicine sharing practices need any intervention? If so, what are the possible intervention strategies that may reduce the potential risks and harms of medicine sharing?

1.4 Rationale and significance

Most studies so far have tended to focus on negative aspects of medicine sharing and on investigating the prevalence rates and demographic correlates of sharing behaviours.1,2,4,5,12-14,18,32 Although demographic correlates can be used to identify target groups for interventions, they are often difficult to modify. Past studies have also often been restricted to certain populations and have lacked detailed information about sociocultural, behavioural and psychological factors that may contribute to medicine sharing. Overall, little is known about malleable risk factors that could be targeted by interventions and addressing this issue was one of the aims of this research.

Most of the published evidence regarding non-recreational medicine sharing has been from cross-sectional surveys and has not provide an in-depth understanding of sharing behaviours.1,2,5,12,13,15,18,32 Only one mixed methods approach for studying non-recreational sharing amongst adults has been reported, to date45; however, the study population comprised only adults aged 65 years or older. The qualitative component of this thesis has allowed for a 'rich' description of the phenomenon. This research has also investigated health professionals’ experiences and attitudes towards patients’ medicine sharing practices. Understanding healthcare providers’ perspectives is important in the context of designing a comprehensive intervention. Researchers in the past have not explicitly specified the use of theory in their studies about medicine sharing.2,5,13,15,18,32,45,46 The use of health and behaviour theories provide an overarching framework from which to explore underlying factors influencing the occurrence of the behaviour and to design effective interventions.47 Finally, to the researcher’s knowledge, this is the first study of medicine sharing to apply a ‘harm reduction’ philosophy to non-recreational sharing – an approach which accepts that sharing behaviours is always likely to occur, but seeks ways to reduce any resulting harm.
Chapter 1 Introduction

Overall, as has been indicated in section 1.1, medication sharing can have a significant negative effect on the individual patient, the healthcare system as well as the society.\textsuperscript{3,5,20} However, little is known about what types of prevention strategies might be effective in reducing the potential risks of sharing.\textsuperscript{6} This research has sought to provide new information regarding the extent and types of frequently shared medicines, the context and circumstances for sharing, the consequences of sharing and potential intervention strategies. Therefore, the information may help healthcare providers to identify and address problems related to medicine sharing. The findings can also be used by patient support groups, medicine regulatory agencies, district health boards, and other local and international organisations involved in promoting the rational use of medicines. In addition, research on medicine sharing behaviours is still a developing field and the findings may serve as a foundation for research teams developing new research protocols.

1.5 Structure of thesis

This thesis reports the findings of a mixed methods programme of research carried out to explore non-recreational medicine sharing behaviours of adults in NZ. The thesis comprises a literature review, a methodology section, two qualitative studies, a chapter on potential medicine sharing harm reduction strategies, a quantitative study, and overall discussion and conclusion chapters. The first section of the literature review Chapter (section 2.2) contains a previously published paper.\textsuperscript{17} To comply with copyright requirements no alterations in wording were made to the systematic review article. However, some alterations (e.g. changing citation, table and figure numbering) were made to the contents of the paper so as to ensure the consistency of the thesis. Permission was obtained from the publisher to include the whole content of the paper in the thesis.

In the first chapter of the thesis, the research topic, the research purpose, rationale and significance of the research have been outlined. Chapter 2 comprises a literature review of the non-recreational medicine sharing research. Gaps in the literature are identified and the significance of medicine sharing research is discussed.

Chapter 3 outlines the theoretical framework and methodology of the thesis. First, an overview of research philosophy is provided. Then, the two theoretical perspectives guiding the research process are presented. Finally, the methodologies for each phase of
Chapter 1 Introduction

the research are described. Specific methods for each study included in the thesis are presented in the individual chapters presenting the study results.

Chapters 4 and 5 describe the two qualitative studies which were conducted to explore patients’ and healthcare providers’ perspectives on medicine sharing behaviours, and address the first research question. Chapter 4 presents a study of patients and describes their views on factors influencing sharing behaviours, their experiences of the consequences of sharing, and their risk assessment when deciding to share medicines. Qualitative interviews were also conducted with doctors, pharmacists and nurses to explore their experiences of, and attitudes towards, factors influencing medicine sharing behaviours, the consequences of sharing, and the types of prescription medicines they were aware of being commonly shared by patients. These findings are presented in Chapter 5.

Chapter 6 describes findings related to the last research question, which is to identify potential medicine sharing harm-reduction interventions. In this chapter, the results of the two qualitative studies are analysed using a behaviour change framework, the Behaviour Change Wheel.47

Chapter 7 seeks to answer the second and third research questions. This chapter describes the procedure, data analysis and results of an online survey. The extent and reasons for medicine sharing, the types of shared medicines, consequences of sharing and predictors of sharing behaviours are presented. Univariate and multivariable analysis was undertaken to identify predictors of borrowing and lending behaviours. In addition, the extent, reasons and predictors of leftover medicines storing practices are discussed.

Chapter 8 summarises the key findings presented in the previous chapters. This chapter also discusses the thesis limitations, implications of findings, and directions for future research. The thesis conclusions are presented in Chapter 9.

<table>
<thead>
<tr>
<th>Type of study</th>
<th>Research aim</th>
<th>Research question (RQ)</th>
<th>Described in</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interview with patients</td>
<td>Aim 1, 2 &amp; 4</td>
<td>RQ 1 &amp; 3</td>
<td>Chapter 4</td>
</tr>
<tr>
<td>Interview with HCPs</td>
<td>Aim 1 &amp; 4</td>
<td>RQ 1 &amp; 3</td>
<td>Chapter 5</td>
</tr>
<tr>
<td>Secondary analysis of patient &amp; HCP</td>
<td>Aim 5</td>
<td>RQ 4</td>
<td>Chapter 6</td>
</tr>
<tr>
<td>interviews</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>An online survey of adults</td>
<td>Aim 3 &amp; 5</td>
<td>RQ 2 &amp; 3</td>
<td>Chapter 7</td>
</tr>
<tr>
<td>Qualitative &amp; quantitative data triangulation</td>
<td>Aim 3 &amp; 5</td>
<td>RQ 2 &amp; 3</td>
<td>Chapter 8</td>
</tr>
</tbody>
</table>
CHAPTER 2. LITERATURE REVIEW

2.1 Chapter overview

This chapter provides an overview of the relevant literature and is organised into two sections. The first section presents a published systematic review journal article (Beyene KA, Sheridan J, Aspden T. Prescription medication sharing: A systematic review of the literature. Am J Public Health. 2014;104(4):e15-e26) which was undertaken to summarise available research evidence around non-recreational sharing behaviours. It is presented here with the permission of the publisher (see Appendix 1). Definition of medicine sharing behaviours, prevalence rates, factors influencing sharing and potential consequences of sharing are among the topics covered in the systematic review. Additionally, the systematic review findings are interpreted and the limitations of the review are discussed. An update on non-recreational medicine sharing research articles published since the systematic review was published is presented in section 2.3.

2.2 Prescription medication sharing: A systematic review of the literature

2.2.1 Introduction

Medication sharing is defined as the lending or borrowing of prescription medications where the recipient of those medicines is someone other than the person for whom the prescription is intended. In other contexts, “lending” and “borrowing” imply a temporary transfer that will be returned, but these terms are used loosely in the literature regarding prescription medications, which are often not replaced into the supply of the person to whom the medication was prescribed. A previous review article pointed out the negative consequences of medicine sharing, such as unanticipated adverse events, complications of incorrect use, delay in seeking professional help, antibiotic resistance, and addiction or misuse related to the addictive properties of some medications, but empirical research is limited.

Medication sharing has two distinct types; recreational and non-recreational. Recreational sharing is the sharing of abusable prescription medications to get high, to relax, or for
experimentation. Non-recreational sharing is the sharing of any prescription medication for medical use or altruistic reasons.\textsuperscript{6} Both represent non-prescribed use of medication.

Past research on medication sharing has tended to focus on recreational sharing.\textsuperscript{11,48-53} Non-recreational sharing has not received much research attention,\textsuperscript{6,16} and little information describing prevalence and practices of non-recreational sharing has been published. Moreover, no previous systematic review has attempted to reveal the types of medicines shared, determinants of non-recreational sharing, and consequences of sharing practices.

Researchers have reported a correlation between sociodemographic variables and prescription medicine diversion practices (i.e., trading, selling, or sharing of prescribed medicines).\textsuperscript{8,49,51,53} By and large, adolescent girls are more likely than adolescent boys\textsuperscript{51} and younger adults are more likely than older adults\textsuperscript{53} to share medications. Lower socioeconomic status and having drug addiction problems are also positive predictors of receiving medicines from others.\textsuperscript{53} Furthermore, disparities in health care access and utilization have been noted among ethnic groups,\textsuperscript{54,55} and these can lead to sharing of prescription medicines. Medicine sharing could also be driven by inappropriate self-treatment,\textsuperscript{56,57} and it is also possible that inappropriate drug information on the Internet inspires inappropriate self-treatment and sharing of prescribed medicines.

A systematic review of prescription medicine sharing could be useful in several ways for health planners, health care practitioners, and patients. For instance, understanding the determinants of sharing behaviours could aid in the development of specific interventions and targeted educational messages about safe medication use for patients. Moreover, the findings could help drug regulatory authorities and pharmaceutical companies to design messages targeted at reducing the risks of medicines sharing, for example, in product packaging, advertising and promotion, or public awareness campaigns.

We conducted a systematic review of the available literature on non-recreational prescription medication sharing was conducted. Our objectives were to

1. identify the sources and types of medicines shared,
2. investigate determinants of medication sharing,
3. identify reasons for sharing prescription medicines,
4. explore the positive and negative consequences of medication sharing, and
Chapter 2 Literature review

5. explore the impact of medication sharing on the patient-health care provider relationship.

2.2.2 Methods

2.2.2.1 Search strategy

In close consultation with an expert librarian, we searched PubMed and the OvidSP databases EMBASE and PsycINFO for published articles on medicine sharing practices. We selected these databases because they contain a wide range of both health (medical) and social science literature. To ensure the retrieval of all relevant research reports, we also conducted a customised multidatabase search (Table 2). We identified further articles by scanning the reference lists of all articles retained for eligibility testing and by using an advanced Google search. Databases varied in the dates of their earliest articles; we scanned all of them through March 31, 2013, and set auto-alerts on the same searches and followed up to August 15, 2013, to ensure the inclusion of the latest articles. However, we identified no relevant published after March 31.

Table 2: Customised multidatabase search for systematic review of studies of non-recreational prescription medication sharing

<table>
<thead>
<tr>
<th>Database</th>
<th>Type</th>
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<tbody>
<tr>
<td>Australasian Medical Index</td>
<td>Index</td>
</tr>
<tr>
<td>Google Scholar</td>
<td>Search Engine</td>
</tr>
<tr>
<td>International Pharmaceutical Abstracts</td>
<td>Index</td>
</tr>
<tr>
<td>ProQuest Central</td>
<td>Index</td>
</tr>
<tr>
<td>Psychology and Behavioral Sciences Collection</td>
<td>Index</td>
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<tr>
<td>ScienceDirect</td>
<td>Index</td>
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<tr>
<td>Scopus</td>
<td>Index</td>
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<tr>
<td>Springer</td>
<td>Electronic journals and books</td>
</tr>
<tr>
<td>DRUG</td>
<td>Index</td>
</tr>
<tr>
<td>ABI/INFORM Complete</td>
<td>Index</td>
</tr>
</tbody>
</table>

We used the following MeSH terms, combined with Boolean operators: “prescription” AND [“medication” OR “medicine” OR “drug”] AND [“sharing” OR “borrowing” OR “lending” OR “loaning” OR “swapping”] AND NOT [“cost sharing” OR “needle sharing” OR “syringe sharing”]. To ensure automatic term mapping and explosion of MeSH terms, truncation or wild cards in the database searches were not used. However, in advanced Google search, we conducted a phrase searching by enclosing the phrases “medication sharing,” “medication lending,” “medication loaning,” “medication swapping,” and...
“medication borrowing” in double quotes. In all searches, we avoided the use of hyphens and abbreviations. To maximise the chance of finding relevant articles, we searched literature on both recreational and non-recreational sharing and differentiated them by reading the abstracts.

To capture all relevant studies, we did not impose language, date of publication, age, gender, or type of article limitations or any other restrictions in database searches. However, we did not identify any relevant articles in languages other than English.

2.2.2.2 Inclusion and Exclusion Criteria

An article was eligible if (1) its main aim or a major theme was assessing non-recreational sharing of medications; (2) it described a study that employed a well-defined method of measuring medication-sharing behaviours, or a verbatim description of sharing practices in the case of a qualitative study; (3) it clearly described the study’s objectives, methods, and findings; and (4) it was a peer-reviewed research article or a conference abstract or proceeding. We excluded

1. books, book chapters, personal communications, case reports, review articles, and commentaries;
2. letters, if they did not report original or primary data;
3. studies whose full text could not be retrieved;
4. studies with a primary focus on sharing of over-the-counter medicines or recreational use of prescription medications; and
5. unpublished research reports.

K.B. conducted the initial screening and assessment of the eligibility of retrieved articles, according to the predetermined inclusion and exclusion criteria. All authors independently assessed all articles retained for eligibility testing (Figure 1). We evaluated the eligibility of retrieved articles by reading the title and abstract; for articles whose eligibility could not be determined by these, the full text was read.

Articles eliminated by reading titles concerned bank loans and were irrelevant to the review. We eliminated three studies because they reported both recreational and non-recreational sharing, and the data were difficult to separate. In one instance, we resolved a disagreement on eligibility by discussion. We held a series of meetings to ensure the
quality of the overall review process. Figure 1 is a flow diagram describing the selection procedure in detail, according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).\(^5\)

Figure 1: Preferred Reporting Items for Systematic Reviews and Meta-analyses diagram summarising selection procedure for studies of non-recreational prescription medication sharing.
2.2.2.3 Quality Assessment and Data Analysis

K.B. performed the initial quality appraisal and abstracted data for eligible articles with a data abstraction form designed for this review. The other authors rechecked the data; we resolved disagreements through group discussion. We compared the setting, design, study population, sample size, response rate, findings, and recommended interventions of eligible studies.

The heterogeneity of the eligible studies rendered available validated systematic quality evaluation tools inappropriate. However, the studies were evaluated according to the following criteria:

1. Did the study have a clear definition for medication sharing?
2. Were the objectives of the study sound?
3. Was the method used to measure sharing behaviours (in quantitative studies) appropriate?
4. Was the data analysis technique appropriate?
5. Was the study setting appropriate?

The studies in our review used qualitative, quantitative, and mixed-methods research designs; thus, statistical combination of eligible articles was not possible. Furthermore, the study settings, characteristics of participants, and data collection methods varied. The analysis process largely involved answering the pre-set review objectives. Table 3 displays the studies in chronological order to show the focus of medication sharing research over time. As far as possible we followed PRISMA reporting guidelines.58
Table 3: Summary of studies in systematic review of non-recreational prescription medication sharing

<table>
<thead>
<tr>
<th>Study (Publication year)</th>
<th>Location</th>
<th>Design</th>
<th>Sample Size, No.</th>
<th>Response rate, %</th>
<th>Type of shared medicines</th>
<th>Reported reasons/sources</th>
<th>Recommended Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hogan et al. (1990)59</td>
<td>University hospital, Saskatoon, Saskatchewan, Canada</td>
<td>Cross-sectional survey with one-on-one interviews of randomly selected dermatology outpatients with diverse socio-demographics</td>
<td>114</td>
<td>NR</td>
<td>Topical corticosteroids, topical antifungals and antibiotics, oral antibiotics, topical anti-acne medications, crotamiton cream, codeine with acetylsalicylic acid</td>
<td>Got from family members or friends</td>
<td>Asking patients with cutaneous disorders about previous use of medications from all sources while delivering care</td>
</tr>
<tr>
<td>Anglin et al. (1999)38</td>
<td>Community health clinic and other settings in rural eastern Kentucky</td>
<td>Ethnographic research: interviews with health and social workers and nonprofessional staff and observation of clinic</td>
<td>16</td>
<td>NA</td>
<td>Not specified</td>
<td>Ran out of medications, obtained from another person or health care provider, lacked money to pay for prescribed medications, to make prescriptions last longer, self-medication, got medicines through social networks</td>
<td>Close monitoring of medication use by health care providers, educating patients through pharmacy and nurses, reducing poverty and improving medication access, tightening communication between physicians and pharmacists to reduce overprescribing and leftover medicines</td>
</tr>
<tr>
<td>Thompson and Stewart (2001)60</td>
<td>Metropolitan areas of Melbourne, Australia</td>
<td>In-home interviews with non-institutionalized persons aged ≥ 65 years</td>
<td>204</td>
<td>87</td>
<td>Central nervous system and musculoskeletal agents; genitourinary agents; alimentary, cardiovascular, respiratory agents; NSAIDs</td>
<td>Ran out of medications, person asked to share medication, forgot own medication, to try the medication</td>
<td>Promoting pharmacy collection of unwanted medicines from customers</td>
</tr>
<tr>
<td>Study</td>
<td>Country</td>
<td>Study Design</td>
<td>Sample Size</td>
<td>Mean Age</td>
<td>Gender</td>
<td>Common Reasons for Misuse</td>
<td>Medications Considered</td>
</tr>
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<tr>
<td>Daniel et al. (2003)</td>
<td>United States</td>
<td>Analysis of data from Youthstyles (mail survey of respondents aged 9–18 years)</td>
<td>1568</td>
<td>52</td>
<td>NR</td>
<td>Got from family members, leftover medicines; had prescription for same medicine; had the same medical problem as the person who had the medicine; wanted something strong for pimples or oily skin; ran out of medications; emergency; cost; needed for pain, headache, or sleep; wanted to relax or feel good; influenced by advertising</td>
<td>NSAIr, COX-2 inhibitors, benzodiazepines, cardiovascular medications, H-2 antagonists and proton pump inhibitors, codeine or dextropropoxyphene combinations, paroxetine, thyroxin sodium, warfarin, α-2 receptor agonists (inhalers), latanoprost, quinine, allopurinol, bethamethasone (ointment), diphenoxylate with atropine sulfate, prochlorperazine</td>
</tr>
<tr>
<td>Sorensen et al. (2003)</td>
<td>Australia, four states</td>
<td>Cross-sectional survey (researcher-administered questionnaires) of community-dwelling, older war veterans and widowers at risk for medication misadventures and living in their own homes</td>
<td>1086</td>
<td>NR</td>
<td>NSAIDs, COX-2 inhibitors, benzodiazepines, cardiovascular medications, H-2 antagonists and proton pump inhibitors, codeine or dextropropoxyphene combinations, paroxetine, thyroxin sodium, warfarin, α-2 receptor agonists (inhalers), latanoprost, quinine, allopurinol, bethamethasone (ointment), diphenoxylate with atropine sulfate, prochlorperazine</td>
<td>Shared it with spouse</td>
<td></td>
</tr>
</tbody>
</table>

Educating girls and their parents about the need to take medication safely, targeting educational messages to adolescents on safe use of medications.
<table>
<thead>
<tr>
<th>Study</th>
<th>Setting</th>
<th>Methodology</th>
<th>Sample Size</th>
<th>Source</th>
<th>Key Findings</th>
<th>Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hamrosi et al. (2006)</td>
<td>Community health centers and hospitals in Midwestern New South Wales, Australia</td>
<td>Qualitative in-depth interviews with Aboriginal health workers</td>
<td>11</td>
<td>NA</td>
<td>Not specified</td>
<td>Shared between family and friends Providing education that considers community culture and giving appropriate and adequate education training for Aboriginal health workers</td>
</tr>
<tr>
<td>Goldsworthy et al. (2008)</td>
<td>United States, 20 cities</td>
<td>Cross-sectional survey (one-to-one interviews), of respondents aged 12–44 y, with diverse sociodemographic characteristics</td>
<td>700</td>
<td>NR</td>
<td>Allergy medications (e.g., Allegra, Claritin), pain medications (e.g., Darvoset, OxyContin), antibiotics (e.g., amoxicillin, doxycycline, Bactrim/Septa), mood medications (e.g., Paxil, Zoloft, Valium, Ritalin), acne medication (e.g., Accutane), birth control pills</td>
<td>Got from family members; had leftover medicines; had prescription for same medicine; had the same medical problem as the person who had the medicine; wanted something strong for pimples or oily skin; ran out of medications; emergency; cost; needed for pain, headache, or sleep; wanted to relax or feel good; influenced by advertising; got from someone who knew about medications; helped a friend</td>
</tr>
<tr>
<td>Study</td>
<td>Location</td>
<td>Methodology</td>
<td>Sample Size</td>
<td>%</td>
<td>Medications</td>
<td>Actions</td>
</tr>
<tr>
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<tr>
<td>Petersen et al. (2008)</td>
<td>United States</td>
<td>Analysis of data from 2001–2006 USA Healthstyles survey (cross-sectional mail survey of individuals), with emphasis on women of reproductive age (n = 7400)</td>
<td>26,289</td>
<td>72.2</td>
<td>Allergy medications, pain medications, antibiotics, mood medications, birth control pills, acne medications</td>
<td>Got from family member; already had prescription but ran out; had the same medical problem as the person who had the medicine; needed for pain, headache or sleep; emergency; had leftover medicines; cost; wanted to relax or feel good; wanted something strong for pimples or oily skin; influenced by advertising</td>
</tr>
<tr>
<td>Goldsworthy et al. (2009)</td>
<td>United States, 11 locations across country</td>
<td>Cross-sectional survey (one-on-one interviews) of demographically diverse adolescents aged 12–17 years</td>
<td>594</td>
<td>NR</td>
<td>Allergy medications, pain medications, mood medications, antibiotics, acne medications, birth control pills</td>
<td>To avoid health care provider visit</td>
</tr>
<tr>
<td>Study</td>
<td>Location</td>
<td>Methodology</td>
<td>Sample Size</td>
<td>-educated</td>
<td>Medications</td>
<td>Source</td>
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</tr>
<tr>
<td>Mayhorn and Goldsworthy (2009)</td>
<td>11 nationally distributed locations in USA</td>
<td>Cross-sectional survey (one-on-one interviews) of demographically diverse individuals</td>
<td>2773</td>
<td>NR</td>
<td>Allergy medications (e.g., Zyrtec, Clarinex, Flonase), pain medications (e.g., Darvoset, OxyContin), antibiotics (e.g., amoxicillin, doxycycline, actrim/Septra), mood medications (e.g., Paxil, Zoloft, valium, Ritalin), acne medication (e.g., Accutane), birth control pills</td>
<td>NR</td>
</tr>
<tr>
<td>Ali et al. (2010)</td>
<td>Universiti Sains Malaysia</td>
<td>Cross-sectional survey (one-on-one interviews) of randomly sampled female students</td>
<td>481</td>
<td>90.7</td>
<td>Not specified</td>
<td>Got from family or friends, leftover medicines</td>
</tr>
<tr>
<td>Goulding et al. (2011)</td>
<td>University College Cork, Ireland</td>
<td>Cross-sectional survey (anonymous electronic questionnaire) of students, aged 18–25 years</td>
<td>343</td>
<td>NR</td>
<td>Contraceptives, antibiotics, analgesics</td>
<td>Got from family or friend, cost, inconvenience of visiting doctors, didn’t feel sick enough to see doctor</td>
</tr>
<tr>
<td>Auta et al. (2011)</td>
<td>University of Jos, Jos, Nigeria</td>
<td>Cross-sectional survey (self-administered questionnaire) of randomly sampled students</td>
<td>730</td>
<td>81.6</td>
<td>Cold/flu medications, pain medications, antibiotics, dermatological medications, mood medications, antimalarials</td>
<td>Emergency, had the same medical problem as the person who had the medicine, influenced by advertising, ran out of medicines, got from someone who knew about medicines or from</td>
</tr>
<tr>
<td>Study</td>
<td>Location</td>
<td>Methodology</td>
<td>Sample Size</td>
<td>Other Medications</td>
<td>Source of Medication</td>
<td>Procedures</td>
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<td>-----------------------</td>
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<tr>
<td>Goebel et al. (2011)</td>
<td>California, 2 hospitals and 6 affiliated community sites</td>
<td>Cross-sectional cohort study (one-on-one interviews), analysis of self-reported substance misuse for pain management among veterans</td>
<td>343</td>
<td>For pain management</td>
<td>For pain management</td>
<td>For pain management, leftover medicines</td>
</tr>
<tr>
<td>Ward et al. (2011)</td>
<td>New York, four clinical sites at an urban academic medical centre</td>
<td>Cross-sectional survey (one-on-one interviews) of randomly sampled individuals aged ≥ 18 years</td>
<td>641</td>
<td>Opioids (Schedule II–IV), NSAIDs and COX-2 inhibitors, benzodiazepines, antibiotics, antihypertensives, others</td>
<td>Got from family members, friends, someone from street, or Internet; to get high, convenience, self-medication, cost</td>
<td>Regularly asking patients about medication use, cautioning patients about borrowing medications even if they deny the behaviour</td>
</tr>
<tr>
<td>Ellis et al. (2011)</td>
<td>Illawarra region, New South Wales, Australia</td>
<td>Mixed methods (focus group discussion followed by self-administered survey); convenience sample of independently living adults aged ≥ 65 years</td>
<td>focus group, n = 28; survey, n = 226</td>
<td>Antihypertensive, heart disease medications, arthritis or joint inflammation medications, strong pain medications, diabetic medications, depression/anxiety medications, antibiotics, others</td>
<td>Got from family members, ran out of medicines, forgot to fill prescriptions, severe pain, cost, could not go to chemist or doctor, self-medication, tried medication before visiting doctor, medication similar to previous prescription</td>
<td>NR</td>
</tr>
<tr>
<td>Kheir et al. (2011)</td>
<td>Qatar</td>
<td>Cross-sectional telephone interview with randomly sampled household representatives</td>
<td>49</td>
<td>Antidiabetic medications, anti-infective medications, inhaled bronchodilators, inhaled corticosteroids, oral corticosteroids</td>
<td>Shared with family members</td>
<td>NR</td>
</tr>
<tr>
<td>Study</td>
<td>Location</td>
<td>Methodology</td>
<td>Sample Size</td>
<td>Result</td>
<td>Notes</td>
<td></td>
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<tr>
<td>Hodgetts et al. (2011)</td>
<td>Central North Island, New Zealand</td>
<td>Focus group discussion with community health workers with heritage linkage with Māori people and employed by Māori tribal health provider</td>
<td>7</td>
<td>NA</td>
<td>Most prescription medications are shared among family members and social networks, avoided visits to general practitioner/pharmacy, ran out of medications, obtained prescription medicines from general practitioner by presenting false proxy symptoms, cost, cultural barrier</td>
<td>Integrating medication-sharing concerns into training of health care providers</td>
</tr>
<tr>
<td>Kamutingon do et al. (2011)</td>
<td>Hamilton, New Zealand</td>
<td>Ethnographic research (interviews, photographs, diaries, mapping, material objects, and media content) among four Zimbabwean households</td>
<td>17</td>
<td>NA</td>
<td>NR</td>
<td>To demonstrate care among family members during illness, to sustain and nurture social relationship among households</td>
</tr>
</tbody>
</table>

Note: COX = Cyclooxygenase; NA = Not applicable; NR = Not reported; NSAID = Nonsteroidal anti-inflammatory drug
2.2.3 Results

Our initial database search yielded 615 articles. The advanced Google search identified 56 articles, only one of which was not identified by the initial database search. We identified 16 additional articles by scanning the reference lists of articles retained for eligibility testing. Combining the results of all searches and removing duplicates yielded 514 articles. We discarded 81 because they were short communications on Web sites or were written by unspecified authors (i.e., they were not journal articles and did not have an author, casting doubt on their reliability). We read the title, abstract, or full text of the remaining 433 and retained 41 for further eligibility tests. We evaluated the retained articles according to our predefined inclusion and exclusion criteria and excluded 22 (Figure 1 shows detailed reasons). We performed our final qualitative synthesis on the remaining 19 articles.

2.2.3.1 Overview

A summary of the characteristics of the studies is presented in Table 3. The review comprised 19 studies with 36,182 participants from nine countries. Eight of the studies were conducted in the United States, four in Australia, two in New Zealand, and one each in Canada, Nigeria, Malaysia, Qatar, and Ireland. The studies were conducted between 1990 and 2011, and the majority (73.7%; 14/19) were published between 2006 and 2011. The articles were published in 18 different journals. We retrieved one article from a conference proceeding.5 The majority of the studies (73.7%; 14/19) used a quantitative, cross-sectional survey design, 21.1% (4/19) conducted qualitative interviews, and 5.3% (1/19) had a mixed method design. The study participants ranged from children to older people. Three surveys investigated medication sharing among college students,14,15,63 and one study focused on women of reproductive age.12 Two studies reported on medication sharing among children and adolescents.1,13 Of the four qualitative studies,38,39,62,65 three assessed the experiences and attitudes of health workers about medication sharing; respondents worked in rural areas or with indigenous people.38,39,62 Five studies focused on the sharing practices of older people;40,45,59-61 one of these employed a mixed-methods research design.45 The remaining four studies investigated medication sharing among adults with various sociodemographic characteristics.2,5,18,64
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Of the studies that reported quantitative data (n = 15), 12 had sample sizes greater than 200 participants; only seven studies explicitly stated that they recruited participants through random sampling.\(^1\),\(^12\),\(^14\),\(^40\),\(^59\),\(^63\),\(^64\) Eight studies reported a participant response rate,\(^1\),\(^12\),\(^14\),\(^18\),\(^45\),\(^60\),\(^63\),\(^64\) and six of these reported rates of 65% or higher.\(^12\),\(^14\),\(^18\),\(^45\),\(^60\),\(^63\)

### 2.2.3.2 Medication Sharing

We found no reported gold standard method for measuring medication sharing. However, two of the surveys analysed data collected in the USA HealthStyles surveys,\(^1\),\(^12\) and five studies adapted a question matrix used in these surveys to suit their own study.\(^2\),\(^5\),\(^13\),\(^14\),\(^45\) The HealthStyles surveys asked respondents two separate questions to assess their lending and borrowing practices, respectively: “Have you ever shared your prescription medication with others?” and “Have you ever borrowed prescription medication from others?” For instance, in their analysis of 2001 to 2006 HealthStyles survey data, Petersen et al. considered respondents who responded positively to the first question to have lent medicines and those who responded positively to the second question to have borrowed medications\(^12\); they considered those who responded negatively to one of the questions and do not know/not sure to the other not to have lent or borrowed medicines.

Because self-reported survey studies used various recall periods, we could not calculate the average prevalence rate of all studies. However, prevalence rates varied across the studies (Table 4). For medication borrowing, the reported rate was between 5% and 51.9%, and for lending, between 6% and 22.9%. The lowest rates for both borrowing and lending were reported in a survey among older people,\(^45\) and the maximum rates came from two separate surveys, of Nigerian university students\(^14\) and USA adult participants.\(^2\) Of 10 studies that reported both lending and borrowing rates,\(^1\),\(^2\),\(^5\),\(^12\)-\(^15\),\(^45\),\(^59\),\(^60\) the majority (n = 7) reported rates higher than 16%.\(^2\),\(^5\),\(^12\)-\(^15\),\(^45\) Eight studies reported the prevalence rate of lending or borrowing, which ranged from 5% to 54.3%.\(^1\),\(^2\),\(^12\),\(^14\),\(^15\),\(^40\),\(^61\),\(^63\) Of these, five reported a rate higher than 27%.\(^2\),\(^12\),\(^14\),\(^15\),\(^63\)
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### Table 4: Prevalence of sharing in quantitative survey studies in systematic review of non-recreational prescription medicine sharing

<table>
<thead>
<tr>
<th>Studies</th>
<th>Sample size, No.</th>
<th>Response rate, %</th>
<th>Borrowing, No. (%)</th>
<th>Lending, No. (%)</th>
<th>Lending or borrowing, No. (%)a</th>
<th>Recall period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hogan et al³⁹</td>
<td>114</td>
<td>NR</td>
<td>20(17.5)</td>
<td>7(6.1)</td>
<td>NR</td>
<td>1 year</td>
</tr>
<tr>
<td>Thompson and Stewart⁶⁰</td>
<td>204</td>
<td>87%</td>
<td>14 (6.9)</td>
<td>26(12.7)</td>
<td>NR</td>
<td>Ever</td>
</tr>
<tr>
<td>Daniel et al.¹</td>
<td>1568</td>
<td>52%</td>
<td>212(13.5)</td>
<td>171(10.9)</td>
<td>210(13.4)</td>
<td>Ever</td>
</tr>
<tr>
<td>Sorensen et al.⁶¹</td>
<td>1086</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>49(5)</td>
<td>NR</td>
</tr>
<tr>
<td>Goldsworthy et al.²</td>
<td>700</td>
<td>NR</td>
<td>188(26.9)</td>
<td>160(22.9)</td>
<td>236(33.7)</td>
<td>1 year</td>
</tr>
<tr>
<td>Petersen et al.¹²</td>
<td>26,289</td>
<td>72.2%</td>
<td>6086(23.2)</td>
<td>5065(19.3)</td>
<td>7272(27.7)</td>
<td>Ever</td>
</tr>
<tr>
<td>Goldsworthy and Mayhorn and</td>
<td>594</td>
<td>NR</td>
<td>115(19.4)</td>
<td>122(20.5)</td>
<td>NR</td>
<td>1 year</td>
</tr>
<tr>
<td>Goldsworthy⁵</td>
<td>2773</td>
<td>NR</td>
<td>594(21.4)</td>
<td>624(22.5)</td>
<td>NR</td>
<td>1 year</td>
</tr>
<tr>
<td>Ali et al.⁶³</td>
<td>481</td>
<td>90.7%</td>
<td>NR</td>
<td>NR</td>
<td>261(54.3)</td>
<td>NR</td>
</tr>
<tr>
<td>Goulding et al.¹⁵</td>
<td>343</td>
<td>NR</td>
<td>89(26)</td>
<td>70(20)</td>
<td>117(34.1)</td>
<td>Ever</td>
</tr>
<tr>
<td>Auta et al.¹⁴</td>
<td>730</td>
<td>81.6%</td>
<td>379(51.9)</td>
<td>127(17.4)</td>
<td>385(52.7)</td>
<td>1 year</td>
</tr>
<tr>
<td>Goebel et al.⁴⁰</td>
<td>343</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>56(16.3)</td>
<td>NR</td>
</tr>
<tr>
<td>Ward et al.¹⁸</td>
<td>641</td>
<td>80%</td>
<td>116(18)</td>
<td>NR</td>
<td>NR</td>
<td>Ever</td>
</tr>
<tr>
<td>Ellis et al.⁴⁵</td>
<td>226</td>
<td>65%</td>
<td>10(5)</td>
<td>12(6)</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>Kheir et al.⁶⁴</td>
<td>49</td>
<td>18%</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
<td>NR</td>
</tr>
</tbody>
</table>

Note: NR = Not reported

¹If the rate of “borrowing or lending” was not provided by the authors, we calculated as No. of borrowers or lenders = No. Lenders + No. Borrowers – (No. of both Lenders and Borrowers)

²Part of larger study by Mayhorn and Goldsworthy⁵

Four studies reported that medication lending was more common among female than male participants¹,²,¹²,⁵⁹; however, in two other studies lending behaviour was not significantly associated with gender.¹³,¹⁴ Two studies found no gender difference in the rate of borrowing.²,¹² Medication sharing was also associated with age,¹²,¹⁴,⁶³ and those aged 18 to 24 years were more likely to report medicine sharing.¹²,⁶³ For medication borrowing, a study reported a higher rate among women of reproductive age (18 - 44 years) than among older women (≥45 years).¹² Findings about medication lending were not consistent across studies. For example, Petersen et al. documented a higher rate of lending among reproductive-aged than older women,¹² but Goldsworthy and Mayhorn did not find age to be a significant predictor of medication lending.¹³
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In four studies, race/ethnicity was associated with medication sharing. Ali et al. reported a higher rate of sharing among participants of Malay ethnic origin and Chinese college students; however, they did not report the comparison group. Another study documented higher odds of sharing among USA non-Hispanic White reproductive-aged women than among women who were Hispanic or whose race/ethnicity was not White, Black, or Hispanic. However, in three other studies race or ethnicity was not associated with either lending or borrowing. Thirteen of the surveys in our review did not assess the association between income and medication sharing. However, in a study among USA children and adolescents (aged 9 -18 years), lower income was associated with sharing prescription medicines with family members or friends (P < 0.01). Many of the reviewed studies did not explore or report the influence of the Internet on medication sharing. Petersen et al. noted that those who accessed health information from the Internet were more likely than those who did not to report medication sharing (relative risk = 1.50; 95% confidence interval = 1.44, 1.56).

Daniel et al. and Petersen et al. found that a larger household size was a positive predictor of medication sharing. A study that assessed the use of non-prescribed medications for pain management among veterans found substance use disorders (P = 0.006) and pain interference activities (P = 0.047) to be positive predictors of sharing.

A study among adults visiting an urban medical centre in the United States reported less likelihood of medication borrowing among participants with Medicare insurance (P = 0.03) or a primary health care provider who frequently asked about medication usage (P = 0.049). Petersen et al. reported less likelihood of lending or borrowing among reproductive aged women who used a multivitamin daily (relative risk = 1.28; 95% confidence interval = 1.18, 1.40).

2.2.3.3 Commonly Shared Prescription Medicines

Study participants reported sharing a wide range of prescription medicines. Twelve of the 15 surveys reported the types of medicines shared. Seven of the surveys used a predetermined list of medications and asked participants to indicate the medications they shared from the list. The qualitative studies mainly explored the reasons behind prescription medicine sharing and did not report the specific types of shared medicines.
A study of USA adults that involved one-on-one interviews found allergy medications, pain medications, and antibiotics to be the most commonly shared medication classes. Acne medications were also found to be widely shared. Petersen et al. reported a high rate of isotretinoin sharing (25%) among women of child-bearing age. Four studies documented sharing of birth control pills among women. Hogan et al. reported the sharing of prescription topical corticosteroids and other dermatologic medications among randomly selected dermatology outpatients. Sharing of antibiotics among the general adult population was also common. In addition, studies reported sharing of antidiabetic, cardiovascular, and antihypertensive medications.

Seven surveys gave respondents a predetermined list of reasons and asked them to indicate those that influenced them to share their medicines. In four of these studies, respondents received an additional list of hypothetical scenarios to assess situations in which they would be willing to share. In three studies, the main situation in which borrowing occurred involved a person already taking a medicine but running out of it or having the same medical problem as the person who had the medicine. Participants also expressed their willingness to borrow medications if they were obtaining the medicines from a family member or a friend, if the medicine was unaffordable, if the situation was an emergency, if they obtained a lot information about the medicine from advertisements and commercials, for convenience, or for pain management. The primary explanations for lending behaviour were having leftover medication and the desire to help others. Respondents were also willing to lend their medicines if asked by a family member or friend or by a person with a similar problem or taking similar medicine and or in emergency circumstances.

### 2.2.3.4 Consequences of Medication Sharing

Although the surveys in our review focused on investigating the adverse consequences of sharing, the qualitative studies reported both benefits and adverse consequences. Kamutingondo et al., in a qualitative study among four Zimbabwean households in New Zealand, noted that sharing medicines during illness is a means of expressing a caring relationship among family members in a time of sickness. Hodgetts et al., in a focus group discussion with seven Māori health workers in New Zealand, reported that sharing is a convenient means of accessing prescription medicines among Māori. Moreover, the research team revealed a process of accessing medications on behalf of others by the use...
of proxy symptoms (i.e., pretending they were ill to obtain prescriptions from general practitioners) among members of a whanau (an extended family group that may span three to four generations). Anglin and White documented that sharing was a means of accessing prescription medicines in a rural eastern Kentucky neighbourhood largely populated by poor and unemployed people.38

In a study among 594 adolescents recruited from 11 cities,13 which was part of a larger survey (n = 2773) designed to investigate medication sharing in the United States,5 among respondents who borrowed medicines (n = 115), 37.4% had experienced a side effect or an allergic reaction and only about half reported receiving either verbal (55.6%) or written (47.8%) instructions from the person lending the medicine. Moreover, 75% (n = 86) of the borrowers were trying to avoid a medical visit; however, 26.7% (23/86) of these ended up visiting health care providers after their effort to self-medicate with borrowed medicines failed, and one third (28/86) did not inform their health care providers during their next medical visit about the medications they borrowed.

2.2.3.5 Recommended Interventions

The studies suggested various interventions to reduce the harms and risks of sharing medications. Daniel et al. noted that sharing behaviours might be formulated early in the life course, during childhood or adolescence, and they suggested providing targeted messages about the safe use of prescription medications to parents and their children.1 Authors also recommended providing health messages on the risks of sharing.12,13,18 These included alerting women to the dangers of sharing teratogenic medications,12 regular cautioning of patients about risks of inappropriate medication usage,18 and adding messages that prohibit sharing in product packaging.13 Researchers also recommended informing patients about appropriate disposal practices for leftover medications15 and re-examining the cost of health care access, particularly for low-income persons.39 Recommended strategies to increase access were reconsidering physicians’ fee structures and reducing prescription charges in pharmacies.39

Authors also suggested methods to identify medication borrowers and lenders. One suggested technique was inquiring about patients’ medication usage during health care provision.18 Even when patients deny borrowing or lending medications, researchers advocate cautioning them about the risks as a potentially effective deterrent.18
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2.2.4 Discussion

To our knowledge, ours was the first review to systematically summarize research on non-recreational medication sharing. The reviewed literature mainly investigated medication sharing from a medical rather than a sociological or cultural perspective. Furthermore, most of the studies were conducted in developed countries, where access to and affordability of health care services might be different than in developing countries. Authors of the reviewed articles conducted their studies with varying aims and methods. Differences in cultures, health care systems, economics, education, and medication use behaviours across the study settings made comparing findings challenging. However, we were able to draw instructive conclusions on medicine sharing.

The extent and type of medicine regulation varied across states and countries. Whether a medicine requires a prescription or is available over the counter varies internationally. Thus, we could not determine an appropriate denominator to report the average sharing prevalence for all studies. Overall, we documented high prevalence rates of medication lending (6% - 22.9%) and borrowing (5% - 51.9%). The studies that reported the highest rates of borrowing\(^2,13,15,63\) or lending\(^2,5,12-15\) were undertaken between 2008 and 2011; studies conducted before 2005 reported relatively lower rates of lending or borrowing.\(^1,59-61\) This might be attributable to a general increase in self-medication with prescription medicines in recent years.\(^67,68\)

In six studies, lending was generally less prevalent than borrowing,\(^1,2,12,14,15,59\) and this could be attributable to response bias. As noted by Caviness et al., people may be more willing to admit receiving medication from others than giving (or lending) it to someone else.\(^53\) The existence of drug vendors who offer prescription medicines without a prescription\(^69\) is a possible explanation for the much higher rate of borrowing (51.9%) reported among Nigerian college students than borrowing rates in other studies.\(^14\)

Similar to studies investigating recreational sharing of prescribed medications,\(^49,51,52\) our review revealed that the most common source of shared medicines was either a family member or a friend. It is likely that participants preferred to obtain medications from trusted sources than through other channels, such as theft or prescription fraud.

Studies that examined the types of medicines shared found pain medications, allergy medications, and antibiotics to be the most commonly shared classes of medicines. In light
of the addictive potential of some pain medications,\textsuperscript{70} the possibility of adverse reactions from allergy medications,\textsuperscript{71} and the development of bacterial resistance associated with uncontrolled use of antibiotics,\textsuperscript{72} health care providers should take proactive measures to limit the sharing of these medicines.

Sharing of medicines with high teratogenic potential, such as isotretinoin (a USA Food and Drug Administration category X drug), observed among women of childbearing age, carries a risk of birth defects, particularly if women do not inform their health care provider about their borrowing practices.\textsuperscript{12}

Four surveys found that the odds of medication lending were higher in female than male respondents,\textsuperscript{1,2,12,59} this might be associated with greater medication consumption by women than men,\textsuperscript{73} or related to the nurturing role of women in many cultures.\textsuperscript{74} The higher prevalence of sharing among younger respondents, in particular college students,\textsuperscript{14,15} was consistent with findings in other studies on recreational sharing of medications among similar groups.\textsuperscript{52,53} Exposure to new lifestyles at colleges might lead to both social and academic stress and ultimately to medication sharing for self-medication as a response to such stress.\textsuperscript{75} Furthermore, a move away from home might reduce convenient access to students’ usual general practitioners.

We found the association between race/ethnicity and medication sharing inconclusive. Ethnic groups across the studies were not similar; thus, it was difficult to compare findings. Moreover, access to health care services, including availability of medications, differs across countries, and this might influence sharing practices across studies.

Several studies did not explore income as a predictor of sharing behaviours. This might be because most of the studies were carried out in developed countries, where health insurance and subsidized medicines, which are relatively affordable, are available to many. However, as noted by Costello,\textsuperscript{76} with the rising cost of health care, patients may have difficulty paying for a visit to a medical practitioner to obtain prescriptions, and they might share medicines instead.

The sharing practices documented among older people (≥ 65 years),\textsuperscript{45,60,61} although not as prevalent as in younger age groups,\textsuperscript{1,13,14} could result in adverse drug events.\textsuperscript{16} Studies reported sharing of a range of pharmacological categories, such as heart disease medications, antidepressants, antihypertensives, pain medications, and antibiotics, among older people.\textsuperscript{45,60,61} Heuberger noted that medication sharing results in polypharmacy
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among older people. Medication sharing can have other consequences, such as a delay in seeking care, which may complicate simple conditions or, in the worst-case scenario, result in death. Clinicians may be unaware of a patient’s sharing practices, raising the risk of adverse medication interactions. Finally, when borrowing, the recipient may not obtain adherence aids that should accompany the medicine and thus may not comply with the medication’s use instructions.

Articles that recommended interventions mainly based their proposals on research informed by a medical perspective and largely overlooked sociological or patient perspectives. Efforts to test some of the recommended interventions to minimize the harms of sharing were very limited. It is important to note that medicines are more than a chemical entity; they are an element in our social interactions, beliefs, caring relationships, moralities, and routines. Practically, it might also be difficult to stop people from sharing medicines. Thus, any interventions designed to reduce potential harms of sharing need to understand and take into account why people share, how they make decisions to lend or borrow, whether they are aware of the risks, and how they assess the relevance of that risk. The latter two issues remain unexplored and are important areas for future research.

The laws and regulations of several countries prohibit distributing prescription medicines, in the form of gifts or loans or receiving them from a person unauthorized to dispense medicines; however, implementation of such laws can be challenging. The regulations also lack clarity for some medicines, which can be obtained either by prescription or over the counter. For instance, in many countries paracetamol is classified as a prescription medicine or an OTC medicine depending on the pack size, formulation and labelling.

2.2.5 Limitations

Most of the studies in our review adopted a similar survey tool. Although this could be useful for comparing findings, a tool developed for a certain target population in a specific country might not be appropriate for assessing the sharing practices of different population groups. Furthermore, the studies did not indicate the validity and reliability of the tool in their respective settings. No gold standard method has been established for measuring the prevalence of medication sharing, and the definitions and measures of sharing varied across the studies.
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The use of a long recall period (≥ 1 year) for self-reported medication sharing might also have resulted in underreporting because of recall bias. We suspect also that study participants who considered medication sharing to be illegal might not have admitted to it. Bias in participant selection could also have resulted from the voluntary nature of participation. Furthermore, in an effort to identify the types of shared medicines and reasons for sharing, many of the surveys listed predetermined factors and asked the participants to choose from them; this process might limit the discovery of other motives for sharing from the patient perspective.

The majority (73.7%; 14/19) of the reviewed studies were from the United States, Australia, and New Zealand; therefore, the findings might not represent the practice of sharing in resource-limited settings. They also may not be generalisable to the larger population the study sample was meant to represent because of non-random sampling. Because of the heterogeneity of the articles in our review, risk of bias across studies could not be assessed. Moreover, seven surveys did not report their response rate. The cross-sectional nature of most of the studies limited understanding of cause and effect. We did not include unpublished reports, book chapters, review articles, or commentaries; thus, some relevant information might have been omitted.

2.2.6 Conclusions

Although sharing of prescription medicines has received limited attention from researchers, our review demonstrated that non-recreational prescription medication sharing is common. Studies reported that broad classes of prescribed medicines were shared, and sharing was more common among younger adults and adolescents. The main circumstances for borrowing were already taking a medicine but running out of it and having the same medical problem as the person who had the medicine; motivations for lending were having leftover medication and the desire to help others.

The literature to date has mainly taken a medical perspective and largely overlooked investigating medication sharing from patients’ perspectives; many gaps exist in the research. Future studies should explore medication sharing from a patient and societal perspective.
2.3 Updates on the literature since September 2013

This section provides a brief overview of non-recreational, prescription medicine sharing research which has been published since the publication of the systematic review paper presented in the preceding section. Overall, six relevant studies have been published. Two of these studies are from the USA and one each from NZ, Poland, Dominican Republic and Australia.

In an anonymous survey designed to examine the types of commonly used pain medications, and the relationship between functional health literacy level and pain medications borrowing and/or lending behaviours among 254 adults diagnosed with arthritis in Australia, 8.7% (n=22) reported they had borrowed and/or lent prescription pain medicines within three months preceding the survey. This study failed to show a statistical association between functional health literacy and medicine borrowing and/or lending behaviours. Those with low functional health literacy were equally likely to have borrowed and/or lent as those with high or adequate functional health literacy (p = 0.055). The study also examined future intention to lend/borrow medicines, and 8% of the respondents reported that they would borrow/lend prescription pain medicines within the next three months. However, no significant association was found between functional health literacy level and future intention to borrow and/or lend pain medicines (p = 0.258). The authors noted that people with low functional health literacy (e.g. those with cultural and linguistic barriers) may not have been well represented in the sample, and this might have been contributed for the lack of significant association between health literacy and medicine borrowing and/or lending behaviours. Aside from this limitation, this study is one of few studies that examined the relationship between health literacy and medicine sharing.

Another study using anonymous self-administered questionnaire examined the medication sharing behaviours of 642 individuals recruited from 10 community pharmacies in Auckland. Approximately 24.1% of the study participants reported having lent and 25.5% having borrowed prescription medicines in the year preceding the survey. In addition, 14.8% of participants reported giving prescription medications belonging to one child to another child in their care, and 49.8% reported storing leftover prescription medicines at home. Painkillers, antibiotics and allergy medicines were the most commonly lent or borrowed medicines, and having the same problem as the other person and running
out of medicines were the two most frequently cited reasons for lending or borrowing medicines. Having history of asthma and having leftover medicines were associated with higher odds of lending and borrowing medicines. In addition, the odds of borrowing medicines were higher for younger participants. Conversely, the odds of lending medicines were less for those who had history of hypertension. Although this is the first published report primarily designed to assess medicine sharing behaviours in NZ, its use of convenience sampling and exclusion of non-English speakers from the sample has limited the generalisability of the findings. Furthermore, the use of a self-report method to gather information might underestimate the sharing prevalence as the accuracy of the method depends on the ability of the participants to recall their past medication taking behaviours. The cross-sectional nature of the survey also limited in-depth understanding of sharing behaviours.

Pai et al conducted a qualitative study among Latino and Hispanic adults in New York (N=76) to explore how interaction between social networks influenced asthma medication management. The study sample consisted of mainly unemployed individuals with no health insurance. The study participants described asthma medicines-sharing practices as “a way of looking out for each other”, particularly when one cannot afford prescription charges or the doctor’s fee. In addition, those who could not afford for medications reported using asthma medicines prescribed to their children or grandchildren for themselves. Sharing other home remedies and buying asthma medicines from others were also common practices.

Most recently, Valet et al assessed the extent of medicine sharing and its impact on treatment outcomes among 112 USA children diagnosed with asthma. The treatment outcomes assessed included asthma-related emergency department visits, patients’ Asthma Control Test (ACT) scores, asthma controller adherence, and rescue inhaler use. The children were enrolled from primary care or the paediatric clinic at Vanderbilt University and all of them were Medicaid-insured. Children who were aged between four and 11 years and had prescription for asthma controller medications in the past year were eligible to participate. The prevalence rates of borrowing and lending among the study sample were 12% (n=13) and 10% (n=11) respectively. Long-acting β-agonists were the most frequently lent or borrowed medicines. This study failed to prove any statistical associations between medicine sharing behaviours and treatment outcomes described above. However, it was found that 67% of those who lent or borrowed medicines had ACT
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scores 19 or less compared to 43% of those who did not lend or borrow, suggesting better asthma control among those who did not lend/borrow medicines. Although this study is one of few studies which examined the impact of sharing on treatment outcomes, the sample size was too small to detect statistical power.

A recent case study is among one of few studies that have documented the potential risks of medicine sharing. The case is about a 77 years old woman with chronic kidney disease and diabetes. Although the woman was informed previously to stop taking metformin due to risk of lactic acidosis from this medicine in deteriorated kidney condition, she continued using her son’s metformin and did not notify her nephrologist. Finally, the woman developed severe metabolic acidosis and anuria, and was admitted to hospital. It was difficult at first to identify the aetiology of the lactic acidosis until the patient’s son admitted that his mom was taking his metformin. This case showed that appropriate clinical diagnosis can be hampered by medicine sharing, particularly when medicine sharing information is not disclosed.

Lastly, an anthropological study assessed the ‘shareability’ (i.e. appropriateness of sharing) of medicines compared to other household items that could be shared between individuals among a convenience sample of Dominican community residents (n=31), using a visual analogue scale with four numerical values (0 for ‘inappropriate to share’ to 3 for ‘very appropriate to share’). The study did not find a significant difference (p = 0.54) in mean ‘shareability’ scores (calculated from analogue scale values) for 10 medicines and 34 other shareable commodities (such as food, cooking utensils, or bed sheet). However, the study showed that the standard deviation for mean ‘shareability’ scores of medicines were larger than those for other items (p=0.0007), indicating less agreement among participants regarding appropriateness of sharing medicines. For example, three participants with HIV infection, who had received medication adherence training, strictly opposed medicine sharing practices which indicates education might change patients’ attitudes towards sharing medicines. However, this study was not designed to assess the extent and factors associated with medicine sharing.

2.4 What the updated literature adds

In summary, the recent literature discussed in the above section provides additional information on patient characteristics associated with sharing behaviours, the extent of
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sharing in specific populations, the impact of medicine sharing on treatment outcomes of some medical conditions, and people’s attitudes towards appropriateness of sharing medicines. In addition, the studies provide some information on economic factors influencing sharing and the relationships between health literacy and medicine sharing. However, the relationships between sociocultural, behavioural and psychological (predictors) risk factors and medicine sharing remain largely unexplored area. Overall, the updates provide further evidence that support the rationale for this research.

2.5 Chapter summary

This chapter has assessed many aspects of non-recreational sharing that provide the background to understanding the research phenomenon. The extent of non-recreational sharing, types of commonly shared medicines, the sources and reasons for sharing medicines, consequences of sharing and recommendations for interventions were thoroughly reviewed. Generally, the literature review highlights gaps in the current literature and indicates a priority for future research. Although some attention has been paid to assess the proportion of people who share medicines and demographic correlates of non-recreational sharing, there is little information regarding malleable risk factors associated with sharing behaviours. Also noted, currently there is no published intervention to address potential risks of sharing, and there is a lack of qualitative research on non-recreational sharing. Overall, given the medical and public health implications of unsafe medicine sharing practices and the limited amount of information available describing this phenomenon, this is clearly an important area for further qualitative and quantitative research.
CHAPTER 3. RESEARCH DESIGN AND PHILOSOPHY

3.1 Chapter overview

The first section of this chapter gives a general overview of common paradigms in health research and a more in depth description of the paradigm chosen for this thesis. The paradigm description is followed by a discussion about the research design and methodology. Decisions made at each step of the research process are explained in relation to the overall research paradigm. The last three sections presented methodologies related to specific studies comprising the thesis and general ethics consideration.

3.2 Research paradigms

There are different perspectives regarding what research is and what constitutes scientific knowledge. However, there are implicit and explicit principles that guide research processes across disciplines, these principles being referred to as ‘paradigms.’

The term paradigm was first coined by Thomas Kuhn to describe a set of beliefs or scientific achievements acknowledged by a scientific community for a certain time period as a framework for its practices. Guba and Lincoln later expanded the definition of a paradigm; which they viewed as:

“a set of beliefs (or metaphysics) that deals with ultimates or first principles. [In this sense] It represents a worldview that defines, for its holder, the nature of the world, the individual’s place in it, and the range of possible relationships to that world and its parts, as for example, cosmologies and theologies do. The beliefs are basic in the sense that they must be accepted simply on faith (however well argued); there is no way to establish their ultimate truthfulness.”

Several other sources have defined ‘paradigm’ and most of them considered it to be the researcher’s entire worldview.

Paradigms have distinct philosophical elements, such as ontology, epistemology, methodology, axiology, and rhetoric. While ontology refers to the nature of reality (what is real?), epistemology deals with the nature of knowledge, that is, the sources of knowledge, methods of knowing and rationality and explanation of knowledge.
Philosophical strategies to uncover epistemic concepts are referred to as methodology, and it is distinct from research method which includes specific techniques, tools, or procedures to collect and analyse data. Whereas axiology refers to ethics of inquiry or the role of value in research, rhetoric refers to the style of writing and presenting findings.

Based on the above features, Creswell classified meta-paradigms existing to date into four categories. These are positivism/postpositivism, interpretivism/constructivism, pragmatism, and advocacy/participatory. He also reported other paradigms which operate at lower philosophical levels (known as interpretive lenses or communities), such as feminist theories, critical theory, disability theories, and queer theory. However, there are certain degrees of overlap among paradigms, and this has led to several ways of naming and classifying existing paradigms, for example, while some authors recognise critical realism as meta-paradigm, others consider it to be a variant of post-positivism.

Understanding the differences between paradigms is central to justify a paradigm choice. Hence, an extensive literature review was conducted to identify differences and similarities between paradigms frequently appearing in health research. The review indicated that there are different philosophical assumptions among paradigms varying from quantitative purist (which only accepts single objective reality) to qualitative purist (which considers reality as multiple and subjective). Along the objective-subjective continuum there are other paradigms which take moderate epistemological positions (pluralist) and allow the use of multiple methodologies to uncover the world. As Johnson and Onwuegbuzie noted, while pluralists support the use of multiple data collection techniques, those in purist camps oppose mixing methods and advocate the ‘incompatibility thesis’ theory or the so called ‘paradigm wars’ (see Table 5 for a detailed comparison of major paradigms).
<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Positivism</th>
<th>Postpositivism</th>
<th>Pragmatism</th>
<th>Critical realism</th>
<th>Interpretivism (Constructivism)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research purpose</td>
<td>To discover universal laws that explain, predict or control the phenomenon.</td>
<td>To discover universal laws that explain, predict or control the phenomena within a social context.</td>
<td>To discover means by which changes can be made that will have observable satisfactory consequences in an individual’s life or a society.</td>
<td>To explain underlying mechanisms that produce observable or experienced events.</td>
<td>To describe, understand or interpret individuals’ experiences</td>
</tr>
<tr>
<td>Ontology: nature of reality</td>
<td>Singular absolute external reality</td>
<td>A single external reality exists, but its observation influenced by social context and prior experience.</td>
<td>Singular and/or multiple realities. “What works” is real.</td>
<td>Singular, stratified/multi-layered, external reality, but cannot be wholly knowable or discoverable.</td>
<td>Multiple socially constructed realities</td>
</tr>
<tr>
<td>Epistemology: researcher’s role</td>
<td>Objectivist – distance and impartiality not to influence observation</td>
<td>Modified objectivist – absolute objectivity may not be achieved, but effort is made to ensure impartiality.</td>
<td>Multiple stances (relativist and/or objectivist) depending on the situation.</td>
<td>Absolute objectivity cannot be achieved. Researchers are responsible for putting aside their beliefs and biases to see the phenomenon as it is.</td>
<td>Relativist. Closeness and interaction with subjects to make knowledge</td>
</tr>
<tr>
<td>Axiology: the role of value in research</td>
<td>Value free inquiry to ensure objectivity.</td>
<td>Research is value-laden; absolute objectivity cannot be ensured.</td>
<td>Values are not fixed/pre-determined and their consequences should be considered.</td>
<td>All observations are theory-laden; researcher’s theoretical presuppositions may affect observations.</td>
<td>Research is value-laden. Bias should be disclosed.</td>
</tr>
<tr>
<td>Methodology: main research approach(s)</td>
<td>Deductive reasoning, verifying hypothesis. Quantitative approaches.</td>
<td>Deductive reasoning, disproving hypothesis. Uses quantitative, qualitative, or mixed method approach.</td>
<td>Abductive reasoning - moving back and forth between inductive and deductive reasoning. Qualitative, quantitative, mixed methods.</td>
<td>Retductive reasoning – going back from observed patterns or a set of facts to explain what drives them; qualitative, quantitative, mixed methods.</td>
<td>Inductive reasoning, theory or hypothesis development. Qualitative approaches</td>
</tr>
<tr>
<td>Research method(s): data collection and analysis tools</td>
<td>Controlled experiment, observation. Statistical analysis</td>
<td>Modified experiments, observations, interviews. Triangulation. Statistical analysis</td>
<td>Any systematic data collection and analysis techniques, e.g. interviews, observation, experiment.</td>
<td>Experiment, observation, interviews. Triangulation. Statistical analysis</td>
<td>Interviews, visual data analysis, document review, observation. Non-statistical analysis</td>
</tr>
<tr>
<td>-------------------------------------------------------</td>
<td>--------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------</td>
<td>--------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Based on Creswell,\textsuperscript{84} Guba and Lincoln,\textsuperscript{81} and others.\textsuperscript{83,91,94-98}</td>
<td></td>
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</tr>
</tbody>
</table>

[Diagram showing the flow of research methods from Quantitative purist to Qualitative purist]
Several factors influence paradigm choice, such as researchers’ training and experience, institutional policies, working group culture and/or funding availability as well as the research question and aims.44

As has been described in the introduction chapter, this thesis aimed to explore factors influencing medicine sharing behaviours and to design potential interventions. These aims could not be fully achieved if either qualitative or quantitative methods were used alone. Therefore it was decided to adopt a mixed method approach. Hence, paradigms which advocate the use of a single approach, such as positivism and interpretivism were not considered as options.

The mixed method approach involves the use of different methods of data collection, analysis and interpretation strategies at different phases of the research. It requires a paradigm which allows the adoption of a set of philosophical values and beliefs from other paradigms. One of the paradigms which allows such flexibility is pragmatism.93,99 Although critical realism and post-positivism, in principle, acknowledge the fallibility of all data collection tools and encourage the use of multiple methods, these paradigms are attached to certain ontology and provide little practical guidance in regards to combining qualitative and quantitative data without violating ontological or epistemological assumptions. Therefore, of all the options considered, pragmatism was found to have the best fit. Providing support for the validity of this decision, the link between mixed method research and pragmatism is recognised by several prominent methodologists.93,100-102

A further consideration in paradigm choice was the ultimate goal of the PhD research. As has been indicated in Chapter 2, to date most studies around medicine sharing took a ‘medical’ perspective and focused mainly on describing the negative aspects of medicine sharing.17 However, this research takes a ‘harm reduction’ perspective, which seeks to reduce the harm (in this case from medicine sharing) whilst acknowledging that many people will continue to share medicines and that attempts to abolish the practice may be counterproductive at times. Hence, the ultimate goal of this research was to propose a practical intervention aiming at minimising potential risks and harms of sharing medicines. As a result, its main focus is ‘what works best’ for patients sharing medicines and in this regard it suits the pragmatist worldview.
3.3 Pragmatism paradigm

Pragmatism was first introduced by C.S. Peirce, and then developed considerably by American philosophers such as James, Dewey, and Mead. In addition, Habermas, Rorty, Cherryholmes, Putnam, and Murphy significantly contributed towards advancing pragmatism. The central principle guiding pragmatic research is known as the ‘pragmatic maxim’ or ‘pragmatic rule.’ This principle states that the ‘provisional truth value’ (there is no absolute truth in pragmatism) of a certain thought or action has to be evaluated based on its observable desirable outcomes.

Ontologically, pragmatists believe that reality can be singular and/or multiple depending on the situation. Like positivists, pragmatists believe that there is a reality independent of mind (i.e. external reality) that can be observed and understood to certain extent. However, unlike positivists, pragmatists believe that interpretation of external reality is subjective and there is no absolute truth as such. Overall, pragmatists view reality as multifaceted, man-made and evolving over time with man’s understanding of the world.

Pragmatists believe that understanding something without having ‘a priori’ experience is impossible. “What works at the time” is taken as provisional truth. Pragmatists consider the quest for one reality to be a futile exercise and condemn alternative paradigms for wasting too much time on such an irrelevant issue. Pragmatism also rejects ‘correspondence truth’ a philosophical view that beliefs are true as long as they correspond to reality or facts. The ‘correspondence truth’ theory assumes thoughts on one hand, and facts on the other (theory vs. practice). However, pragmatists believe that theories and facts are inseparable; theories are considered as tools or maps for finding facts.

Epistemologically, pragmatism can be characterised as a ‘fallibilist anti-Cartesian’ approach. Fallibilism is a philosophical viewpoint that advocates the need to be open-minded for new ideas as far as the new idea is better than existing beliefs. According to Johnson and Onwuegbuzie, pragmatism “generally prefers more moderate and common sense versions of philosophical dualism, based on how well they work in solving problems. Further it rejects [any form of] traditional dualism (e.g. rationalism vs. empiricism, realism vs. antirealism, free-will vs. determinism, platonic appearance vs. reality, facts vs. values, subjectivism vs. objectivism).” Pragmatists acknowledge pluralism and they work using theories of both positivism and interpretivism to uncover complex phenomena.
Methodologically, pragmatism allows the use of any methodological approaches that help to address the research question and produce meaningful outcomes. Specifically, pragmatism favours the use of multiple methods (mixed methods) to triangulate data sources. Pragmatism acknowledges empiricists’ ways of knowing, that is, knowledge is based on experiences and should be liable to refutation or falsification. However, unlike empiricists, pragmatists’ conclusion is mainly based on tested results, that is, the one that works best from practical experience is more acceptable.

Pragmatism is at odds with traditional paradigms such as positivism and interpretivism and, as a result, has received criticism; these are summarised by Johnson and Onwuegbuzie: (i) it may hinder the development of basic research due to its focus on observable consequences or applied research; (ii) it may delay scientific revolution and major changes in the society as its focus is mainly on incremental change; (iii) like postpositivism, it may not be able to address issues of marginalised people; (iv) it does not give clear clarification on the meanings of usefulness and workability; and (v) it cannot be a solution for existing philosophical debates between different paradigms. In addition, Creswell and Tashakkori noted that concepts of pragmatism mainly reflect an Americans’ way of life and may not apply to others. However, most of the above claims are not based on empirical evidence. By and large, a pragmatist perspective is useful in ensuring the appropriate utilisation of resources and in promoting research that produces useful outcomes.

### 3.4 Harm reduction as a theoretical perspective for reducing the harms of sharing medicines

#### 3.4.1 What is harm reduction?

Harm reduction generally refers to a strategy or programme designed to reduce social, economic, or health related harms related to certain behaviours at an individual, community or society level. The principles of harm reduction are largely built upon public health concepts with strong emphasis on pragmatism, rationality, utilitarianism, humanitarianism, and libertarianism. Improving an individual’s quality of life and ensuring the well-being of a society are the main goals of harm reduction.
Proponents of harm reduction believe that people who engage in certain behaviours (e.g. drug or alcohol use) are responsible citizens and should not be seen as deviant individuals or helpless victims. When applied to psychoactive drug use (licit or illicit) a harm reduction approach aims to reducing physical, social and legal harms associated with drug use for those who cannot or are unwilling to stop using drugs. Regarding attitudes towards drug use behaviours, this approach takes a neutral stance; that is, it does not consider any form of drug use as being ‘good’ or ‘bad’ per se, unless it has some positive or negative consequences. Therefore, instead of eliminating drug use, the strategies give more emphasis to reducing the harms associated with drug use. Harm reduction considers drug use as a complex behaviour that encompasses several dimensions and accepts that some forms of drug use are safer than others, or even harmless, to a person or a community.

Harm reduction practitioners do not impose the same forms of treatment on every client; their role is to give guidance to the client about different courses of treatment and help the client to make an informed choice. The client has the right to choose from the available options such as abstinence, managed drug use, safer drug use, or behavioural treatment. In general, harm reduction in drug use pays more attention to the individual using the drug, than the drug itself. Harm reduction strategies are usually customised to the local context, and recognise the overall effect of poverty, racism, social isolation, class, and discrimination on behaviours and try to eliminate or minimise social inequalities.

3.4.2 Effectiveness of harm reduction strategies

This thesis will take a harm reduction perspective, and describing the effectiveness and criticisms of the philosophy in the context of illicit drug use provides a useful background for this research. There is a body of evidence supporting the effectiveness of harm reduction strategies. Ritter and Cameron conducted a systematic review of more than 650 published articles to determine the efficacy and effectiveness of harm reduction programmes in reducing harms related to alcohol use, tobacco smoking, and illicit use of drugs. In their review, they included only studies that used pre-post-test or that applied comparison group to measure the effect of intervention programmes. Studies were eligible if they had harm reduction as a goal, and those with a goal of only reducing drug or substance use were excluded. The authors revealed that there is strong evidence for the effectiveness of needle-syringe exchange programmes and outreach programmes for
reducing harms related to illicit drug use without increasing drug use. They also indicated that there was promising evidence for safer drug consumption rooms. Concerning alcohol, except for interventions to reduce road trauma, there was limited evidence to support the harm reduction programmes. For tobacco use the evidence was largely contradictory and the authors could not reach a conclusion. However, they did report that nicotine replacement therapies are promising harm reduction interventions.

Apart from psychoactive substance use, harm reduction strategies have been successfully adopted for other health behaviours, for example, sexual health education for teens in order to reduce unwanted pregnancies and minimise sexually transmitted diseases. There are several other examples of successful harm reduction strategies. Some of these include safer sport interventions (such as promoting the wearing of bike helmets) and mandatory seat-belt use.

### 3.4.3 Critics of a harm reduction approach

Hunt et al have summarised the major criticisms related to the intention, effectiveness, and effects of a harm reduction approach. Concerning its effectiveness, ideally implementation of a harm reduction intervention involves evaluating the impact of the intervention in comparison with other interventions (or sometimes with no intervention). However, in practice due to the involvement of many confounders, evaluating the impact of harm reduction interventions is difficult. In terms of their effectiveness, there are concerns that harm reduction interventions may ‘encourage’ individuals to continue with their drug taking. For example, those who criticise methadone substitution therapy raise a question about the long term benefit of this intervention, with this being seen simply as an exercise of merely replacing one drug with another. Another common criticism is the concern that harm reduction may encourage the use of recreational drugs among society, where critics have suggested that an approach that particularly encourages the safe use of drugs until someone decides to stop might influence non-drug users to develop positive attitude towards the use of drugs.

Weatherburn also noted some weaknesses in a harm reduction philosophy. First, the lack of an agreed definition and the use of various terminologies (such as ‘harm reduction’, ‘harm minimisation’, ‘risk reduction’, ‘reducing harm’, and ‘vulnerability reduction’), sometimes with conflicting meanings, creates confusion among policy makers,
practitioners, and researchers. He also expressed his concern about making harm reduction the goal of a drug policy. Certain behaviours may be associated with several types of harms and there is no way to reduce all harms related to certain behaviour. For instance, minimising the harm of one drug may increase harms associated with other drugs. Weatherburn suggested specifying precisely the type of harm to be addressed by harm reduction intervention, and simply ignoring certain problems in favour of others, for example, prioritising law enforcement strategies in drug dealing hotspots. He noted that this strategy may lessen confrontation of harm reduction with other existing strategies.

Another challenge is that quantifying harm is difficult in practice as harm can have different contextual interpretations. What is harmful for one individual maybe beneficial for another, for instance, the use of certain psychoactive substances in some communities for ritual practices might be considered as a harm by other communities.

The value neutrality stance taken by harm reduction (i.e. not supporting or opposing the use of drug use per se) is also a subject of criticism from some groups. Hathaway noted that by claiming this stance harm reduction presents little moral challenge to prohibitionists (i.e. those who advocate abolishing drug use).

However, some of the criticisms about harm reduction are not based on research evidence. For instance, the claim that harm reduction may increase drug use among non-drug users is unfounded. Drug use has complex causes and there is no evidence that correlates harm reduction interventions with increased use of drugs among non-users. Moreover, harm reduction provides a wide range of messages to drug users and their communities about safe use and abstinence from drugs. Thus, it is unscientific to judge the impact of this approach by looking only at a single element of the strategy. Generally, harm reduction should not be considered as an antagonist of other prevention efforts and can be effectively incorporated into existing public health programmes.

3.4.4 Application of harm reduction to non-recreational medicine sharing

Current efforts to reduce harms related to non-recreational medicine sharing are minimal, there are no clear guidelines for advising patients or the general public about the risks associated with medicine sharing. Current medical practice also appears to oppose any form of prescription medicine sharing. Although no empirical evidence is available, due
to healthcare providers’ negative perception of medicine sharing, those individuals who have and/or had intended to share medicines may not be willing or able to discuss their intention to share with their healthcare providers, and may make an autonomous decision. These decisions may result in adverse consequences, such as unexpected adverse drug reactions, overdose, or contraindications. Previous studies have demonstrated that up to 50% of those who attempted to self-treat their problems with borrowed medicines, but end up going to their physicians, failed to inform their physicians about their previous medicine borrowing practices.

Harm reduction interventions would seek to reduce harms related to medicine sharing (e.g. unanticipated side effects or allergy, taking inappropriate dose or accidental poisoning) without punishing or stigmatising people from engaging in medicine sharing. The aim rather is to make medicine sharing practices as safe as possible. The basic principle here is that there are inherent risks involved in medicine sharing, and there are strategies that, when appropriately followed, minimise these risks for those who choose to share medicines. In theory, prohibiting sharing should be an effective approach to reducing harms associated with medicine sharing. However, in practice, this approach is highly unlikely to be achievable and it also ignores the fact that sharing can have positive outcomes. Thus, harm reduction approaches attempt to reduce the harm that occurs with medicine sharing, acknowledging that prescription medicine sharing is harmful to both the individual sharing medicines and the general public, but that complete elimination of this behaviour is an unattainable goal, and may be one which could indeed increase harm.

A medicine sharing harm reduction approach is pragmatic. It recognises that, regardless of legal prohibition, people will continue to share medicines, for different reasons. For some people, health services might be inaccessible. For others, medicine sharing remains preferred despite availability of healthcare services. The reasons for their preference are many: inconvenience, prohibitive cost of treatment, lack of knowledge, embarrassment to see a doctor and so forth. While these barriers to healthcare need to be addressed, healthcare providers have a responsibility to inform those who are sharing medicines safer options to do so. Harm reduction interventions focus on understanding and addressing underlying factors contributing to medicine sharing. To achieve this, the focus of interventions may shift from individual patients who share medicines to the wider social, environmental and structural factors which create opportunities for sharing. For example, many people may resort to medicine sharing...
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because they cannot afford or cannot access healthcare.\textsuperscript{37,38} In this case, a harm reduction approach may require policy adjustment to ensure that those people should not be denied basic health services.

The other core principle of harm reduction is neutrality.\textsuperscript{123} This approach is only concerned with reducing risks and harms associated with certain behaviour, not whether the behaviour is right or wrong. Generally, medicine sharing outcomes are not fixed or pre-determined; depending on the circumstance and/or the type of medicine sharing may have favourable or unfavourable outcomes. Thus, labelling medicine sharing behaviour as bad \textit{per se} does not align with a harm reduction philosophy.

A harm reduction philosophy is also concerned with empowerment.\textsuperscript{113} Providing accurate information about the risks and potential consequences of medicine sharing to individual patients and the public is likely to promote behaviours that reduce the potential harms of sharing. Such education may include information on personal and environmental risk factors for medicine sharing, the risks associated with sharing inappropriate medicines or taking wrong doses, precautions required while using someone’s medicines and so forth. This information is likely to empower people to make educated sharing decisions and, consequently, could result in reduced harm.

It is also noteworthy that healthcare providers engage routinely in harm reduction practices without necessarily labelling it as such;\textsuperscript{112} for example, promoting the use of condoms to reduce risks of unsafe sex.

Overall, healthcare providers are in an ideal position to provide medicine sharing, harm reduction interventions. First, they have the therapeutic knowledge about the effects of medicines and are well positioned to provide tailored education regarding the risks and outcomes of sharing medicines. Second, healthcare providers are often routinely involved in health consultations with patients, thus they have regular opportunities to identify unhealthy behaviours and provide brief interventions to high risk groups. Third, patients who are engaged in non-recreational medicine sharing practices (unlike recreational sharing) are less likely to face serious punitive criminal measures and are, therefore, potentially likely to disclose their sharing practices to healthcare providers and to be more receptive to such interventions. Overall, the use of harm reduction strategies is likely to have benefits for the healthcare system, for example, by minimising the expenditure associated with managing harms resulting from shared medicines. Therefore, adopting
intervention strategies that aim to reduce the potential harms of medicine sharing seems a reasonable alternative to aiming for abstinence. Chapter 6 provides specific harm reduction intervention to medicine sharing.

3.5 Health behaviour change theory

In addition to a ‘harm reduction’ approach, a behaviour change framework/model was used in this research. However, although behaviour change theories were explored at the start of the PhD as a guide to developing the research, the decision to use a behaviour change framework for analysing data was not among the original strategies for this research; it was only considered after qualitative data collection was completed. This is discussed below.

As has been discussed in Chapters 1 and 2, medicine sharing is a multifaceted behaviour, and hence interventions to change unsafe medicine sharing practices cannot be designed by a simple trial and error strategy. As Davies et al noted, interventions to change health behaviour may be more effective if they are informed by theory. Therefore, health behaviour theory can be used as a framework to systematically classify factors influencing sharing behaviours and propose effective interventions. Several theories have been proposed to explain related health behaviours, such as medication adherence and self-treatment behaviours. These include Behavioural Learning Theory, social cognition theories (e.g. Health Belief Model, Theory of Planned Behaviour/Theory of Reasoned Action, Social-cognitive Theory, and The Protection Motivation Theory), Self-regulatory Theory, and the Trans Theoretical Model. These theories operate at individual, interpersonal, or societal levels, and can be used to examine cognitive or affective determinants of behaviours. It is not within the scope of this thesis to review the strength and weakness of each of these theories. However, because of their comprehensiveness and frequent use in health behaviour research, social-cognitive theory (SCT) and theory of planned behaviour (TPB) were initially considered as options for this thesis.

SCT hypothesises that an individual’s behaviour is the result of a dynamic and reciprocal interaction of the individual, environment, and behaviour. A person’s past experience with respect to the behaviour may also influence their decision to engage in certain behaviour. Moreover, the influence of role models and anticipated outcomes of performing the behaviour may determine the person’s engagement in the behaviour.
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Due to its wide-ranging focus and the difficulty of operationalising its constructs, SCT has limited ability to guide the development of specific interventions.\textsuperscript{125}

On the other hand, TPB hypothesises that intention is a precursor (proxy) for behaviour where intention is a function of the person’s attitude about the consequence of performing the behaviour (behavioural beliefs), the person’s perception of others’ approval or disapproval of him/her engaging in the behaviour (normative beliefs), and the extent to which the person feels s/he can control factors impeding or facilitating the behaviour (control beliefs).\textsuperscript{128} Although TPB has been used to predict a range of health behaviours, it does not consider the person’s past experience, and the environmental and economic factors that may influence behaviour.\textsuperscript{125}

TPB and SCT have several other weaknesses. For instance, neither considers non-voluntary factors (e.g. habit) that can influence behaviour, psychological or behavioural skills needed to perform the behaviour, and health system factors determining the occurrence of the behaviour.\textsuperscript{125,130,131} These theories also focus only on the target behaviour and they do not provide sufficient explanation about any competing behaviours. For example, medicine sharing and medication adherence behaviours may influence each other as sharing could be a coping strategy to adhere with previously prescribed medicines.\textsuperscript{132}

A recent review has reported 82 theories of behaviour or behaviour change that can inform the development or evaluation of public health related interventions. The authors noted that most of these theories are not comprehensive enough to explain a range of issues influencing health behaviours, such as social environment, habit or health system related factors.\textsuperscript{124} Considering the limited predictive ability of individual health behaviour theories and their overlapping constructs, many behavioural scientists called for an integrated theoretical framework that combines constructs of several existing theories.\textsuperscript{126,133,134} In light of this, Michie et al developed the Behaviour Change Wheel (BCW) by combining constructs of 19 existing theoretical frameworks.\textsuperscript{134} In this thesis, the BCW was used as an overall framework to classify intervention strategies which can address factors influencing sharing behaviours and to propose the development of theory-led interventions.
3.5.1 Behaviour Change Wheel framework

The BCW has three main components: the COM-B model, intervention functions, and policy categories (see Figures 2 and 3).\textsuperscript{134}

The starting point when using the BCW is identifying what needs to be changed by using the COM-B model in order to identify the target behaviour. According to COM-B, for any behaviour to occur the person has to be psychologically or physically capable of performing the behaviour, there must be a favourable physical or social environment (opportunity) for the behaviour to occur, and the person should be adequately motivated to engage in the behaviour.\textsuperscript{134} COM-B further assumes that there is dynamic interaction between the capability, opportunity and motivation components.

COM-B can be used for analysing either ingrained\textsuperscript{131} or one-off behaviours,\textsuperscript{135} and it can be employed at individual, group, community or system level.\textsuperscript{134} Understanding the target behaviour using COM-B requires collecting data from different sources to have the full picture of the target behaviour. For example, if the target behaviour is medication adherence then patients, health professionals or other stakeholders, prescription and dispensing records can all be relevant information sources.\textsuperscript{134} The information can be collected using different methods such as individual semi-structured interview,\textsuperscript{136} questionnaire,\textsuperscript{137} focus group interviews,\textsuperscript{138} and so forth. Survey questions can be used to measure the constructs of the COM-B model.\textsuperscript{134} In this thesis, the COM-B model was used to systematically classify factors influencing sharing behaviours which were identified by thematic analysis of patients’ and healthcare providers’ interviews (Chapter 6) and to inform the development of an online patient survey questionnaire (Chapter 7).

After examining the target behaviour using COM-B, the next step is choosing interventions to enhance the desired behaviour.\textsuperscript{134} Intervention functions, the second component of the BCW, encompass nine broader classes of intervention strategies that can help to maximise capability/opportunity or to motivate the person to engage in the desired behaviour.\textsuperscript{134} BCW has detailed guidelines to link each of the intervention functions with the COM-B components. In this thesis, appropriate intervention functions that could address factors influencing sharing behaviours were identified and linked to the COM-B components (see Chapter 6).
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Figure 2: The Behaviour Change Wheel, adapted from Michie et al.\textsuperscript{47}

Figure 3: The COM-B system: A framework for understanding behaviour, adapted from Michie et al.\textsuperscript{47}
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The third stage of designing interventions using the BCW involves identifying policy categories that would support the delivery of intervention functions to change the target behaviour.\textsuperscript{134} The BCW framework incorporates seven policy categories that are likely to be effective in supporting each of the nine intervention functions.

3.5.2 Application of the BCW for health behaviour change

Although the BCW is a relatively new framework, a review of the literature revealed that elements of this framework have been used to examine different health behaviours. For example, Jackson et al used the COM-B model to systematically categorise factors associated with medication adherence.\textsuperscript{131} In this study, although most factors associated with adherence readily fitted within one of the COM-B components, the authors reported that the effect of some factors on adherence (e.g. forgetting, substance abuse, depression) could be explained by more than one of the COM-B components. The authors noted that COM-B can provide a better understanding of factors influencing adherence behaviour compared to existing theories or models of adherence.\textsuperscript{131} In another study the BCW was used as a framework to group existing interventions aimed at promoting adherence to cardiovascular medicines.\textsuperscript{139}

Rubin et al conducted a qualitative study to explore New York City primary care doctors’ views and experiences about counselling and provision of long-term reversible contraception to adolescents.\textsuperscript{136} After coding their data using a thematic analysis approach, the authors mapped codes describing barriers and facilitators of counselling and contraception provision onto COM-B components in order to identify key factors that could be targeted by intervention.\textsuperscript{136} The COM-B model has also been used to identify factors influencing the uptake of vaccine and antiretroviral medicines among the general public in a pandemic flu outbreak scenario.\textsuperscript{135} Moreover, COM-B was used to examine behaviours as diverse as workplace learning,\textsuperscript{140} mental health care,\textsuperscript{141} and clinical audit and feedback.\textsuperscript{142} The BCW has also been used to propose behaviour change interventions aimed at promoting healthy eating,\textsuperscript{143} reducing risks of Alzheimer,\textsuperscript{137} facilitating stroke rehabilitation,\textsuperscript{144} and promoting mobilisation of older people.\textsuperscript{138}
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3.6 Research Methodology

One of the most important decisions when undertaking research is making the right methodological choice. Most importantly, the methodology has to be robust enough to minimise errors in data collection and analysis.

Traditionally, quantitative methodologies have been the dominant approaches for examining various issues in health sciences, such as in new drug discovery, the evaluation of health services quality and the effectiveness of medical or educational interventions.\textsuperscript{145} However, due to the complex nature of health problems, quantitative approaches alone may not be adequate, and this has resulted in an increased use of qualitative methodologies in health disciplines.\textsuperscript{146} In this regard, pharmacy research is not an exception, as qualitative approaches have become integral elements of some pharmacy disciplines, including social pharmacy, public health pharmacy and pharmacy practice. This increased recognition of qualitative approaches led to an increased interest in combining qualitative and quantitative approaches and ultimately resulted in the recognition of mixed methods as an alternative methodology in health research.\textsuperscript{145}

The research topic, medicine sharing behaviours, is a multifaceted health behaviour and all aspects of medicine sharing are less likely to be fully understood if either a qualitative or a quantitative approach is used alone. Therefore, both qualitative and quantitative data were collected using a mixed methods approach to attain the overall aim of the thesis. At this point it is appropriate to discuss further the definition, purpose, and other characteristics of the mixed methods approach.

Several definitions have been formulated for mixed methods research. Johnson identified 19 different definitions used by leading mixed method researchers and methodologists.\textsuperscript{147} For this thesis, mixed methods research is defined as “an approach to inquiry that combines or associates both qualitative and quantitative forms. It involves philosophical assumptions, the use of qualitative and quantitative approaches, and the mixing of both approaches in a study. Thus, it is more than simply collecting and analysing both kinds of data; it also involves the use of both approaches in the tandem so that the overall strength of a study is greater than either qualitative or quantitative research.”\textsuperscript{99}

As Howe noted, working from pragmatism philosophical viewpoints, mixed methods researchers typically believe that qualitative and quantitative methods are compatible and
can be used together.\textsuperscript{101} Unlike qualitative or quantitative approaches, in mixed methods the researcher is not forced to choose one method of inquiry over the other; the researcher can combine different methods depending on the research questions. A mixed methods approach acknowledges pluralism; it also accepts deductive and inductive reasoning and objective and subjective viewpoints of knowing. Overall, the use of qualitative and quantitative methods in combination could potentially offset the drawbacks of either approach when used alone and increase their utility.\textsuperscript{148}

3.6.1 Application of a mixed method approach to the current research

As has been indicated in the previous section, a mixed method approach was found to be the best fit for the overall thesis aim. Apart from its suitability for the aim of the research, several other factors justify the use of mixed methods for this thesis.

First, the systematic review (Chapter 2) indicated that there is a dearth of qualitative and quantitative evidence regarding non-recreational medicine sharing behaviours. Specifically, there was no qualitative study explicitly designed to explore adults’ medicine sharing behaviours at the beginning of the PhD and there was little understanding about factors influencing sharing behaviours. This lack of information limited the appropriateness of a primarily quantitative approach. To address this gap, the researcher conducted separate qualitative studies with patients and healthcare providers.

Second, available quantitative studies were not informed by behaviour change theories. This could potentially limit the survey findings’ usability as health planners often prefer systematic and theory lead approaches for designing effective and practical interventions. Therefore, a decision was taken to develop a survey based on the qualitative study findings and using behaviour change theory in order to identify the personal and environmental factors that could be targeted by interventions. The survey was also used to determine the most important factors influencing sharing behaviours among several factors identified by qualitative study participants.

Third, a mixed method approach is flexible and allows the use of different data collection and analysis strategies to suit the research question. As such it suits the research paradigm, pragmatism.\textsuperscript{44}
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Given the above considerations, and the research team experiences, beliefs and methodological development in health research, a mixed methods methodology was adopted for this thesis.

3.6.2 The purpose of mixed method research

In practice, mixed methods research has various purposes. Green et al, based on a review of the mixed method literature, identified five distinct purposes of mixed methods research, including complementarity, development, triangulation, initiation, and expansion.\textsuperscript{148} While ‘triangulation’ involves the use of different sources of data with the intention of corroborating findings, ‘complementarity’ seeks clarification, enhancement or illustration of findings from one method with the findings of another method. ‘Development’ involves the use of the findings from the first phase to inform the development of the second phase and requires conducting the two components of mixed methods one after another. ‘Initiation’ looks for contradictions between qualitative and quantitative data in the hope of discovering why such inconsistencies occurs. ‘Expansion’ occurs when it is necessary to extend the scope and breadth of inquiry for a phenomenon that requires different methods of knowing.

Rossman and Wilson reported four purposes of mixed methods research which are more or less similar to that of Green et al; these include corroboration, initiation, development, and elaboration.\textsuperscript{149} Bryman, based on content analysis of 232 mixed method studies, suggested 16 different purposes of mixed methods.\textsuperscript{150} The most common purposes were triangulation, completeness, enhancement, diversity, instrument development, and to facilitate sampling. Generally, most of the suggestions indicate that often, methods are mixed for the purpose of in-depth analysis and interpretation of the research topic and to benefit from the advantages of different inquiry methods.

Of the purposes reported by Green et al,\textsuperscript{148} this thesis attempted to achieve the benefits of triangulation, development, and complementarity. Triangulation was achieved through comparing the findings of semi-structured interviews with that of online survey results. The thesis also attempted to seek the opportunity of development by using the qualitative findings to inform the development of an online survey. In regards to complementarity, patients’ and healthcare providers’ interviews revealed a number of factors influencing sharing behaviours, and the online survey was utilised to determine the relative influences of each factor using rigorous statistical tests. In order to achieve triangulation,
development, and complementarity, the researcher carefully chose an appropriate mixed method design among several options.

### 3.6.3 Mixed methods design

A research design has been defined as “procedures for collecting, analysing, interpreting, and reporting data in research”, and it helps to answer the research question as unambiguously as possible. Several designs have been proposed for mixed methods research. Creswell et al classified these designs into four categories: convergent (concurrent or parallel), embedded (nested), sequential (exploratory or explanatory), and multiphase designs.

In convergent design, qualitative and quantitative data collection occurs at the same time, equal priority is given to both data sets, and the two data forms are collected and analysed separately and merged during the interpretation phase of the research. In embedded design, the qualitative and quantitative data are collected and analysed in tandem with one form of data embedded or nested in the other. Sequential designs are used when one form of the data (qualitative or quantitative) informs the design and conduct of the other. Depending on the sequence of data collection and the priority given to each form of data they can be explanatory or exploratory sequential designs. Explanatory sequential design begins by collecting and analysing quantitative data followed by collection and analysis of qualitative data. More priority is given to the quantitative data and the qualitative results primarily used to augment quantitative results. This design is best used when the researcher has a priori knowledge about the research variables and wants to build on existing knowledge. Conversely, sequential exploratory design involves collecting and analysing qualitative data first followed by quantitative data. Priority is given to qualitative data, and the quantitative data used to explain or augment qualitative findings. This design is useful when there is limited a priori knowledge about the research phenomenon, and to develop and test new tools/instruments based on the qualitative results or when the intention is generalising qualitative results to a specific study population. In multiphase design, mixed methods is used as an overall framework to guide multiple research projects with a common purpose conducted over time.
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Overall, there may be an infinite way of designing mixed methods research.\textsuperscript{44,93} As Johnson and Onwuegbuzie noted, mixed methods researchers should not be constrained by a series of pre-determined designs and should be able to create their own designs to effectively answer their research questions.\textsuperscript{93} However, several key issues should be taken into consideration during design selection and these should be made explicit.\textsuperscript{44} These include analytic logic, timing (data collection), priority, point of interface (the point of mixing), and conducting single or multiphase mixed methods study.\textsuperscript{155}

In the following sections the decisions made regarding these issues will be discussed in light of the research design chosen for this research, which is sequential, exploratory mixed methods design.

3.6.3.1 Sequential exploratory mixed method design

Among the mixed methods designs, sequential exploratory design was adopted for this thesis. Sequential explanatory design was considered, but due to the limited availability of information regarding factors influencing sharing behaviours adopting a primarily quantitative design found to be impractical.\textsuperscript{44,158} Therefore, a slightly modified form of sequential exploratory design was used for this thesis. Two separate qualitative studies were conducted concurrently to explore patients’ and healthcare providers’ views and experiences of medicine sharing behaviours, and the findings were used to inform the design and conduct of an online survey. The three studies were conducted and analysed independently. The pragmatic nature of mixed method research allows the researcher to make such modifications on the available mixed method designs.\textsuperscript{153}

In mixed methods designs, data are intentionally combined (integrated) to maximise the advantages and minimise the disadvantages of each form of data.\textsuperscript{155} Integration may occur at different stages of the research process, ranging from formulating the research question to the final interpretation of findings.\textsuperscript{156,157,159} It has been noted that the lack of proper integration is one of the major weakness of many mixed method studies.\textsuperscript{148,150} In one review, Green et al reported that out of 57 studies, 44\% of them did not combine qualitative and quantitative data at all.\textsuperscript{148}

In this thesis, data integration occurred at different stages of the research. First, the central research question: “Why do patients share medicines and how do they decide to share?” has both qualitative and quantitative components – and this enabled data integration during the initial phase of the research. Second, key themes from the qualitative interviews
were used to formulate the survey aim, design, and specific questionnaire items and this allowed integration at the intermediate stage of the research. Third, during the final stage, the quantitative and qualitative data were compared and connected to identify similarities and differences between the two forms of data.

The relative importance of the components forming mixed methods research is determined by many factors, such as the researcher’s experience, the research purpose or research questions, and practical issues. In line with the research design adopted for this thesis and the primary aim of the research, more emphasis was given to the qualitative phase of the research. As has been previously discussed, medicine sharing is among the lesser researched health behaviours, and there is a lack of in-depth understanding of sharing behaviours. In this case it was decided that initially at least qualitative studies would be more useful in terms of in-depth exploration and understanding different aspects of the phenomenon.

Practical issues were also considered when deciding the relative importance of the mixed methods components. For instance, empirical evidence regarding harms from shared medicines is limited. This could be due to under reporting of cases, poor case recording practice, or it might be due to the small amount of research on this area. For example, in adverse drug reporting forms harms from shared medicines are generally recorded as medication errors or adverse drug events and the contribution of sharing in these adverse events is not precisely known. Hence, the researcher initially was interested in gathering empirical evidence regarding harms from shared medicines; however, on consultation with an external advisory team and from the research team experience, it was decided that this aim could not be achieved within the limited timeframe of a PhD and was not pursued.

The evidence regarding prevalence of sharing behaviours has primarily come from relatively small cross-sectional surveys and it is largely inconsistent. Thus, the researcher had an interest in conducting a large nation-wide survey using stratified sampling, but this was found to be impractical in terms of feasibility including the limited resources available for the PhD.

3.6.3.2 Strengths and weaknesses of sequential exploratory design

Creswell and Plano-Clark described the strengths and weakness of sequential exploratory designs. In its favour, this design is simple and straightforward to implement, and it is the best method when prior knowledge about the research topic is limited. In addition,
the inclusion of a quantitative phase may potentially increase the acceptance of the research findings by quantitative oriented audiences. However, this design has some weaknesses. For example, each phase of the research is treated as a separate study and may require considerable time to finalise. In addition the second phase cannot be planned until the first phase is completed. As such it might not be suitable for smaller studies with a limited budget and a short project life span. Practical challenges may also occur; for example, it can be difficult to arrange interviews with busy participants, such as healthcare providers, particularly due to ethics constraints if the researcher has to wait passively for the interviewee’s response. In addition, theoretically the analysis of qualitative data may provide results which are not suitable for the subsequent phase (quantitative study), and in this case the researcher has to rework the overall research plan. Most of these challenges were experienced in this thesis and the researcher tried to anticipate and overcome those challenges through early planning, careful time management and conducting the two qualitative studies concurrently.

3.6.4 Challenges of mixed methods research

Despite the increasing popularity of mixed methods research, it has been criticised by methodological purists for its lack of philosophical foundation and impracticality. Bryman reported the main challenges of combining qualitative and quantitative data based on his interview with 20 social scientists from UK. These included inclination of the researcher to one component of mixed method, lack of a suitable audience, writing for different audiences, lack of project structure suitable for data integration, short timelines for conducting both phases, lack of skills, ontological differences between the two phases, and the challenge of publishing mixed method findings. Conflict of ideas among researchers drawn from different disciplines, space limitation in scientific journals, sampling problems, and difficulty with merging contradicting findings are additional challenges. To minimise these barriers the researcher attended qualitative and quantitative training courses and workshops and consulted experts from both research disciplines at different stages of the research.

The philosophical debates around mixed methods research are mainly concerned with the pluralistic nature of this approach. The views are diverse and range from those who totally ignore the importance of mixing methods (methodological purists) to those who advocate ignoring the role of paradigm in methods selection (‘a-paradigmatic’
As has been discussed in Section 3.2, this thesis adopted a moderate philosophical position (pluralist), and it lies in between these two extreme viewpoints. Whether stated explicitly or not, epistemological stances affect methodology and method selection, hence ‘a-paradigmatic’ stance is less likely to be a suitable option for mixed methods. On the other hand, methodological purists often specialise in a single methodology and may be technically less equipped to move back and forth between inductive and deductive reasoning to ensure data integration. In line with Kroll et al’s suggestion, this thesis did not attempt to reconcile ontological/epistemological differences, but rather the focus was on the complementarity of quantitative and qualitative data and their practical use in attaining the research aims.

The previous sections of this chapter reviewed the paradigm chosen to guide the thesis, the research methodology and design including their strengths and weaknesses, and the limitations of mixed methods research. The mixed methods approach requires each component of the research to be conducted independently in accordance with their respective research traditions. Hence, the subsequent sections contain methodological consideration of the qualitative and quantitative phases of the sequential exploratory design. Specific methods for each study will be discussed in subsequent chapters.

### 3.7 The qualitative phase

Apart from helping to uncover complex phenomena not amenable to quantitative methods, qualitative research is a pre-requisite of good quantitative health research, particularly when prior knowledge about the phenomenon is limited. Therefore, the qualitative phase of this research was used to explore patients’ and healthcare providers’ views and experiences of medicine sharing behaviours. The results were used to describe and define essential characteristics of sharing behaviours to be further investigated in the quantitative phase. Moreover, the results helped to explain the process of assessing risk and decision making when adults share prescription medicines. The data for the qualitative phase were collected using semi-structured interviews and the strength and limitations of this technique are discussed below.
3.7.1 Semi-structured interviews

Interviewing was chosen as the data collection method. Interviewing has several forms; the common ones include individual face-to-face, telephone interviews or group interviews, and postal or self-administered questionnaire interviews. Interviews can also be categorised as unstructured, semi-structured or structured. Due to the exploratory nature of most of the research questions structured interviews, often associated with quantitative techniques, were not considered for this study. The researcher had some knowledge of medicine sharing and fully unstructured interviews were not needed. Telephone and focus group interviewing were considered as options. Telephone interviewing (using landline phones) may increase access to hard-to-reach populations and maximise anonymity, and be suitable for interviewing those who are reluctant to participate in face-to-face individual or group interviews. However, this research was intended to include participants from different social backgrounds such as those from lower socio-economic groups (who may not own landline telephone) and immigrants where English is not their first language, and telephone interview may not fit this purpose.

Compared to individual interviews, group interviews are relatively cheap and take less time, and the group dynamics could be stimulating for some participants. However, medicine sharing is a relatively sensitive issue and patients might not disclose their sharing behaviours in a group setting or the group thinking elicited may not reflect an individual patient’s views and experiences as unless skilfully facilitated then a few participants may dominate the group. In addition, arranging group interviews for healthcare providers can be a difficult task.

Of all the options considered, individual face-to-face, in-depth, semi-structured interviews were determined to be the best option for exploring patients’ and healthcare providers’ views and experiences of medicine sharing behaviours. Semi-structured interviews are the most common form of qualitative interviewing and are often designed to address a set of pre-determined open-ended questions, but to be flexible enough to incorporate additional questions covering subject matter not predicted by researchers which emerges during earlier interviews into later interviews in an iterative manner. In face-to-face interviews both verbal and non-verbal behaviours of the interviewees can be observed.
which can provide richer and more detailed data than can be obtained by other formats, such as telephone interviews. Unlike methods using questionnaires, questions can be modified or re-arranged to suit individual interview requirements. The interviewer can also use different methods to make the interviewee feel at ease and this process often helps to minimise any misunderstanding and apprehension about the research and the questions asked.

However, semi-structured interviewing is not without problems; it can be time consuming, difficult to organise, may not be the best technique to use when the respondent is shy or when the researchers interviewing skills are limited. Although the interviews can be confidential, anonymity of participants cannot be assured; as a result, interviewees may be reluctant to disclose illegal behaviours or may provide socially favourable responses.

3.7.2 Sampling strategy and sample size in qualitative research

3.7.2.1 Sampling strategy

Marshall has classified qualitative sampling strategies into three categories: convenience, purposive, and theoretical sampling. In convenience sampling participants are selected based on ease of access, and purposive sampling identifies information-rich participants. Theoretical sampling, on the other hand is used to sample participants based on emerging data, in order to build a theory that explains the phenomenon and is commonly used in grounded theory design. However, Marshall has noted that the three strategies are not mutually exclusive, and their relative importance is dependent on the data analysis technique and the central research question. For this research, purposive sampling was found to be the best option. Convenience sampling was considered because of its advantages in terms of saving time and money; however, as mentioned above, in this strategy information is collected from participants who are available by chance (or easily accessible) and as such the findings could be biased and may not be credible.

The goal of purposive sampling is to sample participants in a strategic way in order to gain rich information, so that to answer the research questions. Therefore, the researcher selects participants who can best inform the research question. The sampling procedure is an iterative process and involves moving back and forth between data collection and analysis.
3.7.2.2 Sample size

Unlike quantitative research, the nature and number of qualitative study participants cannot be determined ahead of data collection; they are to be discovered during data collection.\textsuperscript{178}

Some general guidelines for determining the number of participants required for qualitative designs are available.\textsuperscript{84,179,180} For instance, Creswell has noted that 20 to 30 interviews are sufficient for developing a theory using grounded theory approach.\textsuperscript{84} For phenomenological design, Morse suggested six to 10 participants.\textsuperscript{180} For semi-structured interviews (irrespective of the study design), Morse suggests 30 to 60 participants.\textsuperscript{180} However, all the above suggestions are not based on empirical justifications.\textsuperscript{181,182} As Mason noted, if saturation is the guiding principle for sample size determination there is no way it cannot be achieved at any other number (e.g. 8, 13, or 67).\textsuperscript{181}

For most qualitative study designs the sample size is determined by the point at which saturation is reached.\textsuperscript{183} The various forms of saturation include ‘theoretical saturation’, ‘data saturation’, ‘conceptual saturation’, and ‘thematic saturation.’ Thematic or data saturation commonly refers to the process of data collection until the point where no new codes, themes, or categories are identified.\textsuperscript{184} Conversely, theoretical saturation (commonly used in grounded theory) is the point at which the researcher stops analysing and sampling new data and can effectively explain how different categories, themes, and concepts interconnect to form a theory.\textsuperscript{179,185}

Although most qualitative researchers agree on the importance of ensuring saturation, little guidance is available as to how to operationalise it.\textsuperscript{182} Bowen has noted that the concept of saturation is still vague and the process lacks clarity in many disciplines.\textsuperscript{186} Also it has been remarked on that the notion of saturation was originated in grounded theory and transferability of the concept beyond its origin is limited.\textsuperscript{184} Noting this deficiency, many authors have called for the use of robust quality ensuring procedures within specific research traditions rather than imposing the concept of saturation across all designs.\textsuperscript{182,184,186-188}

Overall, the lack of generic guidelines for evaluating researchers’ claims of saturation is a major challenge. As noted by Sandelowski ultimately in qualitative research sample size determination is a matter of judgement and experience of the researcher.\textsuperscript{174} With respect to this research, sample size determination for both qualitative studies was guided by the
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‘data saturation’ principle.\textsuperscript{184} Considering the above arguments, saturation was defined for each study as “the point in data collection and analysis when new information produced little or no change” to the understanding of medicine sharing behaviours.\textsuperscript{182} Specific measures taken to attain saturation are discussed in subsequent chapters.

3.7.3 Developing rapport

Unlike unstructured interviews (such as used in classical ethnography) where rapport is developed over time,\textsuperscript{167} there was less time available for the researcher to develop rapport with the interviewees, in particular with healthcare providers. Within this limited time, efforts were made to establish trust and rapport with interviewees. First, there was informal chat, mostly on social events. Then, the interviewees were informed about the researcher’s professional status, the research purpose, and general definition of medicine sharing. At this stage the goal was mainly to create a non-threatening environment and to encourage the interviewees to talk. The first question for all interviewees was “What does medicine sharing mean to you?” The researcher observed the participants’ level of confidence while they were responding to this broad question and if it was necessary the question was repeated and the interviewees were given more time to think. In some instances, the researcher provided further clarification or used spontaneous follow up prompts/probes to continue the conversation.

The second phase of rapport development occurred as the interviewees were responding to the central interview questions. This involved the researcher attentively listening, learning, supporting, and sharing ideas with the interviewees. In some instances, the researcher and the interviewees corrected each other’s understanding and this helped to clarify the researcher’s questions or the interviewees’ responses. As much as possible, the researcher tried to avoid leading the interviewees or directing them towards certain responses.

3.7.4 Data analysis strategy for qualitative research

3.7.4.1 Overall data analysis strategy

As Braun and Clarke noted there is no ideal technique for analysing qualitative data\textsuperscript{189}; the match between the researchers’ worldview, the research aim, and the method of analysis is the most important.\textsuperscript{190} Although commonly some disciplines prefer a specific
method of analysis over another (e.g. narrative in life history and ethnography in cultural anthropology), a wide range of analysis approaches are employed in health research, such as discourse analysis, grounded theory approach, content analysis, phenomenology, and thematic analysis. However, these approaches are not mutually exclusive.

Of these analysis techniques, thematic analysis was found to have the best fit for this research. The justifications for choosing this approach were (1) thematic analysis does not adhere to a particular research paradigm, and it can be applied to a wide range of worldviews; thus it is well suited to pragmatism and mixed method research. Some of the other approaches are strongly associated with either interpretivist/constructivist perspectives (such as discourse, narrative analysis, ethnography, and phenomenology) or positivist perspectives (e.g. quantitative content analysis), and they were not considered as options; (2) thematic analysis shares many advantages with some of the other approaches, for instance, in thematic analysis, as in discourse or phenomenology analysis, the researcher plays an active role in interpreting the data. It also shares many features with quantitative content analysis, but counting observable instances is not a focus. Like grounded theory (constant comparison approach), it can be used to develop models or theories to explain a phenomenon without applying time-consuming (and often very technical) open and axial coding processes; (3) thematic analysis is suitable for applied health research where the focus is on influencing health planners or practitioners through delivering relevant and usable knowledge. One aim of this PhD was to inform the development of specific intervention strategies for minimising the potential risks and harms of sharing, thus it can be considered as applied health research; and (4) thematic analysis is also an ideal approach for analysing large amount of data and for team research.

However, thematic analysis has some limitations. In thematic analysis, unlike discourse or conversation analysis, more attention is given to defining codes and category development than the meaning of the text. Unlike some methods (such as narrative analysis) which looks for patterns within a single case, thematic analysis focuses on identifying patterns across an entire data set. Thus, thematic analysis may not capture subtle meanings in the data. It is also been criticised for its lack of depth, and the data disassembling (coding) process may increase bias or subjective interpretation; however, all methods involving coding are vulnerable to this bias.
A decision was also made as to whether to adopt an inductive or a deductive coding approach. In the deductive approach codes are generated from pre-existing research and primarily used to test a hypothesis or corroborate previous research findings; these codes are largely employed in qualitative research which is undertaken from a positivist perspective. Conversely, in an inductive approach, which is mostly tied with interpretivist or constructivist paradigm, codes emerge from the data, and the researcher does not refer to existing theories or models until coding is completed.

As was indicated in Chapter 2, before starting the qualitative studies, a systematic review of literature was undertaken to identify models or theories that could potentially explain medicine sharing behaviours. The only model retrieved in the process was hypothetical, and designed to explain potential adverse consequences of medicine sharing. Although the systematic review process did not lead to the identification of a suitable model, it allowed the researcher to comprehensively examine various sources of information related to medicine sharing. The information obtained was also used to inform the research aim and the interview guides. Thus, the researcher had a general understanding of medicine sharing behaviours and adopting entirely inductive coding (which ideally requires the researcher to be free from preconceptions and biases) became impossible. On the other hand, medicine sharing is a relatively new area of research and the review indicated several gaps in the current literature, thus it was justifiable to use an inductive coding approach to explore new underlying causes of medicine sharing behaviours. In order to incorporate the knowledge gained from the systematic review into the qualitative research and uncover potentially complex aspects of medicine sharing, the researcher decided to adopt a coding approach that had both deductive and inductive elements. In searching for a suitable thematic analysis approach with both deductive and inductive features the researcher came across the general inductive approach (GIA).

Like other analysis techniques, the GIA involves reading the textual data, developing categories and themes from the data, and transforming the themes into models or frameworks. However, GIA procedures are less structured and less time consuming compared to most other coding approaches. While the general themes are likely to be derived from the research objectives (deductive feature), more specific categories/sub-themes arise from the data (inductive feature). The GIA approach allows the researcher to make decisions about what is more useful or less useful in the data. The main focus of the GIA is to address the specific research objectives, and thus it might constrain other
possible outcomes from the data. However, unlike absolute deductive approaches (such as confirmatory analysis) it does not focus on testing a hypothesis or a theory. GIA also does not require adopting time consuming structured analysis techniques, such as open and axial coding\textsuperscript{194}; hence, it is well suited for mixed method research that needs to be completed in a relatively short time.

Other decisions were also made before coding the data. Thomas, in his introduction to GIA, did not specify the best time to start coding\textsuperscript{199} Braun and Clarke have suggested reading through the entire data sets at least once before starting coding; however, this procedure requires gathering all data before starting analysis\textsuperscript{189} Conversely, other authors have suggested coding throughout the data collection process to modify the research questions and to refine the coding process as data collection continues\textsuperscript{203,204} A decision was taken to start coding while the data collection was in progress; this approach was chosen mainly due to the need to use the initial interview codes to inform subsequent interviews.

The researcher also explored suggestions regarding the optimal number of people needed to be involved in the coding process. There is no single approach applicable to all types of qualitative research; the coding process might be handled individually or in a group\textsuperscript{205} For a study that requires an extended, ongoing relationship with informants (e.g. ethnographic study) the coding process preferably should be conducted by the ‘choreographer’ of the study\textsuperscript{206} Conversely, for most other studies coding in teams is reasonable. To ensure consistency of coding, four interview transcripts from each group of interviews were coded by the research team and the remaining transcripts were coded by the lead researcher.

3.7.4.2 Coding and theme identification

As Sandelowski noted, there is a significant overlap in the processes of qualitative data collection, preparation, analysis and interpretation; it is an iterative process\textsuperscript{207} Although not distinct phases, the major activities of the data preparation and analysis of this research included interview transcription, data organisation, data familiarisation, data coding, and theme identification.

The first step of the data analysis involves transcribing interview recordings and helped to minimise bias in representation of dialogue between the researcher and the interviewees\textsuperscript{208} There are several ways of transcribing interviews, and the level of
transcription detail needed is informed by the methodological assumptions and specific data analysis technique.\textsuperscript{209} For instance, in conversation analysis where describing and examining the actual speech pattern is essential word-for-word (‘true verbatim’) transcription is required.\textsuperscript{208} Conversely, thematic and content analysis techniques usually focus on identifying the common ideas (concepts) in the data and ‘true verbatim’ transcription may not be required.\textsuperscript{210} Therefore, the ‘intelligent verbatim’ transcription technique\textsuperscript{211} was adopted for this research, and this involved full transcription of what was said followed by light editing to remove “idiosyncratic elements of speech”, such as pauses, false sentence starts, stutters, filler words, non-verbal, and involuntary vocalisations (e.g. coughing, sniffing or sneezing).\textsuperscript{208} This approach has been used in health research\textsuperscript{212} and is appropriate for mixed method design.\textsuperscript{210}

Transcribing involves repeatedly listening to the interview recordings and paying attention to the details of the recording and as such it helps to familiarise the researcher with the data and facilitate realisation of emergent ideas.\textsuperscript{209} The decision to transcribe interviews was evaluated against the time available for the PhD and the researcher’s clerical skills. Considering different options, a hybrid transcription system was adopted. To allow the researcher to become immersed in the data, the majority of the interviews were transcribed by the lead researcher, and the rest were transcribed by an experienced transcriber.

Data familiarisation, the second phase of analysis, require the researcher to familiarise themselves with the data through repeatedly listening to the audio recordings and reading transcripts. Generally, at this stage, a rudimentary type of data analysis was begun.\textsuperscript{207} As Yin suggested, this stage was used to explore the distinctive features of each interview and examine any interesting insights related to the research phenomenon.\textsuperscript{213} However, the researcher was not committed to any form of formal data analysis at this stage.

After data familiarisation, preparation for coding and theme identification begins. First, the level (details) of coding needed was defined. Some analysis techniques (e.g. discourse analysis) require detailed levels of coding such as word by word or line by line coding, others simply code phrases, a sentence, a group of sentences or a paragraph.\textsuperscript{203} To avoid ‘word overload’, the unit of analysis was defined as meaningful segments of the data, such as a phrase, a sentence, or a group of sentences.\textsuperscript{207} Second, decisions were made regarding what to code. Creswell suggested that the decision on what to code is mainly guided by the intuition of the researcher.\textsuperscript{64} Ryan and Bernard noted that codes (or themes) are
identified when the question “What is this expression an example of?” is answered.214 In this research both the researchers’ intuition and the perceived meaning of participants’ responses to specific research questions were used to identify underlying themes and to decide what to code. Attention was paid to coding data relevant to the research aim while ensuring inclusion of incidental findings.215

Data from patient and healthcare provider interviews were analysed separately. The decision to separate the two data sets was partly driven by the intention to publish the findings separately; however, the findings from both groups were later triangulated.

3.7.5 Rigour and trustworthiness

Although qualitative research is becoming established within health research, there is a lack of consensus as to how to evaluate the quality of the findings. There are three schools of thought: those who advocate the use of quantitative research quality-assuring criteria (validity and reliability) to evaluate qualitative findings, those who advocate the use of evaluation criteria unique to qualitative research, and those who oppose the use of any pre-determined criteria for qualitative research quality evaluation.216 The arguments around evaluation criteria are largely related to theoretical perspectives. 217 While positivists call for ensuring the validity and reliability of qualitative research, the interpretivists oppose the use of validity and reliability concepts to evaluate qualitative research. However, over the last three decades the concepts of validity and reliability in qualitative research have started to be replaced by the concepts of research rigour and trustworthiness.217 For instance, the first school of thought’s idea of ensuring reliability through monitoring inter-coder agreement seems irrelevant. Given the complexity of the topic and subjective nature of interpretation in qualitative data analysis, it is unrealistic to expect a high degree of agreement between two or more coders (i.e. ≥ 80%). Leaving aside the paradigm debates, in this research pragmatic measures were taken to ensure the rigour and trustworthiness of findings.84,199,218,219 Some of these measures included:

- Rapport was developed with participants and any misconceptions or misinformation about the research was clarified.
- The interviewees were offered an opportunity to edit or verify their interview transcripts.
All interviews were audio recorded, transcribed and the accuracy of transcripts was ascertained; post interview notes and memos were written; and detailed codebooks were developed.

The research team met at 2-3 week intervals throughout the project lifespan to discuss emergent findings.

Patients’ and healthcare providers’ views and experiences were triangulated to examine the similarities and differences around different aspects of sharing.

Findings were presented at departmental seminars and local and international conferences.

Emergent findings were peer reviewed by colleagues.

The researcher disclosed his personal presuppositions, bias and past experiences with the research phenomenon (see below).

During analysis the researcher included outlying data or negative cases.

To ensure transferability of the findings ‘thick description’ of the research process was provided.

3.7.6 Reflexivity

Reflexivity entails researchers documenting and reflecting on the way in which they collect, analyse, and interpret data and how the research process shapes the findings. Unlike quantitative research where the researcher remains neutral and objective, in qualitative research the researcher is the research instrument; hence their values, beliefs, and experiences may influence the research process. Therefore, reflecting on the way in which the researcher affects the research process is required to identify the nature of these influences. Reflexivity has various forms. Methodological and epistemic reflexivity has been discussed in the previous sections of this chapter. In the following sections (sections 3.7.6.1 and 3.7.6.2), the lead researcher’s experiences and views on medicine sharing and his role and impact in data collection and analysis will be discussed.

3.7.6.1 The lead researcher’s experiences and views on medicine sharing

At the commencement of the PhD, I had more than five years of experience as an academician and researcher specifically in pharmacoepidemiology and social pharmacy. Additionally, I was registered as a pharmacist in Ethiopia. My first research experience was the postgraduate dissertation work on adherence to antiretroviral therapy. This
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project introduced me to both qualitative and quantitative research traditions and their underlying concepts. I was also involved in several trainings (both as trainer and trainee) related to rational medicines use, medicines supply management, and HIV/AIDS. In all these trainings medicine sharing was viewed as unhealthy behaviour and patients were criticised for being involved in sharing practices.

Growing up and working in resource limited settings I have seen people hoarding and sharing antibiotics, antimalarials, and other medicines due to a lack of confidence in the healthcare system and frequent disruptions to the supply of essential medicines. While I was gathering data for my post-graduate dissertation, I observed healthcare providers advising patients to share antiretroviral medicines at a time of stock-outs or when the patients failed to attend their medical appointment in a timely manner. The healthcare providers did this, not because of ignorance or lack of knowledge, but because it was mainly as a last option to help the patient stay alive. Considering my training around the rational use of medicines, it struck me that experienced health professionals were advising patients to share toxic antiretrovirals. On the other hand, I was aware of the strict medication adherence (≥ 95%) requirement for these medicines and the potential repercussion of missing doses.

Overall, the potential negative consequences of medicine sharing is concerning, but it is yet unclear why people share medicines and there is little information on hand regarding the best strategy to reduce harms and optimising benefits of sharing. Therefore, the lack of research on medicine sharing and my personal experience (as described above) have motivated me to undertake this research.

3.7.6.2 The lead researcher’s role in data collection and analysis

As the lead researcher for this project, I feel that I might have been biased when collecting and interpreting data due to my previous training as a health professional, which has influenced me to focus mainly on the negative aspects of medicine sharing. However, I tried very hard to resist my preconceptions and committed myself to genuine open reflection about the views and experiences of the research participants. Generally, the data do not speak for themselves; there is no theme waiting to be discovered; it all depends on the researcher’s interpretations of the data. Thus, theme identification and the interpretation of the findings might be different if another researcher had collected and/or
analysed the data. Moreover, had another data analysis technique been used, different themes might have been generated.

On the other hand, my knowledge about medicines and the healthcare system, in general, facilitated the data collection process by decreasing the level of distraction in communication that could happen had a non-health professional conducted the interviews. I supported patients to construct their thoughts and helped them to remember the name of medicines or other medical terminologies without leading them. Generally, I tried to be good listener in order to learn from patients rather than approaching each interview as an expert. My experience as a pharmacist also decreased the healthcare providers’ perception of me as an ‘outsider’, and increased their perception of me as someone who understands what they were saying. I used this opportunity to establish rapport and trust with healthcare providers. My expertise and experience also helped me to filter out relevant data from less useful data for contemporary medical and pharmacy practices, and this is in line with pragmatism principles. Furthermore, I have had an opportunity to see the healthcare system of both developed and developing countries and this helped me to interpret the research findings in a wider scope.

As an international student, with English as a second language, my relative lack of experience in the culture and language of New Zealanders challenged me while collecting data. However, I received a range of support from the University of Auckland and my supervisors to overcome these challenges. I was challenged by my supervisors to constantly examine the interpretation of the data, particularly to be open-minded for new thoughts and ways of looking at emerging findings.

While conducting the interviews I did not try to hide my professional experience. Therefore, I accept and recognise the potential effect of this on the interviewees and the interpretation of findings. To monitor subjectivity, all the major research activities were documented in a research journal. Finally, as someone who trained in social pharmacy, I strongly believe in the importance of using multiple methodologies and the need to be flexible when incorporating patients and healthcare providers’ perspectives, in an effort to comprehensively explore the medical and sociocultural aspects of medicine sharing.
3.8 The quantitative phase

This section provides an overview of quantitative approaches, sampling, validity and reliability measures. Specific methods used are reported in chapter 7.

3.8.1 Choosing a quantitative research approach

There are a range of quantitative methods used in pharmacy practice; the major ones include analysing existing data, direct observation and self-report data. Direct observation methods were not fit for this research. Analysing existing datasets was considered an option, but no relevant pharmacy or prescription records were identified containing information on medicine sharing practices. Thus, the research team decided to conduct a patient survey using the self-report method. Overall, survey methods are less expensive and quicker at collecting data than direct observation or experimental methods. However, the data may be biased as respondents may not always report their actual experiences, attitudes or beliefs.

There are different modes of administering a survey; these include face-to-face (in-person), mail (postal), telephone, or online (such as Web based or via email) or hybrids of these approaches. Each mode of administration has its own advantages and disadvantages, and there is no mode of administration superior in all aspects and settings. The choice between survey modes depends on the cost involved, the accessibility of the target population, the required response rate, the required response accuracy, the research objective, and available resources.

In a face-to-face survey a trained interviewer interrogates one or more individuals using a questionnaire about their opinion on the research topic. The physical presence of an interviewer means respondents can get clarification on difficult questions, and hence increase data completeness and quality. This approach is suitable where the target population has less access to telephone, mail, or internet; however, it is costly and time-consuming and introduces interviewers’ bias or social desirability bias. Similar to the face-to-face approach, in telephone survey the interviewer can probe the respondent or clarify difficult questions, but it is less expensive as it does not involve travelling. However, this approach may exclude people without a telephone. Mail surveys avoid interviewer’s bias and the respondents complete the survey at their convenience. Compared to telephone and face-to-face surveys, mail surveys are less expensive, but
usually have low response rates, and completed questionnaires may not be returned in a timely manner. Online (internet) surveys are the quickest and least expensive of all the approaches, and social desirability bias is not a major concern.

The majority of previous surveys on medicine sharing used the paper based, face-to-face data collection. Due to its unique design features, faster completion rate, and ability to reach a large number of geographically diverse respondents, an online mode of survey administration was chosen for this study. A mail survey was considered as an option. However, in order to easily access patients taking prescription medicines, respondents were mainly recruited via patient support groups, and an online survey was found to be cheaper, more convenient, and quicker than mail surveys in this scenario. Moreover, due to privacy issues it was anticipated that most patient support groups would not store or be willing to pass their members’ mail addresses to third party. Due to the cost involved and the short time available for the PhD, face-to-face and telephone surveys were not considered as options. In subsequent sections the strengths and limitations of an online survey will be discussed.

3.8.2 Strengths and limitations of online surveys

3.8.2.1 Strengths of online survey

The advantages of online surveys were summarised by Menon et al. Some of these include: (i) online surveys can help to recruit a large sample size in a short time, and hence be more efficient and cost-effective compared to other survey modes; (ii) online surveys may facilitate access to hard-to-reach populations such as drug users, people with sexually transmitted diseases, cancer survivors, and so forth; recruiting those groups through other survey modes can be extremely expensive and time consuming; (iii) in an online survey a wide geographical area can be covered with a limited budget and this has the potential to increase representativeness; (iv) online recruitment can enhance anonymity and confidentiality, thus is ideal for studying sensitive issues such as prescription medication diversion or illegal drug use; (vi) online survey responses can be automatically imported into statistical databases, and thus saving data entry time and reducing human errors in data entry and coding. It also significantly reduces personnel costs associated with data collection and expedites data analysis; and (vii) online surveys also offer more design options, for example, allow the inclusion of complex skip patterns, and this can help to
reduce the response and cognitive burden on respondents and may reduce missing values and inconsistent responses.

In addition, online survey participants can usually complete the survey at their own convenience; thus the cost of participation for respondents is less compared to face-to-face or telephone surveys where participants need to take time-off from work or pre-arrange it around other activities. Another advantage is online survey participants are mainly self-selected samples and previous studies have shown that self-selected respondents provide more complete and clearer responses than those who were not self-selected volunteers. Furthermore, online survey respondents are less likely to provide socially favourable responses compared to paper based or telephone survey respondents.

3.8.2.2 Limitations of online survey

While online surveys have several advantages, there are limitations. Generally, online surveys have low response rates and the findings may not be as generalisable as those collected using other survey modes. This is because some individuals may not access the internet or might not possess the skills or devices required to complete the survey. Invitation emails containing URL links to an online survey may also be considered as spam by e-mail management systems and respondents may refrain from responding for safety or confidentiality issues. However, response rate is a function of the target population characteristics, study design, study topic, and Internet coverage, and making meaningful comparisons between different modes of surveys is difficult. For example, in a recent survey 86 in every 100 New Zealanders surveyed reported having active internet connections on their mobile phones, and Internet coverage was not a major barrier for participants in this study. To maximise the response rate in this study, participants were offered a chance to take part in a prize draw and follow up emails were sent to potential participants. In addition to offering the chance to enter the prize draw, to increase the credibility and acceptability of the invitation and assure anonymity, the survey link was sent to potential participants through support groups via their administrators. The survey was also designed to be compatible with various devices such as mobile phones, tablets and computers.

The other limitation of online surveys is the potential for multiple responders or bogus data because of little control over who can and cannot take the survey. However,
dishonesty and fake responses are possible in other survey modes.\textsuperscript{245} One method of monitoring multiple responses is to track the IP address of each respondent.\textsuperscript{245} However, this was an anonymous survey and due to ethics committee requirements for assuring anonymity, this option was not considered. Instead, after data were collected, data were checked for presence of outliers, repetitive and anomalous data patterns.

It has been also noted that there are demographic, social and psychological differences between internet users and non-users. Internet users are more likely to be educated, Caucasian and young.\textsuperscript{245} Unlike telephone and mail surveys, it can also be difficult to maintain contact with internet responders.\textsuperscript{236}

Although a large sample size at low cost is a particular advantage of online surveys, those who participate may have different characteristics from those who do not. It was anticipated that in this survey, respondents were likely to be more computer literate and health conscious, or they might be more likely to be taking regular medications. On the other hand, non-English speakers, those who had less time or less interest in medicine sharing might not be well represented in this study. However, due to the nature of recruitment, it was not possible to assess the characteristics of non-responders in this study, and hence it was difficult to assess the effect of selection bias on the results of the study.\textsuperscript{246} Non-responders bias is particularly a problem when the response rate is low.\textsuperscript{246}

### 3.8.3 Limitations of self-completed questionnaires

Whilst an absence of interviewer bias and convenience, and a rapid rate of administration are particular advantages of self-completed questionnaires, there are also several limitations associated with this method. Bryman has provided a comprehensive summary of those limitations.\textsuperscript{175} Participants may misinterpret the questions, and there is no one present to help them if they do not understand the questions. Moreover, because of ‘respondent fatigue’ long questions are less likely to be completed. This form of questionnaire is also not appropriate for some groups of the population, for example, for participants whose English or literacy is limited. Because of a lack of prompting, incomplete responses are common. Questions that appear irrelevant to participants are less likely to be answered, thus missing data is more common compared to in-person surveys. The investigator has also no control over who completes the questionnaire.
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Another limitation of self-report is participants may not recall past events accurately. Particularly, the recall and reporting of behaviours or events which might be considered socially undesirable could be reduced or misrepresented,\textsuperscript{247} thus behaviours which are socially unacceptable are often under-reported.

To address the above limitations various measures were taken. To minimise the questionnaire length, irrelevant questions were removed based on expert feedback (see details in section 7.5.1.1 of Chapter 7) and the Qualtrics survey software was programmed to display only questions relevant to each participant. Moreover, the questionnaire was piloted, and poorly worded or ambiguous sentences were corrected, and clear instructions were given for each part of the questionnaire. Participants were also provided with a guarantee of anonymity.

3.8.4 Sampling and sample size in quantitative surveys

3.8.4.1 Sampling method

There are no universally agreed methods for defining a target population, which often relies on the investigator’s judgement and logic and the aim of the study. If the research phenomenon is rare the researcher may include the entire population experiencing the phenomenon. However, in most cases it is too costly to study the entire population, a smaller number of carefully selected samples that represent the population can be used instead.\textsuperscript{248} There are two main methods of selecting a sample: probability and non-probability sampling. In probability sampling each member of the target population has a known chance of being selected, and findings can be generalised to the population. Probability sampling techniques include random, systematic, cluster, stratified and multi-stage sampling.\textsuperscript{249} Conversely, in non-probability methods, the probability of being selected is unknown and findings cannot be generalised to the population. These include purposive, convenience, quota and snowball sampling techniques.\textsuperscript{249} Probability sampling is generally considered to be more accurate,\textsuperscript{249} but it is not always practical or theoretically sensible to use probability sampling, and in those cases non-probabilistic methods could be better alternatives. Furthermore, simply because non-probability sampling techniques do not allow generalising to the population does not imply that the techniques and resulting data are less useful.\textsuperscript{248} The research purpose is the most important factor in determining the data usefulness.\textsuperscript{250,251} Most importantly, in the real-world, none of the
probability sampling methods matches the ideal sampling techniques described in textbooks, all surveys involve some form of compromise.\textsuperscript{252}

Morse noted that the appropriateness of a sampling method relies on its ability to facilitate understanding.\textsuperscript{151} For many reasons, a convenience sampling was found to be appropriate for this research. First, this study is exploratory research, and more emphasis was given to internal validity than external validity (generalisability). Second, there was limited time and budget available for the PhD, and using expensive and lengthy random sampling techniques was not feasible. Third, this study did not aim to document either the national prevalence of medicine sharing among the adult population or to establish causal/temporal relationships between independent and dependent variables in the population. Rather, the aim was examining whether those variables were related to each other as anticipated by theory or practical experience, and to reject the null hypothesis that the independent and dependent variables are entirely unrelated to each other throughout the population; convenience sampling is suitable for such a purpose.\textsuperscript{250,251,253} Although determining the frequency distribution of outcome measures in the population is quite important, in this study more attention was paid to exploring basic trends and predictors of sharing behaviours, to lay a foundation for further studies on specific risk factors for sharing and prevention strategies. However, disadvantages of convenience sampling include over or under representation of certain groups,\textsuperscript{254} and the findings may not represent the experience of all adult patients in NZ.

\subsection{Sample size}

Regardless of the sampling method, the sample must be large enough to identify any significant association or difference that may exist in the study sample.\textsuperscript{249} Like sampling method selection, sample size estimation is also affected by the time and budget available for the study, the design and objectives of the study, and the type of statistical analysis planned.\textsuperscript{255} Generally, a sample size for most studies depends on the statistical power of the study (often set at 80%), acceptable level of significance (set at 95% confidence level), the required accuracy (or margin of error – often set at 5%), effect size, expected variance or prevalence rates of the key outcome variables, and standard deviation in the population.\textsuperscript{256} Based on those parameters, statistical software packages can be used to estimate the sample size required for a particular study. Some of the key variables in this study were new (e.g. the hypothetical questions assessing attitudes towards sharing
behaviours) and estimating the parameters described above (e.g. effect size, standard deviation) from pre-existing research was not possible, thus determining sample size based on power calculations was not practical. Instead, the sample size determination was informed by the types of statistical analyses needed to answer the research questions. Factor analysis and logistic regression methods were the main statistical procedures required to answer this study’s research questions (described below), and a minimum of 200 valid responses was needed to complete the planned analyses (see Chapter 7). Failure to achieve an adequate sample size decreases statistical power and increases the occurrence of Type II error (β or false negative), that is, failure to detect significant association where significant association actually exists between two variables.257

3.8.5 Likert scales

There are several scales to measure attitudes towards a particular phenomenon.258 Those scales are chiefly used to roughly divide people into different categories based on their attitudes towards a particular phenomenon.258 The most common of these scales is the Likert scale.259 A Likert scale is used to quantitatively measure the scores obtained from respondents and is usually included in survey questionnaires. In this research a Likert scale259 was used to measure survey respondents’ level of agreement or disagreement with hypothetical statements assessing attitudes towards lending and borrowing. There is no consensus regarding the number of scaling points. For the sake of simplicity, most studies use a five point scale, but fewer or more scaling points are not uncommon.258 In this study a five point scale was chosen as it was felt that it would reduce the burden on respondents and encourage them to make considerate decisions about each of the hypothetical statements.

The inclusion of a Likert scale in this survey facilitated statistical analysis; particularly it helped to analyse the hypothetical statements using factor analysis. For this study, a positive endorsement scale was used – the higher the score indicated more positive attitudes towards medicine lending or borrowing behaviour (i.e. 1 = Strongly disagree, 2 = Disagree, 3 = Neither agree nor disagree, 4 = Agree and 5 = Strongly agree). Some hypothetical items in the questionnaire were negatively worded, and for consistency of scoring these items were reverse scored.
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3.8.6 Quantitative data analysis

3.8.6.1 Logistic regression

The relationships between independent (explanatory) and dependent (outcome) variables were examined using logistic regression. Since all outcome variables were dichotomous, logistic regression was chosen over the other models. In the logistic models all explanatory variables were combined to estimate the probability that a certain event would occur. Several assumptions must be met in order to use the logistic model. Some of these include: (i) the sample size has to be large enough to support the model, a minimum of 10 cases per explanatory variable is required. (ii) the explanatory variables have to be categorical or metric. If the explanatory variable is nominal and non-dichotomous, it has to be changed to a dummy code variable. (iii) the predicting variables should not be highly correlated with each other, that is, there should not be a multicollinearity (or collinearity) issue. If two predictors exhibit multicollinearity, one of them should be removed from the model.

In addition to the above assumptions, in order to make any statistical inferences, the regression model has to be checked to see if it fits the data sufficiently well. There are several ways of assessing model fitness. One approach is assessing how well the explanatory variables predict the outcome measure (i.e. the predictive power of the model). The predictive power can have values between zero and one, with zero indicating no predictive power and one indicating perfect predictions. There is no consensus on cut-off point, but the higher predictive power the better the model fits. Several pseudo R-square measures have been proposed to determine the predictive power of a logistic model, the two commonly used ones are Nagelkerke R-square and Cox and Snell R-square, and for these statistical tests the chi-square should be significant (p-value < 0.05) in order for the model to be fitted. Generally if the model fits, the independent variables can explain enough variance in the outcome variable. Another approach for assessing model fit is to calculate a goodness-of-fit statistic, for example, the Hosmer and Lemeshow’s test. In Hosmer and Lemeshow's test the observed frequency is matched with the predicted frequency, and the more similar the two values are, the better the model fits. With a p-value of >0.05, the Hosmer and Lemeshow's test indicates that the model fits the data well. The third approach for assessing the degree to which actual outcomes agree with predicted probabilities is expressed in SPSS as a classification table. There is
no consensus regarding the cut-off point, but a value greater than 0.5 is often considered to be adequate.\textsuperscript{263}

There are two basic approaches to building a logistic regression model: standard (Enter method) and stepwise (e.g. backward, forward, stepwise or combined backward-forward elimination) methods.\textsuperscript{260} In the standard method, all explanatory variables are introduced into the model in one step. In contrast, stepwise approaches include or remove explanatory variables in sequential fashion.\textsuperscript{264} Stepwise regression procedures are largely controversial and criticised for their over-simplification and biased estimates of logistic regression coefficients.\textsuperscript{270,271} Also noted is that the utility of the stepwise approaches for a relatively small sample size are limited.\textsuperscript{270} Therefore, standard logistic regression (Enter method) was chosen for this study.

Unlike linear regression, which uses the ordinary least-squares method, logistic models use the maximum-likelihood estimation technique to find the coefficients for the explanatory variables in the regression equation.\textsuperscript{264} In addition, in contrast to linear regression, logistic regression does not require the explanatory variable to be normally distributed or be linear.\textsuperscript{263}

3.8.7 Validity and reliability

The survey questions assessing attitudes towards medicine borrowing and lending (see section 7.5.1 of Chapter 7) behaviours had not been used in other studies and hence their usability in measuring the target behaviours was assessed using different tests of reliability and validity. These tests are discussed below.

3.8.7.1 Reliability

Reliability describes the overall consistency of a certain tool, test, or procedure, such as a questionnaire.\textsuperscript{272} Measures which have high reliability are expected to produce the same results under the same conditions. While reliability may not necessarily imply validity, unreliable measures are less likely to produce valid results.\textsuperscript{273} There are several measures for determining reliability.\textsuperscript{258} The most common of these measures is the Cronbach’s alpha test which only requires a single test administration to estimate the reliability of a given test.\textsuperscript{272} Therefore, in this study the internal consistency of hypothetical items measuring attitudes towards borrowing and lending behaviours was assessed using the Cronbach’s alpha test (see section 7.6.12 of Chapter 7). There is a lack of agreement on what
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constitutes an adequate level of alpha. Generally, a scale that displays an alpha greater than 0.7 is considered to have adequate internal consistency. A scale that displays an alpha between 0.6 and 0.7 is considered to have questionable internal consistency, and it is unacceptable if alpha is less than 0.5.

3.8.7.2 Validity

Validity refers to a questionnaire’s ability to measure what it claims to measure. There are broadly two types of validity: internal and external validity. Whereas external validity indicates the findings’ generalisability to the target population, internal validity refers to the extent to which the research minimises bias (systematic error) in order to rule out the effect of unobserved variables on the conclusions made. Content validity, construct validity and criterion-related validity are the three most commonly assessed forms of internal validity.

Content validity measures the relevance and representativeness of the questions included in the questionnaire, for example, whether items assessing borrowing behaviour cover all aspects of borrowing. In this study, content validity was achieved through literature review, qualitative interviews, expert review and pilot testing. Criterion-related validity evaluates how the questionnaire performs compared to other established valid instruments. Since there were no other existing valid measures, criterion-related validity was not assessed. Construct validity assesses the degree to which the questionnaire measures the construct it is intended to measure. In this study factor analysis was used to assess construct validity and this procedure is described below.

3.8.7.3 Factor analysis

Factor analysis, a multivariate statistical technique, was used to reduce a large number of questions assessing attitudes towards medicine borrowing and lending into a fewer number of unobserved underlying variables (factors). There are three main types of factor analysis: Exploratory Factor Analysis (EFA), Principal Component Analysis (PCA) and Confirmatory Factor Analysis (CFA) and. EFA and PCA seek to uncover the underlying structure (factors) of a large number of observed variables and are often used when there is little understanding about the underlying mechanism of the target behaviour. Conversely, CFA is used when there is an existing theory that explains the underlying
mechanism of the target phenomenon and when the researcher is interested to test if the research data fit the existing theory.\textsuperscript{282}

In this study, because of the inadequate knowledge about the underlying mechanisms of lending and borrowing behaviours, CFA was not considered as an option. Although the development of questions assessing attitudes was informed by COM-B, existing evidence around the performance of the model for explaining sharing behaviour is limited. Furthermore, the COM-B constructs are not mutually exclusive and an attitude question meant to represent one construct can also represent another construct. EFA was considered as an option, but since the primary purpose of the data reduction was to identify and compute composite lending and borrowing scores for the factors underlying attitude questions, PCA is more appropriate.\textsuperscript{283-285}

To minimise potential errors and to produce reliable results, sample size adequacy and the suitability of the data for PCA was determined. Overall, there is lack of consensus regarding the sample size required for factor analysis. While Hair et al suggested a minimum of 100 cases to run factor analysis,\textsuperscript{286} Tabachnick and Fidell suggested that the sample size should be over 200.\textsuperscript{287} Instead of absolute numbers, other authors provide a general rule of thumb based on the number of variables to be measured (i.e. sample to variable ratio), ranging from three participants per variable to 20 participants per variable.\textsuperscript{288} In consultation with a statistician, this study aimed to achieve a sample size of between five and ten participants per variable. The sampling adequacy was also checked by using the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy.\textsuperscript{289} The KMO index (between 0 and 1) is used to examine whether each variable and their overall sum is suitable for factor analysis. The KMO for the overall data set and the KMO of each individual variable should all be over 0.5 for factor analysis to be considered appropriate.\textsuperscript{289} In SPSS, the KMO value for each variable is produced on the diagonal of the anti-image correlation matrix.

Multiple criteria were used to examine the suitability of the data for factor analysis (i.e. factorability). A matrix of inter-correlation among all the variables included in factor analysis was examined to check whether there were adequate correlations (\textgreater{} 0.3) between variables so that the common factors could be extracted.\textsuperscript{286,290} A lack of adequate correlations among all the included variables (\textless{} 0.3) is an indication that the variables are uncorrelated with one another.\textsuperscript{286} Thus, there are no common characteristics which can be correlated with the underlying (latent) factor, and the correlation matrix will roughly be
Bartlett’s test of sphericity can be used to test the null hypothesis that the correlation matrix is an identity matrix. Rejection of the hypothesis (p<0.05) indicates that there are significant relationships among the variables which are appropriate for factor analysis.

There is no agreed method for determining the number of factors to be extracted (retained). Multiple criteria should be used when deciding on the number of factors to be retained. In addition, the usefulness and interpretability of factors should be considered. Kaiser’s criteria, Horn’s Parallel Analysis technique, and Cattell’s Scree test (or scree-plot test) were used to estimate the number of factors. In Kaiser’s criterion, only factors with an eigenvalue greater than one are retained, whereas in scree-plot tests only factors before the breaking point (elbow) of the graph are retained. In parallel analysis, randomly generated eigenvalues are compared with actual eigenvalues, and factors are retained if the actual eigenvalues are greater than randomly generated eigenvalues. It has been noted that Parallel Analysis provides a superior estimate over the other methods.

In factor analysis, factors are rotated to obtain more interpretable and simpler structure. There are two common techniques for rotating factors: oblique and orthogonal rotations. While oblique rotations yield factors that are correlated, orthogonal rotations do not allow the factors to be correlated. In the real world, it is unlikely for factors explaining human behaviours to be uncorrelated, thus the oblique rotation (Promax method) was chosen for this research.

Only variables with factor loadings greater than 0.40 on a particular factor were considered to be ‘significant’ and used to define that factor. Variables which displayed factor loadings greater than 0.40 onto two or more factors and those with factor loading less than 0.40 were excluded from subsequent analyses. The extent to which a variable correlates with all other variables (i.e. communality) was also checked. Those items which displayed low communalities (less than 0.40) were excluded. Cronbach’s alpha was calculated for coherent variables within each factor to determine their internal consistency. A total Cronbach’s alpha was also calculated for all the variables retained.
3.8.7.4 Detecting outlier cases

Since outliers may alter the factor structure obtained by PCA, the presence of outliers was checked. One way of detecting outliers in SPSS software is computing regression factor scores and identifying those which have a value greater than ±3.0 standard deviations away from the mean as outliers.\textsuperscript{299,300} Using this rule, the regression factor scores were calculated, sorted in ascending order and the presence of outliers for each score was checked separately. When outliers were detected, the analysis was repeated excluding the outliers. If the analysis excluding outliers yielded the same factor structure, with analysis consisting of all cases, it was assumed that the outliers have no impact on the overall factor structure and the excluded outliers were restored.

3.8.7.5 Composite scores (subscales)

One of the goals of the factor analysis in this study was to form composite scores (subscales) and use them as independent variables in subsequent statistical analyses. Therefore, after factors were identified, variables within each of the factors were combined to form subscales to represent the factors. Composite scores can be calculated by different methods, such as total sum scores, mean scores or regression scores.\textsuperscript{301} As suggested by Cattell\textsuperscript{302} and in consultation with an established health psychologist, the mean score technique was chosen to compute composite mean scores. In this approach, the average of each respondent’s response values on the variables with factor loadings greater than ±0.4 on a given factor was calculated (e.g. composite mean score = mean (X\textsubscript{i}, X\textsubscript{ii}, X\textsubscript{iii}, X\textsubscript{iv}). Detailed mean score calculation procedures are discussed in section 7.6.12 of Chapter 7.

3.9 General ethical consideration

For each study included in this thesis, approval and permission was sought and obtained from the University of Auckland Human Research Ethics Review Committee. The survey and interview participants were given an explanation of the nature of the study, its purpose, the procedures involved, the expected duration, the potential risks and benefits of involvement, and any discomfort it may entail through the provision of Participant Information Sheets. Each potential respondent was informed that participation in the study was voluntary and that they could withdraw at any time. The confidentiality of both written and verbal responses as well as recorded voices were made known to the research
Chapter 3 Research design and philosophy

participants. The interviews were conducted in space which afforded privacy to ensure respondent confidentiality, and participants were informed that at any time, during the interview, they can exclude themselves from the study. As the bulk of data in this research was collected using survey and interview techniques, there was little risk of harm to participants. The possible risk to the respondent was the loss of privacy and disclosure of their behaviour. To avoid this, the following measures were taken: data were stored and backed up on password protected computers; written and recorded responses and the consent forms were maintained under lock and key was accessible only to the lead researcher and the research supervisors, results were presented as aggregates, data collected were not stored in other institutions for future use, and no identifying information was collected or reconstructed retrospectively about the participants. All tape-recordings will be erased at the end of the research programme. A one-time honorarium of NZ $20 was given to each interview participant. Respondents of the survey were given a chance to take part in prize draw to win one of five NZ $100 gift vouchers.

3.10 Chapter summary

This chapter has provided an overview of the theoretical framework, study design and the research methodology. Specific methods and procedures related to each study forming the thesis are presented in subsequent chapters. A pragmatism paradigm and a mixed methods approach informed the research design, and data were collected using both qualitative and quantitative techniques. The main data collection tools were semi-structured interview guides and an online questionnaire where open and close-ended questions were included. The qualitative interviews were analysed using the GIA and different statistical procedures were used to summarise the quantitative data. A harm reduction approach and the BCW were additional theoretical perspectives guiding this research. The subsequent three chapters comprise the qualitative components of the research.
CHAPTER 4. QUALITATIVE INTERVIEWS WITH PATIENTS

4.1 Chapter overview

This chapter presents the findings of a qualitative study which explored prescription medicine sharing behaviours from the perspectives of non-health professional adults in Auckland. The chapter is organised as follows. The first three sections outline the background, purpose and objective of the study. Then, the study methods are presented, including design and sampling, participant recruitment, data collection and analysis and ethical considerations. The last four sections present the study results, interpretation of major findings, limitations and summary.

4.2 Introduction

As has been demonstrated in Chapter 2, by reviewing the relevant literature in medicine sharing research, it was found that research on the practice of non-recreational medicine sharing has not received a great deal of attention. Particularly, limited qualitative studies are available describing non-recreational medicine sharing behaviours among adults. The literature search revealed only two qualitative studies that were specifically designed to assess medicine sharing behaviours. One of these studies was a focus group discussion which was part of a mixed method research to explore older adults’ sharing behaviours, and the other was designed to determine people’s willingness to share medicines compared to other sharable commodities, and as such it did not provide details about sharing behaviours. The lead researcher is also unaware of any research which has explored in detail the reasons why people share medicines and how they make decisions about whether or not to do so. Little information is also available regarding the risk factors for sharing medicines and the consequences of sharing.

Most evidence around adults’ medicine sharing practices has been obtained from cross-sectional surveys. In these surveys, a range of medicines have been reported to be shared. Pain medications, medicines to treat allergies and antibiotics were chief among them. However, most of the surveys used closely similar predetermined list of medicines and this might limit identification of other
medicines that may be shared by patients. These surveys have also reported several reasons for medicine sharing behaviours. These include running out of previously prescribed medicine,\textsuperscript{2,12,32,45} inability to afford a medical visit or prescription charges,\textsuperscript{1,15,18,38,45} emergency situations,\textsuperscript{2} or convenience.\textsuperscript{18} Being on the same medicine or having the same health problem as the other person could also create opportunity for sharing medicines.\textsuperscript{2,60} Again, many of these surveys listed predetermined factors and asked participants to choose among them,\textsuperscript{1,2,12-14,45} and this process might limit the identification of a comprehensive range of motives for sharing from the patient perspective. Overall, little is known about sociocultural, behavioural and psychological factors that may contribute to medicine sharing. It is also unclear how patients assess the risk of sharing medicines and if and how they assess risk in their decision making to lend or borrow medicines.

Further, as described in preceding chapters, past research around sharing has usually taken a ‘medical’ perspective and largely focusses on negative consequences of sharing behaviours.\textsuperscript{2-5} This approach may not provide a complete picture of sharing. People’s decisions to share medicines might not differ from their decision to share other commodities,\textsuperscript{79} and understanding the ‘social context’ of medicines might provide further insights into why people share medicines. To start to address this gap in the literature, using an in-depth, semi-structured interview technique, this study has broadly investigated adults’ perspectives on medicine sharing behaviours. This part of the research aimed to explore lay perspectives and health professionals were excluded from the study.

### 4.3 Aim of the study

The aim of this qualitative study was to understand adults’ experiences and views on non-recreational prescription medicine sharing behaviours and their ideas about potential interventions. Understanding patients’ medicine sharing behaviours will inform efforts to promote the safe use of medicines.

### 4.4 Objectives

The objectives of this study were:

- To understand adults’ experiences and views on prescription medicines sharing behaviours
Chapter 4 Qualitative interviews with patients

- To explore factors that contribute to medicine sharing practices
- To understand how patients decide if prescription medicines were safe to be shared
- To explore adults’ views on potential strategies to reduce risks and harms associated with medicine sharing (findings related to this objective reported in Chapter 6)

4.5 Methods

4.5.1 Design and Sampling

One-on-one, face-to-face, semi-structured interviews were conducted to explore adults’ beliefs and experiences about prescription medicine sharing practices. Participants were sampled purposively based on their age, gender, income, and employment status in order to gather a wide range of information from different socio-demographic backgrounds. English-speaking adults aged 18 years or older with experience or interest in medicine sharing were eligible to participate. Health professionals were excluded from participation. The interpretation of findings was guided by a ‘harm reduction’ philosophy focusing on minimising the risks and harms of sharing without necessarily considering it essential to eliminate sharing practices.

4.5.2 Study setting and recruitment

The study took place in Auckland, the largest city in NZ with a population of 1.4 million.306 Participants were invited through local patient support group newsletter advertisements, pamphlet advertisements in a public library and a community pharmacy, and via email advertisements on university email lists. Potential participants were initially contacted via telephone or email by the lead researcher. Initial discussions included an introduction about the purpose of the study being undertaken and what is expected from participants. At this point, the inclusion/exclusion criteria were also explained to potential participants so as to ensure their eligibility prior to meetings being arranged. Their eligibility was checked by the lead researcher using a checklist developed for this purpose. All participants gave written informed consent prior to the interviews, and received a NZ $20 gift voucher for their participation.
4.5.3 Data collection

To ensure consistency, all interviews were conducted by the lead researcher. An interview guide (Appendix 2) was used to ensure broadly similar topics were covered with each participant whilst allowing them to introduce and expand upon individual experiences. The selection of topics was guided by the research team experience and a review of available literature.\(^1,2,5,12,15,16,18\) The research proposal was also presented at departmental seminars and feedback from colleagues was used to refine the topics. The interview guide was piloted with two participants and the results discussed among the research team to further refine the guide. Pilot data were excluded from final analysis. The main topics explored in the final guide were: the types of medicines shared by participants, participants’ beliefs and experiences about benefits and adverse consequences of medicine sharing, circumstances that lead to sharing medicines, participants’ views regarding ways to minimise the potential harms of medicine sharing. After conducting the first four interviews, previously unforeseen topics were added to the interview guide. Participants also completed a short questionnaire (Appendix 3) describing their socio-demographic characteristics and medicine taking habits.

Participants were interviewed at a time and location of their choice. With the exception of one participant (who preferred to be interviewed at home), all interviews were conducted at the University of Auckland. At first instance, the lead researcher outlined the study purpose and procedure and answered any questions and written informed consent was obtained from all eligible participants prior to any data collection is occurring. At this point, participants were also asked if they want to edit their interview transcripts and if they wish to do so their email or mail address was collected. Then, participants were asked to complete the short demographic questionnaire; on average, it took them two minutes to complete.

Before the actual interview began, to ensure participants understood the purpose of the study, all participants were provided with a general definition of medicine sharing, and were instructed to focus on non-recreational prescription medicine sharing. With participants’ consent, all interviews were audio recorded. At the end of each interview, the participant was given a document describing the potential risks of medicine sharing. Interviewing continued until data saturation was reached, which was considered to have occurred after 17 interviews (as no new themes were identified from the last three
Chapter 4 Qualitative interviews with patients

interviews). The mean duration of the interviews was 47 minutes (range: 30 to 72 minutes), and they were conducted between September 2013 and August 2014.

The lead researcher’s professional qualification was made known to participants. It is possible that knowledge of the researcher’s health professional qualification could have potentially influenced participants’ responses, as some of them might understate their sharing practices in order to provide socially favourable answers. To minimise social desirability bias, all interviewees were informed of the general purpose of the research and the measures taken to ensure confidentiality of information. They were further informed that there was no right or wrong answer to any of the questions. This appeared to put participants at ease to facilitate disclosure of sharing practices. In some interviews the interviewer was challenged by participants to give his opinion on topics such as the possibility of sharing medicines in some instances and legal issues related with medicine sharing. However, opinions were not supplied, except in instances where further explanation was sought relating to the intention of the interview questions.

4.5.4 Data preparation, coding and theme identification

As has been indicated in Chapter 3 (section 3.7.4), transcription, data organisation, familiarisation, coding, and theme identification were the major steps of data analysis. A brief description of these processes is given below.

The first step of the data analysis involved transcribing digital audio recordings. This process involved listening repeatedly to the interview recordings and paying attention to the details of the recording. The lead researcher transcribed six interviews and the other 11 interviews were transcribed by an experienced transcriber. In both cases the accuracy of transcripts was ascertained by the lead researcher through repeatedly re-listening to the audio recordings whilst reading the transcriptions. The main challenge of transcribing was where the interviewees were non-native English speakers. In addition, to make the analysis more informative post-interview, notes taken by the researcher were added to the final transcripts, particularly to describe the interviewee’s characteristics, setting and context.

After transcription, quality assurance and proofreading was completed, copies of the transcripts were sent to those interviewees who wanted to comment on, or verify their transcripts along with specific editing guidelines developed for this purpose. Interviewees
were informed that if they chose not to read the transcript or did not provide their feedback within two weeks it would be assumed no further changes were required. With the exception of one participant, they did not read and edit them. To ensure anonymity, names, place of work, or any other identifying information was removed and replaced with certain participant characteristics, for example, instead of their names participants were referred to by their general characteristics such as gender, age or employment. Less important identifying details (e.g. work place) were omitted. A unique code number was assigned to each transcript and audio recording. Additionally, each interview was identified by the date and place of the interview. The copies of the original transcripts and audio recordings were securely stored on a password protected computer.

Before data coding began, the audio recordings, field notes, and the interview transcripts were repeatedly revisited by the lead researcher to identify salient topics in relation to the research objectives and to get an in-depth sense of the interview. This process was accompanied by the drafting of initial ideas regarding the possible concepts or themes that could be generated. The preliminary findings were also discussed among the research team at several meetings held over the course of the study. Then, the research team met to agree on the coding procedure.

The actual coding process involved sifting through the data to identify relevant topics, ideas, themes, or concepts and marking them with a label (a word, a term or a phrase) to allow easily retrieval of all data related to that label. Instead of line-by-line coding, the coders coded only sections of data meaningful to the research aims. If a section of the data had multiple meanings it was coded into two or more categories. Overall, two levels of coding were employed. The initial coding phase was used to reduce the data collected into a more manageable form based on the general research topic. Data which were considered irrelevant at this stage were not coded, but retained in case they were needed later in the analysis process. At this stage, each member of the research team independently coded four randomly selected interview transcripts using Microsoft Word and developed their own list of codes and provided their own definitions to the codes. Then, the list of codes and the coded text were evaluated and discussed among the research team. Discrepancies and overlaps were remedied through mutual consensus. The main discrepancy identified was an overlap between themes. Afterwards, the coding lists developed by each coder were then merged to produce an initial coding frame where each of the codes within the frame were defined and characterised. Thereafter, all interview transcripts were imported
Chapter 4 Qualitative interviews with patients

into the NVivo 10 software (QSR International). The software helped in sorting, organising and managing the data. In NVivo themes or categories are represented by nodes. Nodes are of different types and often have hierarchies, such as parent node (representing broader concept or category) or child or grandchild node (more specific themes).

The initial coding frame was hierarchically categorised and introduced as preliminary codes in NVivo. Broader codes were labelled as major categories and more specific codes were sub-grouped below the major categories. If there was no logical connection between two or more codes they were placed in the top level of the hierarchy.

The lead researcher (KB) re-read each interview transcript with the initial coding frame at hand. Then the coding frame was applied to every interview transcript. This way each relevant segment of the transcripts was linked to one or more codes within the coding frame. If any relevant segment in the transcripts could not be linked with the coding frame, then new codes were created and the coding frame was adapted. This way the coding frame was continuously revised. Moreover, every new piece of data was compared in light of the coded data. The entire data were coded in a consistent fashion and the coded data were labelled as parent, child, grandchild, or sibling nodes using NVivo 10.

After relevant passages of all transcripts were linked to appropriate codes, cross-case analysis of concepts was begun. Every code was analysed through a careful examination and revision of all quotes related to the code. In this process irrelevant quotes were uncoded, miscoded quotes were recoded, codes less relevant to the research aim were deleted, broader codes were split into two or more codes, and codes with similar concepts were consolidated. To accommodate such changes the initial coding frame was revised. Then, the lead researcher articulated in his own words the specific meaning of each code in relation to the research aim. Finally, to facilitate tracking of coding decisions, codebooks were generated using NVivo. The codebook was used to record detailed descriptions (name/label), definitions, dimensions, and example quotes for each code. Then the codebook was discussed within the research team and refined.

In the first coding cycle, large tracts of unorganised data were transformed into a smaller more manageable format. The second phase involved more focused coding and used to identify themes, patterns and relationships emerging across the data. The initial phase codes and their text segments were systematically organised to examine for any
similarities or differences in order to draw conclusions. At this point, patterns and relationships started to emerge within and among major categories and subcategories. More attention was paid to the data that did not fit into the emerging patterns and relationships. This phase of analysis involved moving back and forth between the data and codes in order to identify similarities and explain outlying data or negative cases. Mind maps and diagrams (drawn using post it notes and poster papers) were used to visualise the relationship between themes and sub-themes. Finally, initial phase codes were re-organised and clustered into fewer overarching themes. It should be noted that the second phase was not a one-time activity; the process was repeated until patterns and relationships were observed. Overall, the data were re-organised in a way which was convenient for the comparison of findings among study participants and the literature.

After major themes and sub-themes were identified, the research team met to discuss the main findings and to explore alternative interpretations of the findings. Afterwards, the writing up process began. First, the lead researcher identified an overarching theme and related themes, and then selected examples of data that had been coded under that theme and offered a commentary that connected the examples together. The same process was applied until all data had been written up. To stay closer to the original data, throughout the writing process the lead researcher referred back to the original audio recordings and transcripts.

A consistent writing style was adopted. First, the lead researcher wrote up the major findings using selected verbatim quotes of the interviewees adding his own and the research supervisors’ commentaries to illustrate different themes emerged from the data. Then, separate discussion sections were written up to compare and contrast the major findings with existing literature. In this process, some data were left out; these were mainly incidental findings which were less relevant to the research aim. For example, from the patient interviews several themes were generated regarding medicine sharing with pets, recreational and OTC medicine sharing; however, these topics were deemed to be less relevant to the research aim and were excluded from subsequent data analyses.

4.5.5 Ethics approval

Ethics approval was obtained from the University of Auckland Human Participants Ethics Committee (Ref no. 9830, see Appendix 4).
Chapter 4 Qualitative interviews with patients

4.6 Results

4.6.1 Participant characteristics

The sample comprised 12 females and five males, with a mean age of 41.2 years (range: 23 to 69 years) and the majority of participants (n=10) self-identified as NZ Europeans (see Table 6 for detailed description of participants’ characteristics). Twelve participants were recruited through email advertisements to the University of Auckland community, and two each through a public library and a patient support group. One participant was recruited from a community pharmacy.

Table 6: Participant characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number (N=17)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>5</td>
</tr>
<tr>
<td>Female</td>
<td>12</td>
</tr>
<tr>
<td>Age in years* (Mean age = 41.2 years, Range: 23 to 69 years)</td>
<td></td>
</tr>
<tr>
<td>20 - 30</td>
<td>6</td>
</tr>
<tr>
<td>31 - 40</td>
<td>2</td>
</tr>
<tr>
<td>41 - 50</td>
<td>3</td>
</tr>
<tr>
<td>51 - 60</td>
<td>2</td>
</tr>
<tr>
<td>60+</td>
<td>2</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>New Zealand European</td>
<td>10</td>
</tr>
<tr>
<td>Chinese</td>
<td>4</td>
</tr>
<tr>
<td>Others</td>
<td>3</td>
</tr>
<tr>
<td>Highest level of education attended</td>
<td></td>
</tr>
<tr>
<td>Tertiary education (college and above)</td>
<td>15</td>
</tr>
<tr>
<td>Secondary school</td>
<td>2</td>
</tr>
<tr>
<td>Working status</td>
<td></td>
</tr>
<tr>
<td>Working full time</td>
<td>10</td>
</tr>
<tr>
<td>Working part time</td>
<td>1</td>
</tr>
<tr>
<td>Retired</td>
<td>2</td>
</tr>
<tr>
<td>Student</td>
<td>3</td>
</tr>
<tr>
<td>Unwaged</td>
<td>1</td>
</tr>
<tr>
<td>Monthly income (in NZ $)*</td>
<td></td>
</tr>
<tr>
<td>&lt;1000</td>
<td>2</td>
</tr>
<tr>
<td>1001 – 2000</td>
<td>7</td>
</tr>
<tr>
<td>2001 – 4000</td>
<td>2</td>
</tr>
<tr>
<td>4001 – 6000</td>
<td>2</td>
</tr>
<tr>
<td>6000+</td>
<td>2</td>
</tr>
<tr>
<td>Have you been taking any prescription medicines in the past year?</td>
<td>16</td>
</tr>
<tr>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1</td>
</tr>
</tbody>
</table>

*Data were not obtained from two participants
4.6.2 Types of shared medicines

A range of medicines was reported to be shared (see Table 7). Although most of the sharing practice described was for medical purposes, sharing for non-medical purposes was also reported, for example, for cosmetic use (e.g. Botox®), to relax or to ‘get high’ (e.g. strong pain medications), and for dietary supplementation (e.g. glucosamine). Participants also reported sharing homeopathic preparations prescribed by their doctors.

Table 7: Medicines shared by participants

| Allergy medications (e.g., Zetop®, EpiPen®, hay fever medications) |
| Antibiotics (e.g., amoxicillin, Augmentin®) |
| Antidiarrheal medications |
| Antiemetic medications |
| Antihypertensives |
| Anti-inflammatory medications (e.g., diclofenac, naproxen) |
| Asthma inhalers (e.g., Ventolin®, Symbicort® inhaler) |
| Botox® (cosmetic use) |
| Cardiovascular medications (e.g., Cartia®, aspirin) |
| Cholesterol medications (e.g., simvastatin) |
| Constipation relief medications (e.g., VitoLax®) |
| Diabetes medications (e.g., metformin, glipizide) |
| Dietary supplements (e.g., glucosamine pills) |
| Gastric/duodenal ulcer medications (e.g., omeprazole, Losec®) |
| Homeopathic medications |
| Hypnotics (e.g. nitrazepam, Valium®, melatonin) |
| Strong pain medications (e.g., tramadol, morphine, codeine, pethidine) |
| Migraine medications (e.g., sumatriptan) |
| Muscle relaxants |
| Nasal spray to treat snoring |
| Nitrous oxide canister |
| Oral contraceptive pills |
| Psoriasis medications |
| Topical antifungal/corticosteroids (e.g., Micreme H®, Betnovate®, eczema medications) |

4.6.3 Perceived benefits of sharing medicines

When asked about the possible benefits of sharing medicines, participants stated that it helped them to avoid doctors’ fees and prescription charges, and reduced the burden associated with medical visits such as booking appointments, arranging transport, and the need to visit a pharmacy afterwards. Participants stated that visiting a doctor often requires taking time off work and can be costly in terms of income loss or the inconvenience it can create. Participants also reported sharing prescription medicines for conditions that require
immediate treatment because of long waiting times at busy surgeries. Sharing also provided participants with easy access to medicines particularly when they considered themselves not sick enough to visit a doctor.

For those who were concerned about finances, sharing provided an opportunity to try the medicine before making a decision to pay for a doctor’s visit. When the shared medicine was found to be effective, some participants visited their doctors to inform them of their positive experience and obtain their own prescription.

*I have psoriasis and I have some friends who have psoriasis. So if they said to me, “Oh my doctor gave me this [cream], and it was great.” I might say, “Oh do you think I could try that a little bit?” I could see myself doing that. Maybe I’ll see if it seems to work for me and I’ll go to the doctor and get it myself.* (P07, 69-year-old female)

For some participants, medicine sharing was a way of ensuring waste-free utilisation of resources. Some considered discarding unused medicines to be wasteful, and was a reason they were willing to share their unused medicines as long as they believed them to be of benefit to someone else. During many of the interviews participants asked the interviewer if there was any way to return or donate unused medicines. Also of note, was that participants considered paying for medical visits, when only a few doses of medicine are required, a waste of resource.

Apart from cost reduction, medicine sharing had a positive impact on social interactions. For instance, when asked about the impact of medicine sharing on social relationships, those who shared medicines largely described their experiences as positive. During sharing participants disclosed the nature of their illness to the other person, and this process helped them to share illness experiences and to sustain and nurture a social relationship. A university student described her boyfriend’s positive experience as follows.

*My boyfriend got a nasal spray [for snoring] from his friend, that really helped, that really worked, even brought them closer, because that’s a very special experience.* (P08, 28-year-old female)

Sometimes medicines were lost or misplaced and participants borrowed to avoid the inconvenience of getting a replacement prescription. Sharing also allowed some
participants to avoid fear of the consequence of missing a few pills of medicines they were relying on (e.g. diabetes medications or asthma inhalers).

4.6.4 **Negative experience from shared medicines**

When asked about risks of sharing medicines, participants mentioned various risks/harms. While some revealed their own negative experiences from shared medicines, others provided hypothetical scenarios to explain potential risks of sharing. Side effects, drug interactions, toxicity, taking inappropriate doses or wrong medicines were among the most commonly cited risks of sharing.

In an effort to help friends or relatives, participants engaged in diagnosing and prescribing which resulted in sharing their medicines to others. However, in so doing, some of the participants ended up giving inappropriate medicines to the other person. According to participants, it is often difficult for an untrained person to make the correct judgment regarding the dosage, potential contraindications, and side effects as this often requires technical knowledge about medicines. Sharing can have life threatening consequences; one of the participants recounted the negative consequences occurring when her mother shared medicine.

> My mother, she was having pain. She had spondylitis so she was having severe pain and she was talking to her friend who is her next-door neighbour. So she said, “Oh you know what, I have this medicine and it worked fantastic for me” and she gave my mum, and she was given a CNS acting drug, she was given [sic] to take three tablets a day. My mum took the same dose and she went into coma that night. (P10, 30-year-old female)

A few incidences of sharing medicine had resulted in allergic reactions. Most participants believed that the decision to share medicines often relies on symptom matching alone and that allergic histories might not be properly assessed. One participant described her negative experience as follows.

> A long time ago my mum and I were in Taiwan, we were living in a small town, we shared medicine once, after my mum took the medicine her eyes became swollen and she stopped the drug, and she went to the GP, and the GP actually told her that she is allergic to that kind of drugs. (P08, 28-year-old female)
Chapter 4 Qualitative interviews with patients

Participants had different opinions regarding the risk of antibiotic sharing. Some of them had fewer concerns about sharing antibiotics particularly for common conditions; the others were worried about treatment failure and antimicrobial resistance due to sharing and incomplete courses of antibiotics. Depleting one’s own supply and ineffective treatment were other risks mentioned by those who had concerns about antibiotic sharing.

Sharing some forms of medicines (e.g. eye drops, asthma inhalers, creams or ointments) was considered by participants to be unhygienic and a way of spreading infections. Apart from the spread of infections, it appeared that participants had less concerns about the effects of some of these medicines. For instance, many participants were not concerned about the possible side effects or toxicity from shared creams or ointments, compared to pills. On the other hand, one participant warned that the likelihood of using inappropriate creams and exacerbating the skin condition could be high, and she explained the common misconceptions towards topical preparations amongst the public.

*We think it’s safer because we don’t take it in and that’s less chance of getting poisoned by it or something. It’s probably not, that’s what people think. If you eat it inside then people take more precaution. Whereas if it’s topical like something on the skin, like if it’s a cut or a burn or something then they just think it’s less important than something that’s happening inside. (P16, 29-year-old female)*

When asked about the impact of medicine sharing on drug dependence, participants stated that although sharing by itself might not necessarily result in drug dependence, some medicines (e.g. strong pain medications) might be shared for thrill-seeking. Participants believed that this form of sharing could have a negative impact on social relationships. A participant who had been prescribed these medicines described strategies he uses to minimise the chance of being a source of abusable medicines such as keeping social distance or concealing information from potential abusers.

*If they knew what I had they would be knocking at my door, “bro can I have a few of these, few of that?” So that’s why I tell them nothing because I know what they use them for – I don’t really associate with other P [Methamphetamine] freaks, you know. I know a few but as I say, if they’re friends I just keep away from them or just have beer with them or that’s it. If I told them what I had they’d be hitting me up, you know, “Oh bro two of these, two of that.” (P11, 50-year-old male)*
4.6.5 Factors influencing medicine sharing

Participants reported many factors that could facilitate prescription medicine sharing practices; these were classified into four sub-themes.

4.6.5.1 Altruism

A desire to help others (i.e. altruism) was often the main motivator for those who reported sharing medicines. They shared their medicines for what they perceived to be a good reason, to help their loved ones when they were suffering from an illness. Indeed, most of them opposed sharing when they were not confident enough about the borrower’s medical condition or when they felt the borrower’s condition was complex. Participants’ past illness experience could further encourage altruistic behaviour. This was described by one of them.

*Just someone here at work had a terrible migraine and the person did not have access to medication, you know, and it’s something that I suffer from migraine and I know how horrible it is so I just said look I have sumatriptan here if you want I can give you.* (P12, 41-year-old male)

Although medicines were more often reported to be shared with family members, close friends, neighbours, or work mates, when it came to helping people in urgent need of medicine, social distance was less important.

*Yes, one time actually, my boyfriend has asthma and I had his inhaler in my bag because I always carry around for him, and I was out in the pub and a guy had really bad asthma and his friend was running around and saying “Inhaler, inhaler”, so I gave him, so yeah, I did do that, I am happy to do it, it was not like an emergency, but he definitely needed the inhaler.* (P09, 25-year-old, female)

Sometimes the lender used the sharing instance as an opportunity to establish friendship with the borrower, although the main motivator, in doing so, was often altruism.

*I get anxious so I take omeprazole or Losec®. ... And if somebody told me that their stomach was hurting and they needed one of those, I would do that [share], sure. I’m trying to be friendly and a bit of a socialist, you know, but I don’t do it to save money.* (P07, 69-year-old female)
4.6.5.2 Limited access to medicines/health services

The cost of medical visits hindered participants with limited resources from seeking medical care and being prescribed their own medicines. Some of them revealed that their health insurance was limited and does not cover all their medical needs, for example, students and retired participants. Participants took various measures to avoid doctors’ fees, for example, they avoided medical visits for mild conditions, or when they only required a few pills of the medicine. Limited opening hours of local pharmacies and surgeries also influenced participants’ sharing behaviours. For instance, participants reported sharing medicines for pain occurring late at night or at the weekend when local health facilities were not accessible. A university student associated her medicine sharing behaviour with the campus clinic opening hours as follows.

My health insurance is very limited, for example, it’s only free if I go to the campus clinic, and the campus clinic you need to book and their opening hours is very short, I think they are closed at 3:00PM or 4:00PM. So it will be easier if I just get the medicine from someone I know and solve my problem. (P08, 28-year-old female)

Participants also reported sharing medicines while travelling when they could not access their regular doctor within a reasonable time. One lady recounted her sharing experience during an overseas trip.

Oh another time when I’ve lent is it is in Nepal and my guide got a tummy upset, and so I gave him stuff I had in my pack and I told him, you know, if anything like that ever happens on a trek you just ask the Europeans – they always have stacks of stuff to give you. (P03, female)

4.6.5.3 Sociocultural factors

Social, cultural, and interpersonal interactions influencing participants’ sharing behaviours were captured by this theme. Participants cited many sociocultural factors having an effect on medicine sharing: cultural beliefs, embarrassment about seeing a doctor, direct to consumer advertisement, and the Internet.

Although not nationally representative, participants were drawn from different communities, and it was noted that for some participants (e.g. those recently migrating to NZ) visiting a doctor and getting their own medicines was not an easy experience, partly
because of cultural differences (e.g. communication barriers or differences in the health systems). Those participants considered medicine sharing to be a means of accessing prescription medicines without having to see a doctor. It was also revealed that in some cultures sharing medicine and other commodities is a way of providing social support for others. A Brazilian who had lived in NZ for a number of years described the difference in perspectives, with respect to sharing medicines and the role of medicine, between Brazilians and New Zealanders as follows.

In NZ it’s not culturally acceptable, you don’t share someone else’s drink whereas back home it is quite common so I guess that cultural difference may come into play…. Brazilians are much more interventionist, they will medicate people much more commonly than in NZ. So back home, I think there’s much more medication sharing than in NZ. (P12, 41-year-old male)

Embarrassment was reported as a major reason why some patients do not visit their doctor to obtain their own prescriptions. Participants also believed that younger patients might be embarrassed to carry around medicines they rely on and need to take in front of others (e.g., asthma inhalers) because doing so might be considered, by peers to be an indication of weakness.

When asked whether prescription medicine advertisements on the Internet, television/radio, or in newspapers influenced their decision to share medicines, participants believed that television advertising might encourage people to self-diagnose and borrow medicines. It was noted by participants that when a prescription medicine is advertised on television it may lead the public into believing that the advertised medicine is safe to be shared, and might change their attitude towards the risks associated with sharing it. Younger participants appeared to be more influenced to share medicines by patients’ fora and various drug information sources on the Internet. One of the younger participants reported surfing the Internet to help her decide whether to take the medicine she had been offered by a friend.

I remember once I had a cat bite, the cat got some fungus infection and I got the infection on my skin as well. I talked to some friends who also had a cat and I asked whether they had this kind of problem as well, and yeah she said she had once a cat bite and she still have the ointment. So I Googled the drug and I thought
Chapter 4 Qualitative interviews with patients

*that it suits my condition and I borrowed from her, and I just used it until the infection was gone, until I recovered. (P08, 28-year-old female)*

### 4.6.5.4 Having leftover/unused prescription medicines

Participants were unsure what to do with unused/leftover medicines and many of them mentioned passing their unused medicines on to others. When asked about the type of advice they received from healthcare providers about the safe disposal of leftover medicines, most of them revealed that they received little information. Some participants criticised their doctors for failing to understand their actual need and for supplying them surplus pills. A retired woman with back pain was among those who were unhappy with their doctor’s prescribing behaviour.

*Sometimes I have a really bad back problem and so for a little while I went to a back person [doctor] and I think they’re very negligent. He gave me a million tramadol, you know, it was like so much and they just give you these giant prescriptions and so I don’t think I would share that tramadol. To me I would put that into a more serious; it’s not like an Aspirin. (P07, 69-years-old female)*

Although the above participant did not share her tramadol this was not the case for all participants. Some of them reported sharing their spare medicines, and they believed that having an oversupply of medicines motivated them to do so.

*If I don’t need it, yeah. Like with antibiotics I will lend, I would do that because I know I have got heaps and I can go to the doctor again like so without running out, because I need it myself, yeah. (P09, 25-year-old female)*

### 4.6.6 Risk assessment strategies

When asked how they decided if a medicine was safe to be shared, participants reported different strategies that helped them to assess the risks. One such strategy was symptom matching. Participants believed that if someone had similar symptoms to the other person then the medicine would most probably work for him/her.

Their own experience with the medicine also helped participants to assess risks of sharing. If participants had been taking the medicine and if they knew what it was for and were confident that it could help the other person, they were more likely to share the medicine.
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On the other hand, if participants thought that their medicines were specific to their condition, or if they were unfamiliar with the medicine they were less likely to share.

Knowledge about illness and its treatment could also play a significant role in decision making. For example, those who were aware of the risk of misdiagnosis of bacterial infections, risk of allergy and/or antimicrobial resistance firmly opposed sharing oral antibiotics. However, most participants were unaware of the potential risks of topical antimicrobials and were willing to share them. Although the meaning of ‘complicated condition’ was different among participants, they were also generally uncomfortable with sharing medicines which are meant for conditions such as cancer, diabetes, heart problems, or hypertension.

_Ideally the ones for major organs they shouldn’t be shared. But anything that provides pain relief, yes. Anything that’s for major organs or major illnesses, no – you shouldn’t do shit like this because they can cause more harm than good if you have something slightly different on the same nature [sic]. (P15, 32-year-old male)_

On the other hand, some participants were not concerned about assessing risks when lending medicines. They believed that they were not qualified to diagnose the borrower’s condition or to assess the risk of the medicine. Further, they stated that it is up to borrowers to decide if the medicine suits their condition and/or to check allergic reactions.

_I assumed that he didn’t have any sort of particular allergies or something towards the chemical but I think it’s not up to the person who’s offering the medicine to diagnose the other person and give him the right drugs. It’s just I have this, maybe you want to try it, maybe you don’t – I don’t really care. (P14, 23-year-old female)_

Friends’ positive experience with a medicine and obtaining the medicine from a trusted person (i.e., a person with good knowledge of medicine or who used it for long time) had also an influence on participants’ decisions to borrow medicines. Participants frequently reported that they would be willing to try a medicine which worked for their friends with a similar condition to see if it would also work for their condition.
4.7 Discussion

This research explored in depth the positive and negative consequences of, and factors influencing medicine sharing practices of adults. Furthermore, the study examined factors considered by patients when deciding to share a medicine. These findings advance our understanding of medicine sharing and provide further insights into the social, cultural, economic, and therapeutic aspects of medicine sharing. Although the potential risks of medicine sharing are well known to researchers and regulatory authorities, the non-medical aspects of sharing have been largely unexplored. From the medical perspective, medicine sharing is often considered to be undesirable behaviour. However, patients might often see their sharing practices as positive and the study indicates that they often have sound justifications for doing so, as described in our findings.

In line with other research, a wide range of medicines were reported to be shared. A number of previously unreported medicines were also reported; these include melatonin, muscle relaxants, Botox®, homeopathic preparations and migraine medications.

With the rising cost of health-care, it has been noted that patients with lower incomes may adopt different cost-coping strategies such as intentional non-adherence, increasing debt burden, or cutting back (or economising) on necessities such as clothes and food. Our findings suggest that medicine sharing may be another coping strategy. This finding is also in line with earlier studies reporting financial hardship as a reason for medicine sharing and underutilisation of available healthcare services. Also of note, in some developing countries the prevalence rates of medicine sharing are high (55 to 66%) when compared with reports from developed countries (5 to 27%).

For most participants, medicine sharing was not a major concern: participants did not perceive their sharing practice to be risky behaviour. Instead, they weighed up the risks and benefits of sharing particular medicines primarily based on their previous illness experiences and symptom matching. In most instances, participants did not disclose the medicines they have shared or their sharing intention to healthcare providers; one possible explanation for this could be a fear of upsetting their healthcare providers. Overall, participants described a multifaceted system for determining the safety of the medicines they had shared. It appears that medicine sharing practices in this study sample often involved a thoughtful decision making process rather than irresponsible behaviour or
ignorance. However, although sharing medicines had many benefits for participants, we are concerned by some forms of sharing. For instance, opioid painkiller effectiveness for non-cancer chronic pain is controversial, and their continuous use may diminish pain threshold levels or lead to substance use disorders, and antibiotic sharing practices might result in therapeutic failure and may contribute to the emergence of antimicrobial resistance.

Van der Geest et al, in their anthropological study of pharmaceuticals, pointed out that medicines can be exchanged between individuals to facilitate social interactions. The authors further noted that medicines are vehicles of ideologies and styles of life and their use widely differs among societies. Our study findings support the above hypothesis; we found that ‘prescribing’ for others and medicine sharing were common practices, and these practices had a positive impact on participants’ social relationships. Many of the participants had been offered medicines by friends or relatives for free, and the sharing decision appeared to be influenced by altruistic reasons rather than the expectation of a reward. Therefore, any efforts to design interventions need to consider sharing behaviours within the context of wider social interactions.

Inconvenience and embarrassment about seeing a doctor were other reasons why some participants shared medicines. This may be a coping strategy by patients in response to a healthcare system that does not address their needs and expectations. Language, cultural barriers and a lack of information on the healthcare system were reported to be contributing factors to poor access to medical care and medicine sharing practices amongst immigrants in NZ and elsewhere. Similarly, immigrants in this study reported challenges they have faced in accessing medicines or medical care (such as limited health insurance, an inability to pay doctors’ fees, and language barriers), particularly upon their arrival in NZ, and the contribution of those challenges towards medicine sharing practices. Providing more information for migrants on the healthcare system and using translators in healthcare facilities were suggested as strategies to reduce some of the mentioned problems.

This study also revealed that some participants initially try to self-medicate their problems with borrowed medicines before visiting their doctor. This behaviour might lead to a delay in clinical diagnosis and an increase in complications from simple conditions. Moreover, if patients do not inform their prescribers they might be unaware of the patient’s sharing.
practices. This has the potential to increase the likelihood of prescribing interacting medicines. Sharing unused/leftover medicines is also concerning. Some of these medicines might have passed their expiry date and/or their active ingredient might have deteriorated due to unfavourable storage conditions. Providing systems/pathways for unused/leftover medicines to be safely disposed of (e.g. promoting collection of unused medicines by pharmacies) and prescribing medicine in quantities tailored to the actual need of the patient is more likely to reduce the amount of leftovers and associated sharing practices. Some of the adverse reactions reported by participants are potentially life threatening. However, no study to date has tracked the extent and severity of adverse drug reactions occurring as a result of shared medicines, and this is an important area for future research.

4.8 Limitations

This study is not without limitations and the findings should be interpreted in the light of these. First, participants were not a representative sample of NZ adults, and thus their views may not be generalisable, although care was taken to get a sample from a broad range of backgrounds. This could potentially limit the transferability of findings. Second, those who could not speak English were excluded from the study. These individuals are more likely to have different cultural backgrounds and they might have unique concerns and expectations regarding their health and medicine sharing, particularly as language and communication barriers are more likely to increase medicine sharing. Third, the study authors are pharmacists, and despite acknowledging both the benefits and harms of medicine sharing, this could have influenced the study design and data interpretation. However, attention was paid to providing balanced perspectives.

Limitations aside, this study revealed that medicine sharing is a behaviour more complex than some previous quantitative studies suggest. Accordingly, the findings have important implications for healthcare providers who regularly engage in patient consultations about the safe use of medicines and for future research on medicine use behaviours. A cross-sectional survey among larger cohorts need to be conducted to examine the extent, to which each identified factor influences patient’s medicine sharing decisions, and the relationships between these factors.

Generally, as noted by Shoemaker and Ramalho de Oliveria, medicine use behaviours that are considered irrational from medical perspectives might be deliberate acts from the
Chapter 4 Qualitative interviews with patients

patient and could be considered useful when carefully analysed from the patient perspective.\textsuperscript{315} Thus, taking into account how patients understand medicine sharing is critical in designing effective interventions to reduce harms from this practice.

\textbf{4.9 Summary}

This study enriches our previous understanding of medicines sharing, by providing insight into patients’ reasons and contexts for this practice. For example, altruism, forgetfulness, cost of GP visits, illness denial and embarrassment, lack of awareness regarding the risk of sharing which have received little attention in previous surveys were identified as important factors influencing sharing behaviours. Healthcare providers need to be aware that sharing of prescription medicines is not uncommon. The authors suggest that healthcare providers engage patients in discussions which may provide further insights into factors influencing sharing behaviours for particular individuals. Overall, it might be impractical to stop people from sharing their prescribed medicines, and minimising the potential risks and harms of sharing should, therefore, be a priority whilst also acknowledging the meaning such behaviours have for patients, and their reasons for sharing. Quantitative research is required to examine the extent to which the identified factors related to sharing influence patients’ decisions to share.
CHAPTER 5. QUALITATIVE INTERVIEWS WITH HEALTHCARE PROVIDERS

5.1 Chapter overview

This chapter presents data from a qualitative study of healthcare providers. The chapter is structured as follows. First, the importance of conducting a qualitative study of healthcare providers is discussed. This is followed by description of the purpose and objectives of the study. The chapter then outlines the method adopted for this phase of the study, paying attention to design, data collection and analysis procedures. Afterwards, the findings of the study are presented followed by interpretation of findings and description of the limitations of the study. The last section presents summary of findings.

5.2 Introduction

In contrast to the preceding chapter, which focused on lay perspectives on medicine sharing, this chapter presents healthcare providers’ perspectives on medicine sharing behaviours. To date, most studies around non-recreational sharing have focused on the perspectives of patients sharing medicines, and healthcare providers’ perspectives on the issue have rarely been explored. While the importance of understanding patients’ views is not in question, in order to fully understand the factors influencing medicine sharing behaviours, the views of healthcare providers involved in providing care for patients are required. Moreover, as is common in qualitative studies, it is possible that socially favourable answers were given by some of the participants of non-healthcare professional interviews. Thus, it is important to explore the issue from different angles and triangulate findings.

In NZ limited data are available describing the experiences of healthcare providers about medication sharing practices of their clients. In a focus group discussion with Māori origin health workers, the participants indicated that medication sharing is a widespread phenomenon among their community, however, this study was not centred on medicine sharing and did not reveal the details of the sharing practices. Moreover, findings from certain ethnic groups may not be applicable to other groups. Thus, the current study will broadly investigate healthcare providers’ experiences and attitudes about their patients’
medication sharing practices through the use of semi-structured interview techniques. An advantage of exploring healthcare providers’ perspectives is that their views is informed by their encounters with many different patients and, therefore, they may have a broader view than that obtained from an individual patient who shares medicines. This study did not focus on specific ethnic groups’ sharing behaviours; however, some of the study participants talked about their experiences with certain ethnic groups and this is reported.

It would be expected that healthcare providers’ views on sharing practices would be influenced by their biomedical model based training. However, biomedical principles and views inculcated during professional teaching programmes is likely to become tempered with increasing experience with actual patients in practice with a more pragmatic stance being adopted.

Taken together, the two qualitative studies will help to understand the types of medicines commonly shared by patients, the positive and negative consequences of sharing, factors influencing patients’ medicine sharing decisions, and potential intervention strategies that take into consideration the problems faced by people sharing medicines and health professionals dealing with those who had and/or intended to share medicines. In addition, the qualitative studies will be used to identify topics that need to be investigated in the second phase of the research, which is an online survey. Themes arising from the two studies will be developed into a survey questionnaire so as to examine the findings applicability to a relatively larger sample of adults (see Chapter 7).

Overall, medicine sharing is a complex behaviour and lay perspectives alone may not be adequate to inform comprehensive intervention. This study will add depth and richness to the qualitative data reported in preceding chapter.

### 5.3 Aim of the study

The aim of this qualitative study was, using in-depth semi-structured interview methods of inquiry, to explore doctors’, pharmacists’ and nurses’ experiences and views about their patients’ prescription medicine sharing behaviours. The study participants were practising in community and hospital settings in Auckland, NZ. The study helped to understand patients’ medicine sharing behaviour from healthcare providers’ perspectives.
Chapter 5 Qualitative interviews with healthcare providers

5.4 Objectives

The objectives of this study were:

- To understand healthcare providers’ experiences and attitudes about their patients’ medicine sharing behaviours
- To explore healthcare providers’ views on factors that contribute to medicine sharing
- To explore healthcare providers’ views on potential strategies to reduce risks and harms associated with medicine sharing (findings related to this objective reported in Chapter 6)

5.5 Methods

5.5.1 Design and sampling

An exploratory, qualitative study design was adopted. Participants were sampled purposively on the basis of their professional disciplines, speciality, work experiences, and practice setting. An additional focus was recruiting ‘information-rich’ participants. Efforts were made to recruit from different health disciplines with a direct role in prescribing, dispensing, and patient care. Participants were eligible to participate if they were doctors, pharmacists, or nurses registered to practice in NZ, and practising in Auckland at the time of data collection.

5.5.2 Recruitment strategy

All participants were recruited from Auckland. Potential participants were made aware of the study via email advertisements on the University of Auckland and health professional email lists. When initially approached, the lead researcher assessed the eligibility of participants using a check list and those eligible were provided with a participant information sheet (PIS) and consent form. Participation was voluntary and all interviewees provided written, informed consent.

5.5.3 Data collection

Individual, semi-structured face-to-face interviews were used to collect data. The interview schedule (Appendix 5) included a number of questions intended to capture
previously unreported ideas. It was developed from a series of discussions between the authors and informed by existing literature.\textsuperscript{1,2,12,13,15,18} The interview schedule was piloted with two healthcare providers (data excluded from the study). The pilot interviews were video recorded and watched by the research team. The lessons learned were used to refine the schedule and the actual interview procedure. The interview guide was revised after the first four interviews to include unanticipated topics arising from these interviews. The guide contained several open-ended questions with flexible prompts/probes. The following domains were explored: types of medicines participants believed their patients shared, perceptions of the consequences of medicine sharing, and the circumstances in which medicines might be shared. Participants were also asked to comment on potential intervention strategies to reduce the harms of sharing. A brief, structured questionnaire (Appendix 6) was also used to gather basic demographic information from participants. To ensure consistency, all interviews were conducted by the lead researcher at the University of Auckland. With participants’ permission, all interviews were audio-recorded. The lead researcher wrote field-notes and reflections after each interview to document non-verbal expressions and the overall impression of the interview. The interviews lasted between 30 and 60 minutes, and were conducted between January and May 2014. As a token of appreciation a NZ $20 supermarket voucher was offered to each participant.

The professional qualification of the lead researcher was made known to all participants. To minimise social desirability biases, all participants were informed that no judgements would be made regarding their responses and/or knowledge about medicine sharing.

5.5.4 Data analysis

A detailed description of the analysis process can be found in Chapter 4; a similar process was used for this study. The lead researcher transcribed most of the interviews (n=14) and the rest were transcribed by a professional transcriber (n=4). The lead researcher checked the accuracy of all transcripts against audio-recordings. All participants were offered an opportunity to edit their interview transcripts; however, only one participant took this opportunity. This participant both added and removed a couple of phrases to increase the clarity of the transcript. After each interview, the lead researcher listened to the recording and made notes about the interview. This information was used to probe previously unforeseen topics in subsequent interviews. The interview transcripts were analysed using
Chapter 5 Qualitative interviews with healthcare providers

the same procedure described in preceding chapter (see section 4.5.4 of Chapter 4). Overall, during data analysis process, considerable effort was made to reduce subjectivity and increase the validity of findings.

5.5.5 Ethics approval

Ethics approval was obtained from the University of Auckland Human Participants Ethics Committee (Ref no. 010928; see Appendix 7).

5.6 Results

5.6.1 Participant characteristics

Thirty interviews were planned, but as no new themes arose during interviews 16 to 18, data saturation was considered to have occurred and interviewing ceased. Participants comprised 16 females and two males, mean age 40 years (range: 23 - 70 years) (see Table 8 for participants’ characteristics).

Table 8: Participant characteristics

<table>
<thead>
<tr>
<th>Demographics and practice pattern</th>
<th>Number (N=18)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>2</td>
</tr>
<tr>
<td>Female</td>
<td>16</td>
</tr>
<tr>
<td><strong>Age in years</strong></td>
<td></td>
</tr>
<tr>
<td>20 - 30</td>
<td>6</td>
</tr>
<tr>
<td>31 - 40</td>
<td>4</td>
</tr>
<tr>
<td>41 - 50</td>
<td>5</td>
</tr>
<tr>
<td>50+</td>
<td>3</td>
</tr>
<tr>
<td><strong>Health care disciplines</strong></td>
<td></td>
</tr>
<tr>
<td>Physician</td>
<td></td>
</tr>
<tr>
<td>General practitioner</td>
<td>1</td>
</tr>
<tr>
<td>Others</td>
<td>3</td>
</tr>
<tr>
<td>Pharmacist</td>
<td></td>
</tr>
<tr>
<td>Community pharmacist</td>
<td>3</td>
</tr>
<tr>
<td>Hospital pharmacist</td>
<td>4</td>
</tr>
<tr>
<td>Clinical pharmacist</td>
<td>1</td>
</tr>
<tr>
<td>Nurse</td>
<td></td>
</tr>
<tr>
<td>Primary health care nurse</td>
<td>2</td>
</tr>
<tr>
<td>Clinical nurse</td>
<td>2</td>
</tr>
<tr>
<td>Emergency nurse</td>
<td>1</td>
</tr>
<tr>
<td>Research nurse</td>
<td>1</td>
</tr>
<tr>
<td><strong>Experience in current work position (in years)</strong></td>
<td>12</td>
</tr>
<tr>
<td>&lt; 5</td>
<td>12</td>
</tr>
<tr>
<td>5 - 10</td>
<td>6</td>
</tr>
<tr>
<td><strong>Clients per day</strong></td>
<td></td>
</tr>
<tr>
<td>&lt; 20</td>
<td>12</td>
</tr>
<tr>
<td>20 – 50</td>
<td>4</td>
</tr>
<tr>
<td>50+</td>
<td>2</td>
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</tbody>
</table>
Seven participants were recruited via the University of Auckland email list, three via a local hospital email list, two via a pharmacy electronic chat group list, and six via snowballing or word of mouth. Participants were recruited from community and hospital practices, and had various levels of speciality. Eight pharmacists, four doctors and six nurses were interviewed.

The main findings fell within four overarching themes: perceived benefits of sharing, negative consequences of shared medicines, and reasons for sharing medicines (described below) and interventions to reduce risks/harms related to sharing (reported in Chapter 6).

**5.6.2 Perceived benefits of medicine sharing**

Healthcare providers reported that patients might have shared a range of medicines which were obtained on prescription (see Table 9). Sharing such medicines is considered an unsafe practice\(^2,4,13\) and is technically illegal, but not all sharing was regarded by the healthcare providers as harmful. Most participants believed that in some instances the benefits from sharing outweigh its potential risks, for example, sharing lifesaving medicines in emergency situations (e.g. asthma inhalers and EpiPen\(^\circledR\)). Sharing a few doses of medicine when a higher degree of medicine adherence is needed was also seen as important, to avoid negative health consequences of non-adherence, for example, sharing oral contraceptive pills to avoid disrupting the pill taking cycle.

*If it’s like missed contraceptive pills, I would be taking my friend’s one if I missed mine. Oh God! The risk of being pregnant versus just taking my friend’s pills, I would do it.* (P08, emergency nurse)

Some forms of sharing were also viewed by participants as less risky and more likely to result in better treatment outcomes, such as sharing a few doses of cholesterol or diabetes medicines during a trip when family members are taking the same medicines. Some participants viewed medicine recycling/sharing within a family as an efficient and cost-effective use of resources if done safely.

*I think it [recycling] can be quite efficient and cost-effective medicine use system.* (P07, general practitioner)

In some instances, participants themselves had advised patients to share medicines. One such circumstance was when the patient had difficulty affording the charges for the doctor’s visit and/or prescription. One GP described the following:
Chapter 5 Qualitative interviews with healthcare providers

*We give them one prescription for a big bottle of paracetamol to share among all lots of kids, the mother would get a family bottle of paracetamol. (P07, general practitioner)*

Sharing was also viewed by some participants as pro-social behaviour. The positive role of medicine sharing in a wider social-interaction was noted, particularly its role in strengthening family relationships.

*Another benefit is also about family connectedness, from family point of view especially in Pacific family you can’t take something alone if someone need it as well, it’s collectivism approach to living. (P13, nurse/Pacific health speciality)*

When participants were asked about other circumstances where sharing could be beneficial, in general, they felt that most sharing practices could be beneficial if they occurred in consultation with healthcare providers.

**Table 9: Commonly shared medicines**

<table>
<thead>
<tr>
<th>Medicines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acne medicines (e.g., Roaccutane®)</td>
</tr>
<tr>
<td>ADHD medicines (e.g., Ritalin®)</td>
</tr>
<tr>
<td>Antibiotics (e.g., azithromycin, amoxicillin)</td>
</tr>
<tr>
<td>Antidepressants (e.g., Aropax®)</td>
</tr>
<tr>
<td>Antihistamines (e.g., Phenergan®)</td>
</tr>
<tr>
<td>Antihypertensive</td>
</tr>
<tr>
<td>Arthritis medicines (e.g., Voltaren®, diclofenac, Arcoxia®)</td>
</tr>
<tr>
<td>Asthma inhalers (e.g., Ventolin®)</td>
</tr>
<tr>
<td>Cardiovascular medicines</td>
</tr>
<tr>
<td>Cholesterol medicines</td>
</tr>
<tr>
<td>Diabetes medicines (e.g., metformin, glipizide)</td>
</tr>
<tr>
<td>Erectile dysfunction medicines (e.g., Cialis®, Viagra®)</td>
</tr>
<tr>
<td>Gastric/duodenal ulcer medicines (e.g., Losec®)</td>
</tr>
<tr>
<td>Gout medicines (e.g., colchicine, allopurinol)</td>
</tr>
<tr>
<td>Oral corticosteroids (e.g., prednisone, prednisolone)</td>
</tr>
<tr>
<td>Oral contraceptive pills</td>
</tr>
<tr>
<td>Pain medicines (e.g., tramadol, morphine)</td>
</tr>
<tr>
<td>Thyroid medicines</td>
</tr>
<tr>
<td>Topical antibiotic/antifungal (e.g., Bactroban®, Foban®)</td>
</tr>
<tr>
<td>Topical corticosteroids (e.g., Locoid®, Lyderm®)</td>
</tr>
</tbody>
</table>
5.6.3 Negative consequences of medicine sharing

Participants reported several potential adverse consequences of medicine sharing. These were categorised into three sub-themes: personal health risks, public health risks, and a decrease in the quality of pharmacovigilance data.

5.6.3.1 Personal health risks

Almost all participants believed that most patients may not easily appreciate the difference between various forms of the same medicine, such as strength or formulation. Furthermore, participants noted that patients might lack the knowledge to understand the appropriateness of a specific medicine for another person, for example, the lender’s medicines might be contraindicated to the borrower.

You go for holiday and you’ve got gout, … and someone you know might have some diclofenac and you end up taking it, and you might have kidney problems, you might have high blood pressure, and so the medicine might not be suitable for you. (P10, community pharmacist)

Medicine sharing leading to poor treatment outcomes amongst some patients was also reported.

Particularly one family we had, all of them had diabetes at different levels so they were sharing their diabetes medicines all the time. It wasn’t until I went into their house after one of them had died that I realised why the rest of the family their diabetes was not changing. Their blood test was very poor because they were taking each other’s medicines. (P12, primary healthcare nurse)

In addition, some doctors noted that if the shared medicine alleviated the symptoms, the underlying medical condition might be masked and left untreated. Some pharmacists added that during sharing, medicines might be removed from their original containers and information contained on labels, leaflets and package inserts might not be transferred to the borrower, resulting in the loss of important medicine instructions. Further, verbal instructions might be inaccurately communicated.

Although assessing the sharing of psychoactive medicines was not a primary objective of this study, the risk of drug dependence was commonly reported as a potential health risk.
for patients sharing habit-forming medicines, for example, Attention Deficit Hyperactivity Disorder (ADHD) stimulants or strong pain medicines.

*The opiates could be quite risky; they have the risk of dependence although each and every drug has got its own side effects and adverse reactions.* (P06, doctor/rheumatologist)

### 5.6.3.2 Public Health Risks

One of the themes arising from the data related to public health risk was the contribution of medicine sharing towards the emergence of drug resistant bacteria. Sharing antibiotics to self-treat conditions caused by viruses such as flu, colds, or sore throats was seen as a major risk factor for drug resistance.

*Just because you both have upper respiratory or lower respiratory tract infection, it doesn’t mean that you both have the same strain of it, you really shouldn’t share antibiotics because it is gonna make both of you resistant [sic].* (P08, emergency nurse)

Sharing and inappropriate use of certain dosage forms (e.g., eye drops, antimicrobial creams and ointments) were also viewed as a potential public health threat. Participants were concerned that patients might not realise the need to follow certain safety precautions to avoid infection (such as washing hands before use), and thus the medicine could easily be contaminated with bacterial and fungal spores which might result in the spread of infections among the public.

*The sharing of eye drops is very common. Also it’s a really good way to share infections.* (P16, hospital pharmacist/medicine information manager)

*There is some harm of medicines supply to the mouth [e.g., asthma inhalers]; it’s unhygienic to share that.* (P14, doctor/obstetrician and gynaecologist)

### 5.6.3.3 Decrease in pharmacovigilance data quality

Participants noted that patients often did not disclose their medicine sharing practices to healthcare providers and as a result, adverse drug events from shared medicines might not be detected and recorded. One of the pharmacists explained the challenges of gathering adverse drug event data from shared medicines and its consequent negative impact on medicine safety monitoring as follows:
Chapter 5 Qualitative interviews with healthcare providers

I suspect a lot of the time patients don’t want to tell you that they’re sharing medicines because they know that it is not the right thing to do. I suspect you don’t hear about it most of the time so it would be very difficult to obtain accurate statistics on something that no one tells you about. (P16, hospital pharmacist/medicine information manager)

When they were asked about the best strategy for collecting information on adverse drug events from shared medicines, one pharmacist suggested the need to routinely ask patients about their sharing practices during medicine reconciliation (i.e. comparing medicine orders and patient records with current medicines of the patient\textsuperscript{316}) and reporting adverse drug events from shared medicines on an \textit{ad hoc} basis since medicine sharing was not included as a common reason in adverse drug event reporting forms.

5.6.4 Reasons for medicine sharing

Participants described a number of reasons for medicine sharing practices, either based on actual knowledge or speculation as to the causes. The reasons were categorised into eight broad sub-themes. Although the sub-themes are described individually below, they are interrelated and not mutually exclusive. When a code fitted into more than one sub-theme it was discussed in the category in which it was considered to be the best fit. The sub-themes are briefly described below.

5.6.4.1 Lack of access to health services

This theme captured access to medicines-related issues influencing patients’ medicine sharing behaviours such as issues related to availability and affordability of medical care.

Those who had more difficulty accessing healthcare facilities were perceived by participants to be more likely to share medicines, for example, those living in rural areas.

\textit{Particularly patients who live on farms, they are quite isolated from doctors and pharmacists and all sorts of medical centres. I have an example of a farmer, who had a skin infection, and then he took some old medicines that his wife had previously, and he took that and he did not get better of course. (P01, community pharmacist)}

Participants also felt that some general practices are very busy, and whilst waiting for an appointment, the patient might borrow a few tablets to keep the symptoms at bay. As
stated by a pharmacist, long waiting times could be even more problematic if the situation is an emergency or if the illness involves severe pain, for example, gout.

*But at the end of the day when you have gout you think, “I’ve got this pain” and technically you can’t wait for the next two days or until you get to the doctor, so by then it’s too late, so you instantly might take other’s medicines.*

(P10, community pharmacist)

Also noted was pain occurring late at night or at the weekend, when accessing their regular doctor might not be easy or possible, and patients might share medicines to avoid the usually higher cost of ‘after hours’ medical visits. Although the average cost of medical care in NZ is less than some developed countries, the overwhelming majority of participants viewed cost as a major factor influencing sharing behaviours.

*I think it [medicine sharing] all comes down to cost; it saves them the doctors’ cost, and the cost of the medicine. Because, even though it’s $5 for a script if you’ve got half a dozen medicines to collect or even more than that, it’s a lot of money.*

(P04, research nurse)

By sharing a medicine, the patient could also avoid other barriers related to visiting a doctor such as booking an appointment, long waiting times at health facilities to access the doctor, travelling time, and taking time out from a busy work schedule.

*So if it is a prescription medicine, you need to go either to a doctor or the pharmacist to get some medicines. On the other hand, you may know someone, maybe your friend or your family who already have some medicines, and I guess just it’s a bit more convenient.*

(P03, clinical pharmacist)

Participants also believed that patients tended to stockpile leftover or unused medicines, and that such stockpiling might contribute to the availability of medicines which could be shared. This leads to the possibility of sharing medicines which could have deteriorated in quality and/or expired.

### 5.6.4.2 Socioeconomic status

Although prescription charges are largely subsidised in NZ, and reduced doctors’ fees are available for children and most family members receiving low to middle income, it was noted that other costs (e.g. transportation or opportunity cost – such as lost income due to time spent on the medical visit) could deter these families from seeking medical care and
getting their own medicines. In participants’ opinions, the combined wages of members of poor families is often less than their basic needs and medicine sharing could be a coping strategy.

Of course people are more likely to share medicines if their next prescription is going to take a bigger chunk out of their food budget or out of their any kind of budget. (P16, hospital pharmacist/medicine information manager)

Some participants also voiced their concern about the effect of a recent increase in prescription charges (increased from NZ $3 to NZ $5) on the medicine access of poorer families which might result in more medicine sharing.

If you are looking at some areas, really low socioeconomic areas, it most definitely affects them [influences their decision to share]. It sounds that $2 is not much, but $2 is a lot of money for people that don’t get much. (P12, primary health care nurse)

5.6.4.3 Forgetfulness

Participants revealed that sometimes patients forget to carry around medicine which they rely on and might borrow a few pills to comply with their daily dose regimen. Being busy at work, waking up late in the morning, being in a hurry, and travelling were cited by participants as situations that disrupt daily routines and could contribute to forgetfulness. There were also reports that some patients might forget to refill their regular medicines, setting up a situation where borrowing a few pills would be beneficial in order to obtain medicine until they organise a further legitimate supply.

When they forgot to refill their prescriptions, a few patients also used someone else’s medicines without the knowledge of the person. Although this form of sharing may not fit with our operational definition of medicine sharing, it was reported by participants. One of the pharmacists recounted her encounter.

Somebody had come in and said, “Oh yeah, I know what the pills look like so I picked them out of my wife’s pills when I ran out.” He actually took them out of his wife’s blister pack [without her consent]. I think that was quite dangerous; a lot of medicines look alike. (P01, community pharmacist)
5.6.4.4 Lack of knowledge about medication

Apart from increasing the personal health risks of medicine sharing, it was also highlighted that lack of knowledge about medications could be a contributing factor for sharing behaviours. For example, due to inadequate knowledge some patients often did not finish the full course of their prescribed medicines, and some of those unused medicines might then be passed on to others. Participants revealed that some patients had misconceptions about the safe use of certain medicines, noting that topical preparations, oral contraceptives, and inhalers are often not considered to be ‘real’ medicines by patients, and thus might be considered safe to be shared.

In participants’ opinions, some of the misconceptions are, in part, due to a lack of advice and counselling by healthcare providers about the potential risks of sharing medicines. Workload and time limitations were mentioned as reasons for healthcare providers not providing such advice on a regular basis.

I don’t do it [provide advice about medicine sharing] because there’s such a limited time with the patient we have, and I focus on the things that are most important; if I said it to every patient it would take me a lot of time. (P15, hospital pharmacist)

Pharmacists voiced their concerns about patients’ knowledge regarding the safe use of strong pain medicines (e.g. tramadol and morphine). They stated that some of their patients were often prescribed an oversupply of these medicines, and might share their unused medicines. As noted by one pharmacist, sometimes the patient might not be informed by the prescriber and dispensing pharmacist as to when to stop taking pain medicines and what to do with leftovers.

Even though similar medicines packaging/labelling could potentially contribute towards patients’ unintentional sharing, this study’s participants felt that unintentional sharing was more likely to be associated with inadequate medicine knowledge. For instance, when two patients keep their medicines in the same place (in a cupboard or bag) and if the medicine packaging looks similar it might create confusion and result in one using the other’s medicine. One participant lamented one such occurrence:

The worst case of medicine sharing I have seen yet, she came in with a bag of medicine, ... And she said “Well oh! My husband and I put medicines in the same place and then we just take the ones we think we supposed to take per
day.” And she had been prescribed a particular respiratory inhaler, her husband had been prescribed a similar inhaler, but double the dose, and so she was in effect taking his medicine at the same prescribed rate, and she ended up taking four times the amount of medicines she should have been taking. (P09, nurse/respiratory health speciality)

5.6.4.5 Altruistic reasons

Altruism was cited by participants as another reason for sharing medicines. Participants noted that sharing for altruistic reasons is often aimed at ensuring the wellbeing of loved ones. Indeed, when the borrower is a family member or an intimate friend, the sharing might come at the expense of patients’ own need.

A friend may offer it [the medicine] because from an altruistic point of view they may say, “Oh have you got a sore shoulder, well listen I got these tablets from my doctor for a sore shoulder and I can recommend them so why don’t you try some of mine?” (P15, hospital pharmacist)

5.6.4.6 Illness denial and embarrassment

Participants believed that some patients were often uncomfortable using medicines in front of others due to fear of stigma or being ridiculed by others for their health condition (e.g. asthma). Participants explained that sporadic medicine use behaviour due to embarrassment from carrying around medicines may result in the sudden deterioration of health, and ultimately using another’s medicines. Participants proposed that illness denial tends to occur more frequently in adolescents than older people. Illness denial among young asthmatic patients was described by one of the nurses as follows.

They want to ignore their illness, and so part of ignoring an illness means not keeping medicines you are relying on. Some of the reasons around that are some of them feel embarrassed to be taking medicines in front of their friends. (P09, nurse/respiratory health speciality)

Those who were ashamed or embarrassed to disclose illness symptoms to healthcare providers were also perceived to be more likely to use other people’s medicines.
Chapter 5 Qualitative interviews with healthcare providers

For example, women who have got a UTI might be embarrassed to talk to the doctor. But they would talk to their mum and they may use someone else’s medicines. (P14, doctor/obstetrician and gynaecologist)

5.6.4.7 Cultural and linguistic barriers

Apart from financial and health system barriers, participants felt that cultural and linguistic factors barriers to getting health services might influence patients’ decisions to share medicines. For instance, poor patient – provider communication resulting from language barriers was perceived to be a factor which encouraged medicines sharing, particularly for immigrants where English is not their first language. Also noted, due to religious beliefs, some Muslim women might be uncomfortable consulting male doctors, and instead prefer to access prescription medicines through their social networks.

Other cultural factors could also affect medicine sharing decisions, including customs, beliefs about illness and medicines, and family values. One participant noted the effect of family customs on medicine sharing as follows.

A good example we often know is food. If someone is hungry and if they come for a visit to your family and if you have got only one sandwich, you either don’t eat the sandwich and give it to them, or you will have half each. The same with medicines I suppose, if your family members need that medicine you give it to them. (P13, nurse/Pacific health speciality)

5.6.4.8 Direct to consumer advertising influence

Participants were asked for their views about the influence of direct to consumer advertising on patients’ medicine sharing practices, which occurs in NZ. Some participants had a view that when people see prescription medicines being advertised on television alongside OTC medicines and other commodities, their perceptions of the risks associated with prescription medicines might be changed, and this could potentially increase opportunity for sharing. Conversely, some participants highlighted that advertisements might create awareness among their patients regarding medicines available for their illness and it might encourage them to make more informed treatment decisions. A pharmacist described the potential influence of direct to consumer advertising on medicine sharing behaviours as follows:
From a medicine sharing perspective I think it could possibly mean that the person goes out to their friend that they know that takes that and says, “Hey, you know, you’ve got some of that, I saw it on the ad. Is it good? Can I try some of yours?” (P17, hospital pharmacist)

5.7 Discussion

In this study, healthcare providers’ experiences and attitudes towards medicines sharing have been explored to further understand patients’ medicine sharing behaviours. The findings enhance earlier survey reports by providing an exploration of a different perspective on previously identified reasons for medicine sharing, including convenience, cost, poor access to medicines, altruism, and running out of previously prescribed medicines. Moreover, several examples of previously unreported reasons for sharing were identified; these include illness denial and embarrassment, poor medicine knowledge, linguistic and cultural issues, misconceptions about the safety of certain medicines, and unintentional sharing.

In line with earlier survey reports, in this study a wide range of medicines were reported to be shared. Sharing these medicines might result in adverse outcomes. For example, sharing antibiotics might result in life threatening allergies. Some acne medicines (e.g. isotretinoin) are highly teratogenic and if they are shared by women of child bearing age they can cause birth defects. Sharing medicines (e.g. opioid analgesics or ADHD stimulants) may also lead to drug dependence. Additionally overdoses of these medicines can have very serious consequences, for example, an overdose of opioid analgesics can cause respiratory depression and death.

A previous survey indicated that patients might not disclose their medicine sharing behaviours to their healthcare providers. Similarly, in this study, participants noted that their patients rarely disclosed sharing practices. There are several potential reasons for this including patients being aware that it is a behaviour discouraged by healthcare providers, and not being asked directly by healthcare providers about their sharing practices. This information omission has potential ramifications. Firstly, prescribing in the absence of a complete medicine history might increase the occurrence of unanticipated adverse events. Secondly, it can complicate clinical diagnosis and may result in misdiagnosis or a delayed
Thirdly, it makes accurate identification and quantification of adverse drug events from shared medicines a difficult task.

Perhaps, unsurprisingly, participants in this study mentioned a number of influences on patient prescription medicine sharing behaviours that could be considered to be cultural factors in the broadest sense, if culture is accepted to include such concepts as ethnicity, age, gender, religion, geographic location, language and socioeconomic status. These influences have also been reported by others. As noted by Marrone, even if the patient and healthcare provider speak the same language, the experiences and cultural affiliations of the patient may influence his or her decision to seek medical care, and hence also influence procurement of medicines.

It has been reported that illness denial or hiding medicines from others is more common in children and adolescents than adults, and in this regard our findings may not be new. As Taddeo et al pointed out, younger patients often want to exercise self-authority to make their own choices with regards to their illness and medicines, thus ignoring illness and medicine sharing could be part of this experiment. Fear of stigma associated with taking medicines in front of others and the inconvenience of carrying around prescribed medicines would also be more likely to increase the risks of illness denial and medicine sharing.

Participants also discussed altruistic reasons for sharing medicines. Likewise, in a qualitative study among Latino and Hispanic adult asthma patients in New York (N=76), the study participants described their medicine borrowing and lending practices as “a way of looking out for each other”, particularly when one cannot afford the cost of medicine or doctors’ visits. Generally, medicine sharing among patients has been described as a means of expressing a caring relationship or providing social support for loved ones during illness or when medicines are unavailable.

5.8 Limitations

This study has some limitations. First, although participants were recruited from a wide range of health disciplines, their responses might be different from those who practice in other settings, and this could affect the transferability of findings. Second, this study was conducted in a developed country, and the experiences and attitudes of those who practice in developing countries or resource-limited settings might be different. Lack of health
insurance and access to essential medicines would be more likely to increase sharing practices. Third, the extent to which patients’ sharing behaviours was influenced by each of the identified factors could not be determined. The focus of the research was to identify a range of factors influencing sharing behaviours. Fourth, healthcare providers’ views about the behaviours and motives of their patients with respect to sharing medicines might not be an accurate interpretation, and hence might not accurately represent patients’ motives to share medicines.

Nevertheless, examining healthcare providers’ perspectives is useful to generate new insights into this under-researched topic. To the best of the lead researcher’s knowledge this is the first study to explicitly explore healthcare providers’ experiences about their patients’ medicine sharing behaviours. Particular strengths of the study include participants being drawn from different health disciplines involved in different stages of patient care provision.

5.9 Summary

In conclusion, medicine sharing can be viewed as positive or negative health behaviour depending on the circumstance, the characteristics of the people involved, the type of medicine, and/or the health outcomes. As noted by some participants, medicine sharing is inevitable, and sometimes patients’ decisions to share medicines are sensible, for example, during an emergency situation when they cannot afford a doctor’s visit or when health services are inaccessible. However, some of this study’s participants believed patients’ medicine sharing practices to always be inappropriate. This attitude might deter patients who share medicines or intending to share from discussing their sharing behaviours with healthcare providers, resulting in a lost opportunity to increase the safety of such practices. These uninformed decisions by patients may have negative consequences (e.g. unanticipated side effects). If healthcare providers regularly ask patients about their intention to share in a sensitive and non-judgemental manner, this creates opportunities to educate patients about when to share or not to share certain medicines. Thus, adopting strategies that try to reduce the potential harms of sharing (without necessarily eliminating medicine sharing practices or promoting the sharing of medicines) seems to be a pragmatic and realistic approach.
CHAPTER 6. MEDICINE SHARING HARM-REDUCTION INTERVENTIONS

6.1 Chapter overview

The preceding two chapters have described the perspectives of patients and healthcare providers in relation to factors influencing people’s decision to share medicines and consequences of sharing behaviours. This chapter will analyse the data on strategies suggested by patients and healthcare providers to reduce the risks and harms associated with medicine sharing. The chapter is organised as follows. The first section provides the rationale for developing medicine sharing interventions, including information on the theoretical frameworks used to frame medicine sharing interventions. Following that, procedures for the systematic categorisation of factors influencing medicine sharing behaviours are described. This is followed by a detailed description of potential strategies that may minimise the risks and harms associated with medicine sharing. Then, the process of linking potential interventions with each factors influencing sharing behaviours was described. Finally, the study findings are interpreted, the weakness of the study is highlighted and the overall summary of the findings are presented.

6.2 Introduction

Although medicine sharing can be a coping strategy for those who have no other alternatives, unsafe sharing behaviours may compromise patient safety and need to be discouraged. To minimise unsafe medicine sharing practices, all of the factors mentioned in the preceding two chapters which influence sharing behaviours should be considered, and hence reducing the risks and harms associated with medicine sharing is likely to require a multifaceted intervention. Behaviour change theories can inform the focus, design and development of such interventions. Several theories exist which explain or predict health behaviours, for example the Health Belief Model, the Theory of Planned Behaviour, Social Cognitive Theory, and the Theory of Reasoned Action. Most of these theories are insufficiently broad to explain all the determinants of health behaviour. Moreover, most of them have overlapping constructs, and choosing one among many theories may be problematic for those involved in designing interventions. In an attempt to address this issue, Michie et al developed the BCW, a synthesis of 19
frameworks of behaviour change, specifically to guide the design of behaviour change interventions.\textsuperscript{47}

The BCW comprises three core components (see Figure 1).\textsuperscript{47} The first component is a model of behaviour, the COM-B model (see Figure 2). This model hypothesises that human behaviour is influenced by the interaction between ‘Capability’, ‘Opportunity’ and ‘Motivation.’ Each of these components is further divided into two sub-components. ‘Capability’ can be a ‘Physical’ or ‘Psychological’ ability to perform the behaviour. ‘Opportunity’ may be ‘Physical’ or ‘Social’ environmental factors that facilitate/hinder the occurrence of the behaviour. ‘Motivation’ can be either ‘Automatic’ or ‘Reflective’ brain processes that activate/inhibit behaviour (Table 10 displays the full definition of each sub-component). Changing behaviour requires changing one or more of these components, and a change in one COM-B component may influence another component. For example, a change in ‘capability’ or ‘opportunity’ may affect the individual’s ‘motivation’ to perform the behaviour. Moreover, performing the behaviour may positively or negatively affect each of the components. COM-B is often used at an early stage of designing behaviour change interventions mainly to identify what in terms of capability, opportunity or motivation, needs to shift in order for the desired behaviour to occur.\textsuperscript{47}

Intervention functions are the second component of the BCW. There are nine intervention functions defined as “broad categories of means by which an intervention can change behaviour”: education, training, persuasion, enablement, restriction, modelling, environmental restructuring, coercion, and incentivisation (see Table 10 for definition of each intervention function).\textsuperscript{47} Matrices linking COM-B with intervention functions allow intervention designers to be systematic in their selection of intervention functions depending on the results of the COM-B analysis of behaviour (see Table 11). For example, to change physical capability-related factor influencing medicine sharing, education, training or enablement can be used as intervention functions. To address automatic motivation-related factors influencing sharing, persuasion, incentivisation, coercion, environmental restructuring, modelling or enablement are appropriate intervention functions. As its third component, the BCW has seven policy categories that support implementation of the intended intervention functions. These are broader population-based strategies and include legislation, communication/marketing, fiscal measures,
Chapter 6 Medicine sharing harm-reduction interventions

environmental/social planning, regulation, service provision, and guidelines (see Table 10 for full description of policy categories).47

While researchers have identified a range of factors influencing medicine sharing behaviour,2,12-15,18,32,45 none have yet suggested systematically developed and theory-based behaviour change interventions. To fill this gap, this analysis has used a systematic, theory-led process suggested by Michie et al.47

Table 10: Definitions of interventions and policies*47

<table>
<thead>
<tr>
<th>COM-B components</th>
<th>Definition</th>
</tr>
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<tbody>
<tr>
<td>Physical capability</td>
<td>Physical skills, strength or stamina required to perform the behaviour</td>
</tr>
<tr>
<td>Psychological capability</td>
<td>Knowledge, psychological skills, strength or stamina required to perform the behaviour</td>
</tr>
<tr>
<td>Physical opportunity</td>
<td>Opportunity afforded by the environment involving time, resources, locations, cues, physical ‘affordance’</td>
</tr>
<tr>
<td>Social opportunity</td>
<td>Opportunity afforded by interpersonal influences, social cues and cultural norms that influence the way that we think about things, e.g. the words and concepts that make up our language</td>
</tr>
<tr>
<td>Automatic motivation</td>
<td>Automatic processes involving emotional reactions, desires (wants and needs), impulses, inhibitions, drive states and reflex responses</td>
</tr>
<tr>
<td>Reflective motivation</td>
<td>Reflective processes involving plans (self-conscious intentions) and evaluations (beliefs about what is good and bad)</td>
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<table>
<thead>
<tr>
<th>Interventions</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Education</td>
<td>Increasing knowledge or understanding</td>
</tr>
<tr>
<td>Persuasion</td>
<td>Using communication to induce positive or negative feelings or stimulate action</td>
</tr>
<tr>
<td>Incentivisation</td>
<td>Creating expectation of reward</td>
</tr>
<tr>
<td>Coercion</td>
<td>Creating expectation of punishment or cost</td>
</tr>
<tr>
<td>Training</td>
<td>Imparting skills</td>
</tr>
<tr>
<td>Environmental restructuring</td>
<td>Changing the physical or social context</td>
</tr>
<tr>
<td>Modelling</td>
<td>Providing an example for people to aspire to or imitate</td>
</tr>
<tr>
<td>Enablement</td>
<td>Increasing means/reducing barriers to increase capability or opportunity*</td>
</tr>
<tr>
<td>Restriction</td>
<td>Using rules to reduce the opportunity to engage in the target behaviour (or to increase the target behaviour by reducing the opportunity to engage in competing behaviours)</td>
</tr>
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<table>
<thead>
<tr>
<th>Policies</th>
<th>Definition</th>
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</thead>
<tbody>
<tr>
<td>Communication/marketing</td>
<td>Using print, electronic, telephonic or broadcast media</td>
</tr>
<tr>
<td>Fiscal</td>
<td>Using the tax system to reduce or increase the financial cost</td>
</tr>
<tr>
<td>Regulation</td>
<td>Establishing rules or principles of behaviour or practice</td>
</tr>
<tr>
<td>Legislation</td>
<td>Making or changing laws</td>
</tr>
<tr>
<td>Environmental/social planning</td>
<td>Designing and/or controlling the physical or social environment</td>
</tr>
<tr>
<td>Service provision</td>
<td>Delivering a service</td>
</tr>
<tr>
<td>Guidelines</td>
<td>Creating documents that recommend or mandate practice. This includes all changes to service provision</td>
</tr>
</tbody>
</table>

*All definitions represent original definitions given by Michie et al.47

*Capability beyond education and training; opportunity beyond environmental restructuring
6.3 Aim of the study

The aim of this analysis was to explore potential strategies that may help to reduce the risks and harms associated with prescription medicine sharing practices.

6.4 Objectives

The objectives of this study were:

- To systematically map factors influencing medicine sharing behaviour through mapping patients’ and healthcare providers’ perspectives onto the COM-B model
- To use this mapping to identify potential interventions to reduce the risks and harms associated with medicine sharing.

6.5 Methods

This chapter reports on the analysis of data from patient and healthcare provider interviews. Data on factors influencing sharing and consequences of sharing behaviours have been reported in the previous two chapters. In this chapter, the views of patients and health professionals in relation to influences of sharing were mapped to COM-B and attitudes pertaining to strategies that might help to reduce the risk and harms associated with medicine sharing were also analysed. Potential interventions were framed around the
Chapter 6 Medicine sharing harm-reduction interventions

BCW and informed by a ‘harm reduction’ philosophy. As has been discussed in section 3.4.4 of Chapter 3, a ‘harm reduction’ approach accepts that medicine sharing is always likely to occur, and interventions should be designed to reduce risk and harm rather than be focussed on abolishing sharing practises.

The interview schedules for both studies explored similar topics with regards to interventions. Therefore, data from both studies were combined and analysed together.

To identify factors (thematic codes) influencing sharing behaviour and potential interventions, the patient and healthcare provider interviews were first analysed separately based on the GIA (described in Chapters 4 and 5). Then, as described below, to identify targets for interventions, thematic codes from the initial analyses describing factors influencing sharing were mapped to the COM-B model. The mapping exercise was completed by the lead researcher, and then independently reviewed by both supervisors. All discrepancies were resolved by discussion. Figure 4 describes the overall research process including data analysis.

6.6 Results

The results of the data analysis are presented in three parts. Section 6.6.1 describes the secondary analysis of the patient and healthcare provider interviews, which involved mapping factors influencing sharing behaviour onto the COM-B model. Section 6.6.2 presents the results of the general inductive analysis of patients’ and healthcare providers’ views on effective strategies to address factors influencing sharing behaviour. Lastly, section 6.6.3 describes a systematic procedure linking the factors influencing sharing behaviour to potential interventions.

6.6.1 Identifying influences on sharing behaviour using the COM-B

As there was significant overlap between the factors revealed by patients and those identified by the healthcare providers, the results have been combined and presented together.

All thematic codes (describing factors influencing sharing) from both participant groups mapped to at least one COM-B component. In some instances, one thematic code mapped to more than one COM-B component (Table 12).
Research questions
1. Why do people share?
2. What could help to reduce risk of sharing?

Factors influencing sharing
Thematic codes

Factors influencing sharing
Thematic codes

Patient Interviews (N=17) → GIA → Interventions suggested by patients
Thematic codes

GIA → Patient Interviews (N=17)

GIA → GIA

Factors influencing sharing
Thematic codes

Factors influencing sharing
Thematic codes

HCP Interviews (N=18) → GIA → Interventions suggested by HCPs
Thematic codes

GIA → HCP Interviews (N=18)

COM-B components linked to IFs of the BCW

Thematic codes categorised within IFs of the BCW

Thematic codes categorised within IFs of the BCW

Figure 4: The research process
6.6.1.1 Capability

Factors related to knowledge, memory, and cognitive skills influencing sharing behaviour mapped onto this component. Lack of knowledge about safe disposal of leftover/unused medicines, misconceptions about the safety of certain medicines and forgetting to refill or to carry around medicines that the patient is relying on were the ‘capability’ related factors influencing sharing behaviour.

6.6.1.2 Opportunity

This component captured social and physical environmental factors that promote or facilitate sharing behaviour. These included long waiting times at health facilities, the cost of medical visits, a lack of access to health facilities, a lack of time to see a doctor, language barriers and poor quality communication with healthcare providers. In addition, a lack of information from healthcare providers concerning the potential risks of sharing, medicine advertisements in the media, having the same medicines or illness as the other person, and having leftover, unused, or an oversupply of medicines were perceived to increase the likelihood of sharing medicines.

6.6.1.3 Motivation

Automatic or reflective brain processes that motivate sharing behaviour mapped onto this component. Altruism (i.e. desire to help others), illness denial, embarrassment about seeing a doctor or carrying around own medicines, habit, and fear of negative health consequences from missing a few doses of medicines were perceived by patients and healthcare providers to be the main motivators of sharing. In addition, according to the COM-B model hypothesis, all the capability and opportunity factors described above may motivate patients to share medicines.
### Table 12: Mapping factors influencing medicine sharing to COM-B components

<table>
<thead>
<tr>
<th>COM-B component</th>
<th>Factors influencing medicine sharing behaviour</th>
<th>Reported by:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Patient HCP</td>
</tr>
<tr>
<td>Capability - Physical</td>
<td>None reported by participants</td>
<td></td>
</tr>
<tr>
<td>Capability - Psychological</td>
<td>Forgetting to carry around own medicines</td>
<td>NR ✓</td>
</tr>
<tr>
<td></td>
<td>Forgetting to refill regular medicines on time</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td>Unaware of risks of sharing</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td>Misconceptions about the safety of certain medicines (e.g. people don’t always consider topical preparations, oral contraceptives, and inhalers as ‘real’ medicines)</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td>Not knowing what to do with leftover or unneeded medicines and passing them on to others</td>
<td>✓ NR</td>
</tr>
<tr>
<td></td>
<td>Sharing unintentionally (e.g. putting look alike medicines at the same place and sharing by mistake)</td>
<td>NR ✓</td>
</tr>
<tr>
<td>Physical opportunity</td>
<td>Having the same illness or the same medicines as the other person</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td>Being too busy to see a doctor</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td>Lack of access to health facilities or healthcare providers</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td>Having leftover or unneeded medicines</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td>Limited opening hours of local surgeries or pharmacies creates an opportunity for sharing medicines</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td>Sharing for medical conditions requiring immediate treatment - with a long waiting time for medical appointment</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td>To avoid the inconvenience of replacing prescription – for lost or misplaced medicines</td>
<td>✓ NR</td>
</tr>
<tr>
<td></td>
<td>Financial constraints limit the ability of patients to pay for doctors’ fees or prescription charges</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td>Traveling creates an opportunity for sharing as the person may not have easy access to their regular doctor or pharmacy</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td>Unnecessary prescribing (e.g. oversupply of opioid analgesics)</td>
<td>✓ ✓</td>
</tr>
<tr>
<td>Social opportunity</td>
<td>Medicine sharing is a form of social support during illness - caring relationship</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td>Embarrassment about seeing a doctor to get own medicines</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td>Illness denial and embarrassment to carry around own medicines</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td>Lack of information from healthcare providers (e.g. about safe disposal of leftover medicines or potential risks of sharing)</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td>Language barriers and poor patient – provider communication (e.g. cultural barriers)</td>
<td>✓ ✓</td>
</tr>
<tr>
<td></td>
<td>Children may learn sharing behaviour from their role models (e.g. from parents)</td>
<td>NR ✓</td>
</tr>
<tr>
<td></td>
<td>Direct to consumer advertisement influence</td>
<td>✓ ✓</td>
</tr>
</tbody>
</table>
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| Automatic-Motivation | Sharing in an emergency situation | ✓ | ✓ |
| Sharing medicines is an instinctive human behaviour | NR | ✓ |
| Reflective-Motivation | To comply with medicine regimen/running out | ✓ | ✓ |
| Altruistic reasons (e.g. to help others or to ensure the wellbeing of loved ones) | ✓ | ✓ |
| Fear of the consequences of discontinuing regular medicines (e.g. to avoid withdrawal effects of antidepressants) | ✓ | NR |
| Trialling the medicine before visiting a doctor to request a supply | ✓ | ✓ |
| Not sick enough to visit a doctor | ✓ | NR |
| Embarrassment about seeing a doctor to get own medicines | ✓ | ✓ |
| Illness denial and embarrassment to carry around own medicines | ✓ | ✓ |
| To ensure waste free-utilisation of resources | ✓ | NR |
| When only a few pills of the medicines are required | ✓ | ✓ |

*All definitions represent original definitions given by Michie et al. HCP = Healthcare provider NR = Not reported

6.6.2 Specific strategies to minimise the potential risks and harms of medicine sharing

Both patients and healthcare providers were asked to identify effective strategies to reduce the risks and harms of medicine sharing. The majority of the patients and healthcare providers interviewed suggested more than one strategy. Some of the strategies suggested by both groups were the same, and hence the results from both groups have been combined and presented together. Their suggestions were analysed thematically and classified into eight sub-themes.

6.6.2.1 Providing information about the potential risks and harms of sharing medicines

This theme captured educational strategies tailored to individual patients or the public, such as increasing knowledge about the risks of sharing or reducing misconceptions regarding the safe use of medicines.

Most patients reported that their knowledge of the risks and harms of medicine sharing was minimal, and highlighted the need to provide more information to the public. Some also committed to exploring more about the issue after the interview.
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I don’t think there is enough information out there to discourage people from sharing medicines. I never really thought about it until you asked me these questions. So next time when I go to the doctor I’m going to ask, like, “What do I do with this [leftover medicine] afterwards? Am I allowed to share it?” (P13, 29-year-old female patient)

Healthcare providers had similar opinions. Most of them believed that the public should know more about in what circumstances medicines can and cannot be shared.

Although there was little concordance about medicines perceived to be high risk, some patients suggested targeting high risk medicines and providing education commensurate with risk.

I think that it is something that has to be proportional to the risk. If, for example, they are going to find there will be a lot of people die in NZ because of medicine sharing then that would require some more strong action. (P12, 41-year-old male patient)

When healthcare providers were asked if they regularly informed patients about the risks of sharing, most of them stated that they did not often educate their patients about medicine sharing due to work load and limited consultation time. However, patients reported that they felt that healthcare providers could do more to inform their patients.

I think the least that could be done is if the doctors tell patients that they shouldn’t share, like it’s not even a thing that is said, the doctor should say, “Hey, you shouldn’t be sharing – this is for your personal use. It could have possible effects on other people.” ... Like they never directly tell you the risks of sharing medicines. (P14, 23-year-old female patient)

The above patient’s opinion was also supported by an experienced nurse in primary health care.

And we don’t really explain to patients enough, [we should say] “These pills are uniquely for you. This combination has been made up by the doctor based on your blood test results and you should take all of them. You shouldn’t give them to your brother because he is different to you.” Describing really in a simple language that they can understand. (P11, primary health care nurse)
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Some healthcare providers felt that medicine sharing is a nation-wide problem and suggested a national educational campaign to increase awareness.

So this is a huge problem nationwide, people are sharing medicine, it probably need to be addressed at national level through the Pharmacy Guild [an organisation which supports community pharmacy owners - http://www.pgnz.org.nz/] (P11, primary health care nurse)

6.6.2.2 Changing patients’ and healthcare providers’ attitudes towards the risks of sharing medicines

Apart from providing education, both groups of participants discussed the need to change patients’ and healthcare providers’ attitudes towards medicine sharing. Healthcare providers suggested putting posters or brochures in pharmacies and general practitioners’ surgeries illustrating the risks of sharing medicines, in order to persuade patients about the risks of sharing. However, one patient suggested that more patients would be informed if the information came verbally from the healthcare providers prescribing or dispensing the medicine rather than posters or brochures.

I would want the GP to tell me what it is because I think people, including myself, would listen to their GP and they trust their GP actually. At the pharmacy if I get told what to do about leftover medicine or if that medicine doesn’t work. That would be really good. (P15, 32-year-old male patient)

Explaining the potential risks of sharing to patients was perceived to have more impact in changing patients’ unsafe sharing behaviour than informing them only not to share.

Let people know about the risk of sharing medicines. I reckon that will have more impact on people rather than telling them not to do it. Because if you tell people the consequences of it, that will make a huge difference, and they will be able to see for themselves what can happen rather than telling them “Don’t do it.” (P18, community pharmacist)

Both groups of participants believed that the public is likely to pay attention to media advertisements and suggested this as a way to inform people about risks of sharing to change their unsafe medicine sharing behaviour.
I think educating people what medications can be shared and what medications should not be shared. For instance, having an advertisement saying “Sharing is not always caring.” (P08, emergency nurse)

Maybe advertising does work, maybe if you watch enough advertising it goes into your brain. (P06, 49-year-old female patient)

Participants also felt that the advertisements would be well received if they were ‘fronted’ by role models. One pharmacist suggested the advertisement should come from the Ministry of Health or Pharmacy Guild of NZ to be more credible.

Just what popped into my mind was seeing an ad on TV or something like that from the Ministry of Health saying, you know, you could have a couple and then contrast that to another group where their sharing’s unsafe. That would definitely encourage a conversation about sharing. (P17, hospital pharmacist)

It was also noted that targeting children at schools could have an impact in terms of changing the public’s attitudes towards sharing medicines.

While most of the interventions suggested by both group of participants were in line with a ‘harm reduction’ philosophy, there were some exceptions. For example, one nurse felt that non-threatening education, particularly for teenagers, might not be persuasive, and she suggested provoking fear by telling frightening stories about shared medicines. However, when asked about the potential effectiveness of such ‘fear appeal’ strategies, some patients felt that it may not work and suggested providing information targeted at high risk medicines instead.

Healthcare providers noted that the available evidence about harms from shared medicines is limited, and best practice guidelines do not mention the circumstances in which medicines can and cannot be shared. Therefore, they suggested providing facts and figures about harms related to sharing in order to change healthcare providers’ attitudes towards medicine sharing.

So if there is some studies where you can say we surveyed or a large study was done where 1,000 patients were surveyed and we found that 70% of them shared medicines – everyone would say ‘Wow, that’s a really big problem!’ (P15, hospital pharmacist)
6.6.2.3 Helping patients to assess risks of sharing and make an informed choice

Some healthcare providers believed that the final decision whether to share or not to share medicines is in the hands of patients and suggested helping them to understand the risks and benefits of their decisions and make an informed choice.

_We know that people share medicines, and if people are gonna do it, then they need to do it with information and education. I think it is important to talk about its advantages and disadvantages._ (P04, research nurse)

However, due to the risk of increasing antimicrobial resistance, most healthcare providers were against any form of antibiotics sharing.

It was noted that identifying patients engaging in sharing behaviour and communicating risk information to them requires directly seeking that information. For example, asking patients straightforward questions such as “Did you borrow medicines?” or asking them if someone in their family has the same illness and takes the same medicines at the point of dispensing or prescribing.

_I think when you’re taking a history of someone, you don’t ask about sharing, you know, you ask about what medicines do you get from the doctor? Over the counter, what herbal medicines, eye drops and inhalers? But I’m sure most people [healthcare providers] wouldn’t ask anything else that you borrow or share, you know, that would be really important._ (P15, hospital pharmacist)

6.6.2.4 Improving access to medicines and health services

Despite the availability of reduced doctors’ fees for those enrolled with a GP and a low cost access programme for some GPs in NZ, most participants suggested reducing or removing doctor’s fees and prescription charges for frequent users and for those on low incomes to encourage them to visit their doctors and obtain their own medicines.

_Bring down the cost of doctors’ visit; bring down the cost of medicines for patients who are on a lot of medicines. We need to help patients to get their medicine._ (P04, research nurse)

In addition, one doctor recommended sending prescription refill reminders to patients with financial problems who often miss medical appointments, to remind them to organise a new prescription for their regular medications.
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Like a reminder for smear tests, the prescriber or the pharmacist could electronically remind patients. That would be a practical way; people wouldn’t share but get their repeat prescription on time. (P14, doctor/obstetrician and gynaecologist)

Promoting the provision of emergency supplies from pharmacies (i.e. two or three days’ worth of regular medicines in circumstances where there was a genuine need) was suggested by some healthcare providers for patients who might have run out of prescribed medicines and be unable to visit their doctors in time to ensure an uninterrupted supply. However, some pharmacist participants were sceptical of the value of advocating this service.

I know as pharmacists we don’t really preach about the emergency supply because you don’t want people to be misusing it. But we only help them out when they come to us and they fit the criteria then only we give this. Because we don’t want to be giving the wrong message out there that, you know, it is okay come to us for emergency supply. (P18, community pharmacist)

6.6.2.5 Removing leftover or no longer needed prescription medicines

Removing leftover or unused medicines from patients’ homes was another recommendation made by healthcare providers to reduce the opportunity for sharing.

It’s maybe promoting like what to do with medicines once you’ve the medicines. Then like building awareness of what to do with medicines that you no longer need, you know, to take them back to the pharmacy for safe disposal rather than keeping them for a rainy day or giving them to someone else who might use it. (P17, hospital pharmacist)

Patients and pharmacists noted that one of the root causes of leftover medicines is an oversupply of medicines, and they suggested matching the amount of medicines supplied (e.g. pain medicines) to the actual need of the patient. One of the pharmacists noted the importance of asking patients if they think they are actually going to use the entire amount prescribed by doctors on the prescription and dispense according to their actual need (if the quantity is lower than the amount prescribed).

I’ll often say [to the patient], “Look the amount the doctor has written is this much – Do you think you’re going to need to keep taking it?” And they’ll often,
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nine times out of ten, they’ll say “I’m only going to need it for a few days” and they will want to have a smaller amount. (P15, hospital pharmacist)

Some patients were also of the same opinion.

I think maybe the doctor needs to know their patient. They should only give the amount the patient needs. (P06, 49-year-old female patient)

When patients were asked what would motivate them to take back leftover or unused medicines to pharmacies or GP surgeries, some patients reported that they would be more motivated to do so if there was a financial or moral incentive.

If you were taking medicines all the time then it probably wouldn’t be such an issue because you’d be going back to the pharmacy in three weeks or six weeks’ time for a repeat prescription. But if you happen to get an infection and got antibiotics and you had some leftover, I can’t see the person going back three weeks later and returning the rest of it to the chemist. However, if there was some sort of incentive for that, that might help, you know, if you return these many you get $5 off your next prescription or something like that. (P13, 29-year-old female patient)

I think maybe you could work on people’s moral obligations and if there was some sort of charity or something that those leftover medicines went to, [...] that might motivate people to return them. (P13, 29-year-old female patient)

However, none of the healthcare providers suggested incentive-based strategies.

6.6.2.6 Labelling and blister packaging

The inclusion of short cautionary phrases (e.g. “This medicine is only for you”) in patient information leaflets, on medicine bottles, lids, blister packs, or pharmacy bags was perceived by both groups of participants as an effective strategy to reduce sharing. However, most pharmacist participants voiced concerns that the label for most medicines is already too ‘busy’, patients are often already reluctant to read labels and if new information is added labels may become even less likely to be read by the patient.

I think people kind of know it’s something that they shouldn’t really do. Oh you know, they might say “Don’t tell my GP but I’ve just been using my wife’s medicine.” So I do think that people kind of know it’s not really the right thing
Blister packaging was also suggested by some healthcare providers to reduce medicine sharing practices related to patient confusion and forgetfulness.

### 6.6.2.7 Monitoring prescription and medication refill patterns

Although information about shared medicines cannot be directly obtained from TestSafe® (medical information sharing service used by some District Health Boards), some healthcare providers believed that discrepancies discovered when looking at prescription and dispensing records could provide information about the continuity of medicine supply which could indicate a patient’s medicine sharing practices.

> In a hospital often when I’m taking the medicine history, doing reconciliation, one of the resources I use is TestSafe®, which is an online record. If someone has been sharing or if they’ve used somebody else’s or they’ve got a build-up of a supply it won’t show up on their dispensing record so you’ll be talking to them and you’ll say, “Oh but the last time you picked this up was six months ago so where?” And they’ll say, “Oh I’ve been using my old supply, I’ve been using my wife’s and that’s why I haven’t picked any up.” Yeah so you will talk about it or address it if you come across it. (P17, hospital pharmacist)

Strengthening communication between doctors and pharmacists practicing in different settings was also viewed by some healthcare providers as a useful strategy to facilitate identifying patients who shared medicines.

> It’s good communication you need here, communication between GPs, hospital doctors, and community pharmacists. If you look at the GP prescription and if you ring to the GP and the pharmacist, then you can easily identify those who shared medicines. (P06, doctor/rheumatologist)

### 6.6.2.8 Legal strategies

Although prosecuting people for sharing medicines could be unrealistic and would not align with a ‘harm reduction’ philosophy, some participants perceived that informing
patients about the legal consequences of prescription medicine sharing during prescribing or at the point of dispensing would be more likely to reduce sharing intentions.

*Maybe explain to people that it is a breach of the Medicines Act because if you say that to people I’d like to think they’re more likely not to share medicines. (P13, 29-year-old female patient)*

*I know it’s illegal, but only few people [patients] do know about that, and so I think first and foremost that’s what we should be saying “It’s illegal to do this” and giving that information and education might be enough. (P12, primary health care nurse)*

However, some healthcare providers worried about this strategy; stating that it might promote dishonesty among patients, or deter them from disclosing their sharing practices to healthcare providers.

*No I don’t think it would be effective. I think negative reinforcement would not be effective in reducing the amount of people sharing medicines. I think that may promote more dishonesty. (P01, community pharmacist)*

### 6.6.3 Linking COM-B with intervention functions

The BCW provides a theory-based procedure for linking factors influencing sharing behaviour, identified by COM-B analysis, with intervention functions of BCW and specific intervention strategies suggested by participants. It allows intervention designers to be systematic in selection of interventions. After mapping factors influencing sharing to the COM-B model, relevant intervention options for each COM-B component were selected from a range of intervention functions of the BCW (see Table 10 for full range of intervention functions). Then, specific strategies suggested by participants (see section 6.6.2) were classified as corresponding to one (or more) of the BCW intervention functions. For example, strategies intended to empower patients were classified as ‘enablement’, and strategies aimed at changing patients’ attitudes were classified as ‘persuasion.’ Finally, the intervention functions comprising the specific strategies mapped to the COM-B model (see Table 13). None of the factors influencing medicine sharing mapped to ‘Capability – Physical’, and this component was not considered for further analysis. Non-modifiable factors or factors difficult to target by interventions, such as large household size affecting sharing were also excluded.
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As a final step the BCW suggests evaluating the affordability, practicality, effectiveness/cost-effectiveness, acceptability, side-effects/safety, and equity (APEASE criteria) of the interventions considered for changing behaviour, in the context of the target behaviour. Accordingly, the specific intervention strategies suggested by participants were evaluated and most of them would meet the APEASE criteria (see Table 13).

As can be seen from Table 13, a total of 27 specific factors influencing sharing behaviours mapped onto five components of the COM-B model. Initially, seven relevant intervention functions of the BCW were selected to address factors influencing sharing. These include environmental restructuring, enablement, education, persuasion, coercion, incentivisation and restriction. After evaluating against the APEASE criteria, ‘incentivisation’ and ‘coercion’ were found to be unrealistic and excluded. As mentioned above a number of specific strategies suggested by participants were classified under each of the five intervention functions and evaluated against the APEASE criteria, all except four strategies suggested by participants fulfilled the criteria.
<table>
<thead>
<tr>
<th>COM-B components</th>
<th>Factors influencing sharing</th>
<th>Intervention function of the BCW</th>
<th>Example of a specific intervention strategy suggested by participants</th>
<th>Does the specific intervention strategy meet APEASE criteria?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capability-Psychological</td>
<td>Forgetting to carry around own medicines</td>
<td>Environmental restructuring</td>
<td>Promoting the existence of emergency supplies available at pharmacies (i.e. two or three days’ worth of medicines)</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Forgetting to refill regular medicines on time</td>
<td>Enablement</td>
<td>Sending prescription refill reminders to patients to remind them to collect their repeat medicines</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Unintentional sharing</td>
<td>Enablement</td>
<td>Blister packaging</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Unaware of risks of sharing</td>
<td>Enablement</td>
<td>Educating patients/the public about the potential risks of sharing, and explaining in what circumstances medicines can and cannot be shared, e.g., through media advertisement</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Misconceptions about the safety of certain medicines</td>
<td>Education</td>
<td>Providing information on safe disposal of leftover or unneeded medicines at the point of dispensing</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Not knowing what to do with leftover or unneeded medicines and passing them on to others</td>
<td>Education</td>
<td>Empowering patients to help them decide when and when not to share medicines</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enablement</td>
<td>Including short stark warnings about the risks of sharing on the medicine label or the medicine package/bag</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Persuasion</td>
<td>Advertisements on television/radio to change the public attitude towards the significance of the risk of sharing</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enablement</td>
<td>Putting signs/posters in pharmacies to inform people about the potential risks of medicine sharing</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Coercion</td>
<td>Provoking fear by informing patients about the negative consequences of shared medicines</td>
<td>Unlikely to be effective</td>
</tr>
</tbody>
</table>

Table 13: Linking COM-B components, factors influencing sharing behaviour, intervention functions and specific intervention strategies suggested by participants
<table>
<thead>
<tr>
<th>Reflective-Motivation</th>
<th>For altruistic reasons</th>
<th>Education</th>
<th>Educating patients about the risks of sharing in a non-confrontational way</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Coercion</td>
<td>Informing the patient that sharing prescribed medicines is illegal</td>
<td>Unlikely to be effective</td>
</tr>
<tr>
<td></td>
<td>Fear of the consequences of discontinuing regular medicines</td>
<td>Education</td>
<td>Educating about the potential risks of using prescription medicines meant for another person</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Trialling the medicine before visiting a doctor to request a supply</td>
<td>Persuasion</td>
<td>Explaining risks of sharing and providing facts and figures in a non-judgmental manner (without judging their sharing behaviour as ‘good’ or ‘bad’) to change patient’s attitude towards safe use of medicines</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Illness denial and embarrassment to seeing a doctor or carry around medicines</td>
<td>Enablement</td>
<td>Empowering patients to take care of their own health through providing more medicine information</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>To comply with medicine regimen/running out</td>
<td>Education</td>
<td>Advertisements on television/radio to raise public awareness about the potential risks of sharing</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enablement</td>
<td>Sending prescription refill reminders to patients who often miss picking up their refills to remind them to collect their repeat medicines</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Not sick enough to visit a doctor</td>
<td>Enablement</td>
<td>Empowering patients to make appropriate self-management decisions</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Education</td>
<td>Educating patients about the risks of sharing in a non-confrontational way</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>To ensure waste free-utilisation of resources</td>
<td>Education</td>
<td>Explaining to patients the risk of passing leftover prescription medicines on to others</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>When only a few pills of the medicines are required</td>
<td>Education</td>
<td>Educating the public about the potential risks of using another person’s medicines</td>
<td>Yes</td>
</tr>
<tr>
<td>Physical Opportunity</td>
<td>Enabling Factors</td>
<td>Implementation Strategies</td>
<td>Status</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>-----------------</td>
<td>---------------------------</td>
<td>--------</td>
<td></td>
</tr>
<tr>
<td>Having the same illness or the same medicines as the other person</td>
<td>Enablement</td>
<td>Including short sharp warnings about the risk of sharing on the medicine label or the package/medicine bag</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Affordability of medical visits or prescription charges</td>
<td>Enablement</td>
<td>Removing/further reducing the cost of medical visits for those who have financial problems</td>
<td>Yes, but needs political decision/policy change</td>
<td></td>
</tr>
<tr>
<td>Lack of access</td>
<td>Environmental restructuring</td>
<td>Shortening medical appointment waiting times at health facilities</td>
<td>May not be practical</td>
<td></td>
</tr>
<tr>
<td>Sharing for medical conditions requiring immediate treatment - with a long waiting time for medical appointment</td>
<td>Environmental restructuring</td>
<td>Promoting the availability of emergency supplies at pharmacies (i.e. two or three days’ worth of medicines)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>To avoid the inconvenience of replacing prescription – for lost or misplaced medicines</td>
<td>Environmental restructuring</td>
<td>Removing leftover or unneeded medicines from households</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Traveling</td>
<td>Environmental restructuring</td>
<td>Providing moral or financial incentives to patients to encourage them to return their leftover or unneeded medicines to local pharmacies/surgeries.</td>
<td>May not be affordable</td>
<td></td>
</tr>
<tr>
<td>Unnecessary prescribing (e.g. oversupply of medicines)</td>
<td>Restriction</td>
<td>Matching prescribing quantities to the actual need of the patient (such as avoiding oversupply of pain medicines)</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Persuasion of prescribers/pharmacists</td>
<td>Providing facts and figures about harms related to sharing to change healthcare providers’ attitude towards medicine sharing</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Social opportunity</td>
<td>Problem Description</td>
<td>Enablement</td>
<td>Solution Description</td>
<td>Effective?</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>----------------------------------------------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Social support</td>
<td>Social support during illness</td>
<td>Enablement</td>
<td>Empowering patients to decide when to share or not to share medicines</td>
<td>Yes</td>
</tr>
<tr>
<td>opportunity</td>
<td>Lack of information from healthcare providers (e.g. about safe disposal of unneeded medicines or potential risks of sharing)</td>
<td>Enablement</td>
<td>Asking straightforward questions to encourage patients to disclose their sharing practices (e.g. Did you borrow medicines?)</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enablement</td>
<td>Promoting medicine reconciliation and the use of electronic medicine record systems by healthcare providers to facilitate identifying patients who might share medicines</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enablement</td>
<td>Identifying and eliminating communication barriers between patients and healthcare providers</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Enablement</td>
<td>Raising awareness amongst healthcare providers about the risks of sharing medicines</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Environmental restructuring</td>
<td>Enablement</td>
<td>Strengthening communication mechanisms between GPs, hospital doctors, and community pharmacists to make the identification and management of patients who share medicines easier</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Language barriers and poor patient – provider communication</td>
<td>Enablement</td>
<td>Identifying and eliminating communication barriers</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td>Direct to consumer advertisement influence</td>
<td>Enablement</td>
<td>Empowering patients to make appropriate self-treatment decisions</td>
<td>Yes</td>
</tr>
</tbody>
</table>
6.7 Discussion

There is growing research evidence about potential risks of medicine sharing.2-5,13,16 However, no one has yet proposed comprehensive interventions to reduce the risks and harms associated with sharing medicine. Previous attempts to understand medicine sharing behaviour have tended to be ‘atheoretical’ and have not provided appropriate targets for intervention.2,12-15,32,45 To address these gaps, this study applied the BCW to the opinions of patients and healthcare providers about this complex issue. Although the BCW is a relatively new framework, it has already attracted considerable research attention.131,136,139 One of the reasons for this could be that the BCW was designed to be used by anyone, from any discipline, making it more accessible to researchers with a lack of in-depth knowledge of behaviour change theories.134

Overall, specific intervention strategies suggested by the study’s participants address four key issues: provision of patient/public education, healthcare providers’ awareness creation, improving medicines/healthcare access, and reducing the opportunity to share (such as collecting leftover medicines). Five of the intervention functions of the BCW (education, persuasion, enablement, environmental restructuring, and restriction) met the APEASE criteria suggesting they could realistically be used to deliver the specific intervention strategies suggested by participants. Although participants suggested ‘fear appeal’ strategies (coercion), such strategies alone are less likely to be effective in changing attitudes towards health behaviours.331 However, ‘fear appeal’ strategies might be effective if accompanied by direction towards a healthier behaviour,331 for example, educating teens about the risks of sharing pain medicines to ‘get high’, and informing them of the legal consequences of engaging in such behaviour (coercion).

Given the diversity of factors influencing sharing behaviour, it is highly unlikely that one intervention strategy will influence all forms of sharing behaviour. For instance, for young patients with asthma, two of the reasons suggested by this study’s participants for sharing inhalers were illness denial and embarrassment about carrying around reliever inhalers. Therefore, one possible intervention would be empowering young people to take responsibility for their own health (enablement). On the other hand, for patients who store and give their leftover or unused medicines to another person, collecting or removing leftover or unused medicines from households (environmental restructuring) is more likely to reduce the occurrence of sharing medicines.
This study has proposed a number of potential strategies to reduce the risks and harms associated with medicine sharing; however, the strategies need to be designed to fit the local context and to be evaluated against the APEASE criteria. For example, offering financial incentives to patients contingent upon the occurrence of target behaviour has been shown to be effective in improving health behaviours such as medication adherence. This strategy is likely to encourage patients to return their leftover medicines to pharmacies, and hence reduce the opportunities for sharing. However, due to limited health budgets, providing financial incentives to patients may not be feasible or sustainable as a long-term intervention.

Some participants prioritised educating patients and the public not to share medicines. However, medicine sharing is a part of wider social interactions and this strategy does not deal with the social aspects of sharing. Moreover, in some instances the benefits of sharing might outweigh the risks; for example, advising people not to share medicines may be counterproductive in an emergency situation or when medicines are temporarily unavailable from pharmacies. In these situations, helping patients to make educated medicine sharing decisions would be more likely to reduce harm. As one of the nurses noted, withholding safe medicine sharing information from patients is unreasonable. However, during consultations, healthcare providers should bear in mind that there is no clear boundary separating sharing with harmful consequences and sharing with beneficial consequences. Therefore, they should try to identify, on a case by case basis, which medicines can be shared or should not be shared.

Raising healthcare providers’ and the public’s awareness of the risks of sharing through the use of posters, leaflets, workshops, and symposia was also viewed by participants as a useful strategy, and is in line with ‘harm reduction’ philosophy. Hodgetts et al suggested integrating the issue into existing guidelines for health professional training.

In the present study healthcare provider participants stated that advising patients about the potential risks of sharing was not a priority in their practices. Moreover, available best practice guidelines and medicines-related regulations (e.g. USA FD & C Act and Medicines Act of NZ) do not precisely specify the situations where medicines can or cannot be shared; thus it may be confusing for less experienced practitioners to knowledgeably advise patients who intend to share their medicines.
Chapter 6 Medicine sharing harm-reduction interventions

Researchers in the past have noted the need to examine the cost of healthcare access and the existence of specific cultural barriers in order to minimise medicine sharing practices, particularly for immigrants, those with low incomes, and indigenous ethnic groups. Likewise, in the current study participants suggested reducing the cost of GP visits, shortening waiting times at health facilities, and promoting the provision of emergency medicine supplies at pharmacies as strategies for improving access. A formal, legalised emergency medicine supply service is currently available across all pharmacies in NZ. To be eligible for emergency supply, the medicine has to have been prescribed by NZ registered doctor and to be taken regularly by the patient. However, the service is not subsidised by the Government, and some of the interviewed doctors and nurses were unaware of its existence. Thus, it would be useful to investigate further the advantages and disadvantages of providing emergency supplies of prescription medicines at pharmacies and the promotion of the service.

In NZ, many of the patient information leaflets for prescription medicines contain a warning statement “Do not give this medicine to anyone else, even if his or her symptoms seem similar to yours.” This statement is intended to prevent patients from sharing medicines; however, the statement does not specify compelling situations where sharing could be justified and total elimination of medicine sharing practices is likely to be unachievable. Therefore, applying proactive approaches focusing on harm reduction may be a more realistic and beneficial strategy, and participants suggested a range of such interventions. These included putting brief stark phrases about the risks associated with medicine sharing on medicine bottle or bag/packaging, collecting unused/leftover medicines from patients’ homes, matching prescribing quantities to the actual need of the patient, providing prescription refill reminders, and helping patients to assess the risks of sharing and make informed choices. Strategies promoting the use of electronic patient medication records, and medicine reconciliation activities may also support harm reduction efforts. Similar approaches have been suggested by other researchers, for example, promoting the safe disposal of leftover medicines through public awareness campaigns and incorporating information about the risks of sharing in the medicine label.
6.8 Limitations

The study has some limitations. First, identifying reasons for sharing does not provide evidence of the actual influence of each factor on patients’ sharing practices. Second, this study was conducted in a developed country setting. Other reasons for medicine sharing may exist in other settings, for example, in a developing country setting, where there may be different healthcare systems, cultures, and/or healthcare access. Third, even though the overall interpretation of the findings was guided by a ‘harm reduction’ approach, to avoid leading participants they were not explicitly asked their views on this approach. Had the participants been asked to comment on the applicability of ‘harm reduction’ approach for non-recreational medicine sharing, this may have influenced their responses. Fourth, following the development of codebooks for the interview transcripts, the lead researcher was solely accountable for coding the remaining sets of data and for mapping the thematic codes onto the COM-B components. This process, however, was supervised and regularly reviewed by the supervisors. Despite these limitations, the study had strengths. This is, to the lead researcher’s knowledge, the first study to apply a behaviour change theory to conceptualise the factors influencing medicine sharing practices and to propose potential interventions and, therefore it offers a new way of thinking about medicine sharing behaviour.

6.9 Summary

Analysis using the BCW offered insights into the personal (such as knowledge, attitude, or motivation) and environmental factors (such as cost, socio-cultural, or health system) influencing sharing behaviour, and a means by which theoretically underpinned interventions could be proposed. Apart from providing a framework to design medicine sharing intervention, the BCW may provide an explanation for the mechanism of change and a systematic procedure for evaluating the effect of an intervention and for replication in different contexts.134

Finally, the available data suggest that medicine sharing is inevitable and abolishing sharing practices might be unachievable. Therefore, focusing on minimising the potential harms of sharing high risk medicines seems to be a realistic alternative. The next chapter will present the results of the quantitative phase, which is an online survey with patients.
CHAPTER 7. AN ONLINE SURVEY OF NEW ZEALAND ADULTS’ MEDICINE SHARING BEHAVIOURS

7.1 Chapter overview

This chapter contains the quantitative part of this research. It starts by reviewing literature on medicine sharing, then explores in detail how the qualitative findings informed the quantitative phase, and leads into the rationale for conducting the survey. The chapter then describes the method adopted for quantitative data collection and analysis, paying particular attention to the survey instrument development, participant recruitment and the statistical techniques used to analyse the data. The sociodemographic characteristics of the sample, together with the descriptive and inferential results are then presented, including the extent and reasons for sharing and storing leftover medicines, and the consequences of sharing, PCA of items assessing attitudes towards borrowing and lending, and predictors of borrowing and lending behaviours. The survey findings and available literature are then compared and potential interpretations are offered. Finally, the limitations of the study are described and the major findings are summarised.

7.2 Introduction

NZ is a developed nation and NZ citizens have relatively easy access to healthcare, including medicines. However, previous investigations have indicated that prescription medicine sharing practices are widespread. These practices are likely to continue as various socioeconomic, behavioural and health system-related factors continue to foster them. There are, however, several potential risks associated with medicine sharing, particularly for high risk medicines. The qualitative phase of this research revealed several actual and potential negative consequences of medicine sharing, including adverse drug events, increase in microbial resistance, loss of medicine instructions and taking inadequate dose or wrong medicines. In addition, the results indicated that if those who share fail to seek medical care in a timely manner, disease diagnosis may be delayed and this may lead to disease complications. Most of these risks are of concern, for example, antimicrobial resistance due to medicine sharing may reduce the options available for treating common infections, increasing the risk of mortality and morbidity.
As has been discussed in preceding chapters, quantitative studies to date have noted several other negative outcomes of sharing. On the other hand, the qualitative phase findings indicated that sharing medicines can have benefits for participants, including strengthening social relationships, avoiding treatment costs and the inconvenience associated with medical visits, such as booking appointments. Therefore, if an ultimate goal is to reduce the risks and optimise the benefits of sharing, it is necessary that the extent and predictors of sharing behaviours be better understood.

To date, most reports regarding the prevalence rates of sharing have come from studies targeting specific populations, such as college students, women, children/adolescents, older people or urban residents. The prevalence of medicine sharing across these studies varied widely with some reporting figures as low as 5% in Australia to as high as 54.4% in Malaysia. These discrepancies in prevalence rates suggest the need for more context specific studies to estimate the extent of sharing behaviours.

Past research typically examined the relationship between sociodemographic factors and sharing behaviours. These factors (such as gender, age, ethnicity, education level, employment status, household income and household size) are important predictors, but do not capture the underlying causes of medicine sharing behaviours. In addition, the influence of having specific medical conditions on medicine sharing has been examined. However, little quantitative evidence is available describing the influence of psychosocial and behavioural factors on medicine sharing. For example, there has been no published study that has attempted to determine the influence of knowledge, beliefs and attitudes on medicine sharing, although such factors have been shown to be important determinants of other medication use behaviours, such as medication diversion and adherence.

The qualitative phase of this research revealed a myriad of psychosocial, behavioural, economic, and health system-related factors that contribute to medicine sharing, including altruism, limited access to healthcare, cultural and linguistic barriers, cost of medical visits, transportation cost and misconceptions regarding certain medicines. However, the relative importance of these factors in determining medicine sharing behaviours could not be determined from the qualitative data collected, hence a quantitative study was designed to explore this matter further.
Chapter 7 An online survey of NZ adults’ medicine sharing behaviours

Therefore, based on the qualitative phase findings and existing literature, a cross-sectional survey was designed to examine the extent of and reasons for sharing medicines, consequences, predictors of sharing behaviours and types of commonly shared medicines. Specifically, this study sought to add to the current body of knowledge by focusing on latent variables underlying sharing behaviours. The influence of previously identified, sociodemographic, health status-related variables on medicine sharing behaviours were also examined.

As has been indicated in Chapter 6, the COM-B model helped to systematically organise factors influencing sharing. This model has also been used to inform the items in the survey which assess attitudes about borrowing and lending medicines. However, it is important to note that this quantitative study has not attempted to examine whether the constructs of the COM-B model can predict medicine sharing behaviours. The model was only utilised as an overall framework to organise items assessing people’s decision to borrow or lend medicines under different hypothetical scenarios.

7.3 Aim of the study

The aim of this study was to assess prescription medicine sharing behaviours among a convenience sample of adults.

7.4 Objectives

The objectives of this study were:

- To determine the extent of both lifetime and past-year medicine borrowing and lending behaviours
- To assess the types of commonly shared medicines, reasons for sharing and negative health consequences of sharing
- To use the COM-B model, and results from the qualitative studies and the systematic review findings to create questionnaires to assess underlying factors for medicine borrowing and lending
- To use factor analysis to explore latent variables underlying medicine borrowing and lending behaviours among adults
- To identify both modifiable and non-modifiable predictors of medicine borrowing and lending behaviours
Chapter 7 An online survey of NZ adults’ medicine sharing behaviours

- To examine the extent and predictors of leftover prescription medicines storage practices

7.5 Methods

This study used an online, cross-sectional survey design to gather information regarding medicine borrowing and lending and leftover medicines storage practices among adults as well as participants’ attitudes and beliefs about prescription medicines sharing. The survey respondents were recruited through patient support groups and the University of Auckland email network. Detailed information on the methodological issues of study design, sampling, validity and reliability is presented in section 3.8 of Chapter 3. This section will only cover the specific methods and procedures related to the study.

7.5.1 Survey instrument development

Due to the lack of an existing questionnaire that fitted the study objectives, a new questionnaire was developed. Questionnaire development was informed by the previous qualitative studies’ findings and available literature. Several questions were included to assess different aspects of medicine borrowing, medicine lending, and leftover medicines storage practices (e.g. storing unused, unwanted or leftover medicines), respondents’ health status and socio-demographics. In addition, the questionnaire consisted of hypothetical questions assessing attitudes towards borrowing and lending, and the COM-B model was used to systematically organise these questions. The questions had either yes/no, 5 point Likert scales, multiple choice, ‘check all that apply’ or open ended formats. All questions were written using lay language and medical terminology was clearly defined. The draft survey questionnaire was subjected to expert review.

7.5.1.1 Expert review and piloting

The draft questionnaire was reviewed by two experts, specialising in pharmacy practice research, for content and clarity. Feedback from the experts resulted in the removal or rewording of problematic questionnaire items and the expansion of relevant topics. For example, based on the experts’ feedback, new questions were added to assess respondents’ general views on which classes of medicines were considered to be safe and not safe to be lent or borrowed. The feedback also helped to correct some grammatical errors and skip logics, and was used to simplify the definition of medical terminologies, such as
Chapter 7 An online survey of NZ adults’ medicine sharing behaviours

prescription medicine, borrowing, lending and sharing behaviours. Overall, the experts’ feedback improved the relevance and representativeness of items included in the questionnaire, and hence helped to assure optimal structure and accuracy of response options.

After the experts’ feedback had been considered and incorporated, the second drafts of the questionnaire and the pilot survey procedure were approved by the University of Auckland Human Participants Ethics Committee (Ref # 013536, see Appendix 8).

Following ethics approval, the questionnaire and the survey procedure were piloted on 15 people. The anonymous pilot survey link was sent via email to potential participants, and they were asked to complete the survey questions and provide feedback. Additionally, they were asked to comment on language, format, completion time, clarity, relevance and content. Particular attention was paid to hypothetical questions assessing attitudes towards borrowing and lending behaviours. Their feedback was collected online via comment boxes inserted below attitude questions assessing borrowing and lending and at the end of the survey. The piloting outcomes were used to determine the time required to complete the survey, visual appearance, clarity and relevance of survey items and helped to address grammatical and contextual errors, and the process improved face validity. In addition, the piloting was used to ensure the functionality of the online survey link. However, no major changes were made based on the pilot results. On average, the pilot survey required 15 minutes to complete.

7.5.1.2 The final questionnaire

The final version of the questionnaire (see Appendix 9) comprised a total of 78 questions, divided into six sections.

Section 1: Prescription medicine borrowing

There were two different sets of questions in this section. The first set of questions comprised 25 items that assessed respondents’ attitudes towards medicine borrowing using questions relating to hypothetical situations. The items were developed based on the previous qualitative study findings and the extant literature, and were grouped into sub-sections according to the different constructs of the COM-B model. Overall, this set of questions included five items assessing ‘psychological capability’ related factors that facilitate borrowing, eight items assessing ‘automatic’ and ‘reflective’ motivation for
medicine borrowing, and 12 items assessing ‘physical’ and ‘social’ environmental factors which create opportunity for borrowing. However, the COM-B constructs are not mutually exclusive and one item may measure more than one construct. Responses to the items were presented on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Three items (#5, #7 and #11) were negatively worded.

The second set of questions in this section included six items aimed at assessing the lifetime and past-year prevalence of medicine borrowing, intention to borrow medicine, types of borrowed medicines, frequency of borrowing, and reasons for borrowing. These questions were adapted from past research.\textsuperscript{1,2,12,13,18,32,45} Past published work mainly used a predetermined list to assess reason for borrowing\textsuperscript{1,2,12,13,18,32}; in contrast this study used an open-ended question to identify reasons for borrowing from respondents’ perspectives.

**Section 2: Prescription medicines lending**

This part of the questionnaire also contained two different sets of questions. The first set included 23 items assessing respondents’ attitudes towards lending medicines under different hypothetical situations. The items were created based on our previous qualitative studies and the COM-B model. The questions included four items assessing ‘psychological capability’ related factors that facilitate lending, 10 items assessing ‘automatic’ and ‘reflective’ motivations for medicine lending, and nine items assessing ‘physical’ and ‘social’ environmental factors that create opportunity for lending. As in the ‘borrowing’ section, the item responses were presented on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Six items (#32, #34 and #36, #37, #42 and #43) were negatively worded.

The second set of questions in this section included six questions to assess lifetime and past-year prevalence of lending, intention to lend medicines, types of lent medicines, frequency of lending, and reasons for lending. These questions were adapted from other studies.\textsuperscript{1,2,12,13,32,45} An open ended question was used to identify reasons for lending.

**Section 3: General views on medicine sharing**

This section contained two ‘check all that apply’ type questions assessing respondents’ views about the safety of borrowing and lending certain classes of medicines. The same list of medicines was included in the questions on borrowing and on lending.

**Section 4: Leftover medicines storage practices**
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This section contained four questions to assess leftover, unwanted or unused prescription medicines kept at the respondent’s home. Two questions assessing prevalence and reasons for storing such medicines were adopted from Braund et al.341 (questions Q63 and Q64), and the other two questions (Q65 and Q66) were developed specifically for this research.

**Section 5: General health**

This section contained four questions. Participants were asked if they had been prescribed any prescription medicines in the last 12 months and whether they currently had any health problems. In addition, they were asked if they had ever experienced any unusual side effects or allergies from using borrowed medicines, and if they had ever received advice about the risks of sharing from their doctor, pharmacist or nurse. Questions assessing prescription and health problems were adapted from previous research,32 and the other questions were generated by the research team. Those who had experienced unusual side effects or allergies from using borrowed medicines were asked to describe their experience(s).

**Section 6: Socio-demographic characteristics**

Seven questions were used to assess the demographic characteristics of survey respondents. Participants were asked for their gender, age, highest education level, ethnicity, household size, household income and if they were a health professional. The questions were taken from the previous study32 and the NZ national Census questionnaire.342 The inclusion of the socio-demographic variables in this study was based on our systematic review findings.17 An additional question was asked in this section to assess how participants had been made aware of the survey.

7.5.2 **Study population and recruitment**

The study population comprised adults living in NZ and who were aged 18 years or older. Participants were recruited primarily through patient support groups across NZ. Potential support groups were selected from a comprehensive list of patient support groups in NZ.343 Support groups which associated with common medical conditions were approached. Support groups for rarer disorders were excluded from the study as medicines are less likely to be shared for these disorders.2,32 Initially, the administrators of suitable support groups were contacted by telephone, and if they were interested in their support group taking part in the study they were sent a PIS. After reading the PIS, if they were willing
for their organisation to be involved in distributing the questionnaire to their members then they were asked to sign a consent form. The patient support group administrators were also asked to complete a short questionnaire (see Appendix 10) about their organisation. This short, predominantly demographic questionnaire, collecting information related to the support groups was not anonymous or web-based. The support group administrators were then asked to distribute information about the study, including the anonymous survey link, via any of their member e-networks such as group emails, e-newsletters and Facebook pages. Overall, 10 support groups were approached and six were willing to take part. The main reason for declining was not having active e-networks. Since the online survey response rate from support groups was low, participants were also recruited through specified University of Auckland email networks. Participants recruited through both methods had similar characteristics and the responses obtained from both groups were analysed together.

Three support groups distributed an initial survey invitation containing information about the study and the survey link to their members via email. Two groups distributed the survey through monthly e-newsletters and three groups publicised the study on their organisation’s Facebook page to their followers and members.

In all methods of recruitment, the research team had no direct contact with participants except in instances where they were contacted by potential participants for further information or clarification about the study, via email.

### 7.5.3 Survey procedure

The survey was administered through Qualtrics (www.qualtrics.com), an online survey platform available through the University of Auckland’s institutional subscription. Individuals who clicked on the survey link were directed to the first page of the survey where they were provided with brief information about the survey and instructions on how to proceed should they choose to take part. A PIS was presented on the second page of the survey, followed by questions assessing eligibility. To verify eligibility and voluntary participation, participants were asked if they had read and understood the PIS, if they were 18 years or older, if they were living in NZ, and if they agreed to take part in the study. Those who answered ‘Yes’ to all questions were considered to have provided consent and proceeded automatically to the main survey questions. Qualtrics was
Eligible participants were first asked about their medicine borrowing and lending behaviours, followed by questions assessing their general views on sharing, leftover medicines, and general health. Demographic questions were collected at the end of the survey. Qualtrics possesses dynamic routing capabilities, and the survey was programmed to present only questions relevant to a particular respondent, depending on their prior responses (skip logic). For example, only individuals who answered ‘yes’ to the question “Have you ever borrowed medicines?” would gain access to further ‘borrowing’ questions. Participants could skip any questions that they did not understand or did not want to answer. While completing the questionnaire, if they were interrupted, participants could return at later time to complete the survey.

After two weeks, for those who received the initial survey invitation via email the support group administrators sent an email thanking those who had completed the survey with a gentle reminder for others to complete the survey. After four weeks the group administrators sent a final reminder email to their members. For those who were recruited through the University of Auckland’s networks, the lead researcher sent two fortnightly follow up emails. The reminder emails resulted in increased response numbers. It was not possible to send reminders for e-newsletters and Facebook methods of recruitment.

To ensure anonymity, neither IP addresses nor any identifying information about respondents were collected. Finally, those who completed the survey were offered an opportunity to enter a prize draw to win one of five NZ $100 gift vouchers. Those who wished to take part in the prize draw were asked to provide their email address. To ensure anonymity, the survey responses and the email contact information were stored in two separate ‘databases’, and there was no way to link the survey responses to the contact information. Administration of the survey began on August 24, 2015 and remained open for six weeks.

7.5.4 Data management

Survey responses were recorded by Qualtrics and exported to SPSS version 23.0 for data screening and analysis. Then, an appropriate name and label were allocated to each of the variables. Apart from saving data entry time, Qualtrics ensured that respondents provided
one response per question, except for ‘check all that apply’ or open-ended questions. Anomalous responses, outliers and any repetitive response patterns (e.g. responding with all ‘1’ or ‘5’) were checked. Some respondents only answered a few questions and these entries were excluded from final analysis.

To minimise multicollinearity issues and to increase the number of respondents in each group, some of the categories of the categorical independent variables were combined. Accordingly, age was re-coded into four categories (i.e. < 35, 35 to 44, 45 to 64 and 65 or older) and household size categories were reduced into three categories (1 or 2 people, 3 people, and 4 or more people). Since the majority of respondents (78.8%) reported attending tertiary education, in order to make meaningful comparisons the remaining groups were combined and education status was re-classified into two categories (did not attend tertiary education vs attended tertiary education). Only four people reported an annual household income less than NZ $10,000, thus the original income categories were re-coded into four groups (≤ $30,000, $30,001 to $70,000, $70,001 to $100,000 and > $100,000). Over two thirds (69.6%) of the respondents identified themselves as NZ European, thus comparison of outcome measures by ethnicity was not appropriate.

Variables for current medical conditions were re-coded so that a respondent with a missing value for a medical condition (if the person did not respond or did not have a certain medical condition, SPSS consider it as missing value) was considered as not having that particular medical condition.

In the interest of multicollinearity, only six medical conditions were considered for inferential statistics. These included chronic pain, asthma, allergy, sleep problems, diabetes and high blood pressure. The decision to include or exclude a medical condition for each regression model was supported by Chi-square analysis outcomes and evidence from the literature.2,12,32,37,40,45

In order to assess past-year prescription status, respondents were asked whether they had received a prescription from a doctor during the past year. The majority (91.7%) of respondents reported having received a prescription. Therefore, due to the low numbers of respondents who had not received prescriptions, this variable was excluded from subsequent inferential statistics.

Finally, in the original survey, only those who had ever lent or borrowed were asked about their past-year lending and borrowing behaviours. However, for bivariabe and
multivariable analyses, variables assessing past-year borrowing and lending were re-
coded so that a missing value for each variable was considered as not engaging in
borrowing and lending in the past year.

Table 14 displays a summary of variables used in the survey. The variables consisted of
five binary outcome measures and 20 explanatory variables. The outcome variables were
(1) “Have you ever borrowed a prescription medicine from someone else?”, (2) “Have
you borrowed a prescription medicine in the last 12 months?”, (3) “Have you ever lent a
prescription medicine to someone else?”, (4) “Have you lent a prescription medicine in
the last 12 months?” and (5) “Have you got any leftover, unused, or unwanted prescription
medicine(s) in your household?” Responses to the outcome variables were coded as ‘0’
and ‘1’. A value of ‘0’ indicated that the person did not engage in the outcome behaviour.
In contrast, a value of ‘1’ indicated that the respondent engaged in the outcome behaviour.
The explanatory variables were two types: categorical and continuous. The categorical
variables included socio-demographics, current health status, and having leftover
medicines while the continuous variables included borrowing and lending attitude
subscales (the subscale creation procedure is discussed in section 7.6.12). As shown in
Table 14, similar sociodemographic and current health status-related variables were used
as explanatory variables for all outcome measures, while having leftover medicines was
used as an outcome measure by itself and as an explanatory variable for lending behaviour.
Different attitude subscales were used as explanatory variables for borrowing and lending
behaviours.

7.5.5 Data reduction and analysis

A number of statistical techniques were used to answer the research questions posed.
While frequencies and percentages were used to describe categorical variables, means and
standard deviations were used to describe continuous variables. This was followed by
bivariable analysis to examine: a) the relationship between two explanatory variables and
b) the association between each of the explanatory variables and each of the outcome
variables. The bivariable analysis technique involved cross-tabulations and logistic
regression, and the presence of association was determined using two-sided P-values, odds
ratios, and 95% confidence intervals.

The bivariable analyses resulted in several significant associations, but the outcomes were
less useful as the effect of confounders could not be controlled for. Thus, multivariable
Chapter 7 An online survey of NZ adults’ medicine sharing behaviours

analyses were conducted to examine the relationship between explanatory and outcome variables, controlling for potential confounders.

Table 14: Summary of explanatory and outcome variables used in the study

<table>
<thead>
<tr>
<th>Explanatory variables</th>
<th>Outcome variables</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Past-year borrowing</td>
</tr>
<tr>
<td>Sociodemographic</td>
<td>✓</td>
</tr>
<tr>
<td>Gender</td>
<td>✓</td>
</tr>
<tr>
<td>Education level</td>
<td>✓</td>
</tr>
<tr>
<td>Household income</td>
<td>✓</td>
</tr>
<tr>
<td>Household size</td>
<td>✓</td>
</tr>
<tr>
<td>Being a health professional</td>
<td>✓</td>
</tr>
<tr>
<td>Having leftover medicines</td>
<td>✓</td>
</tr>
<tr>
<td>Current health condition</td>
<td>✓</td>
</tr>
<tr>
<td>Chronic pain</td>
<td>✓</td>
</tr>
<tr>
<td>Asthma</td>
<td>✓</td>
</tr>
<tr>
<td>Allergy</td>
<td>✓</td>
</tr>
<tr>
<td>Sleep problems</td>
<td>✓</td>
</tr>
<tr>
<td>Diabetes</td>
<td>✓</td>
</tr>
<tr>
<td>High blood pressure</td>
<td>✓</td>
</tr>
<tr>
<td>Borrowing attitude subscales</td>
<td>✓</td>
</tr>
<tr>
<td>Access related issues</td>
<td>✓</td>
</tr>
<tr>
<td>Concern about missing doses</td>
<td>✓</td>
</tr>
<tr>
<td>Emotional Belief</td>
<td>✓</td>
</tr>
<tr>
<td>Perceived risk of harm</td>
<td>✓</td>
</tr>
<tr>
<td>Lending attitude subscales</td>
<td>✓</td>
</tr>
<tr>
<td>Willingness to help those who cannot afford medical care</td>
<td>✓</td>
</tr>
<tr>
<td>Concern for the wellbeing of others</td>
<td>✓</td>
</tr>
<tr>
<td>Beliefs about the benefits and safety</td>
<td>✓</td>
</tr>
<tr>
<td>Perceived risk of harm</td>
<td>✓</td>
</tr>
</tbody>
</table>

✓ Indicates an explanatory variable included in the logistic regression model containing each of the corresponding outcome variables

Three multivariable analysis techniques were applied. First, hypothetical questions assessing attitudes towards borrowing and lending behaviours were reduced into a smaller number of variables (components or factors) using PCA (see section 7.6.12). The PCA was also used to assess the construct validity of questions assessing attitudes towards borrowing and lending. First, the internal consistency of all retained items and of each of the extracted factors was determined using Cronbach’s alpha test. Second, items within each of the extracted factors were combined to create attitude composite scores (subscales). Third, logistic regression was used to examine independent associations
between explanatory and outcome variables so as to determine the relative influence of each explanatory variable on medicine borrowing and lending behaviours.

Findings of the logistic regression in this study are presented as odds ratios that show the factors that are associated with the odds of lifetime medicine borrowing behaviour, the odds of lifetime medicine lending behaviour, the odds of past-year medicine borrowing behaviour, the odds of past-year medicine lending behaviour, and the odds of leftover medicines storing practices, while controlling for all other explanatory variables in each logistic model. An alpha level of 0.05 (or 95% confidence level) was used to determine a significant association between explanatory and outcome variables. Odds ratios with values less than one indicated a negative association and greater than one a positive association between explanatory and outcome variables.

**Analyses of open-ended survey questions responses**

Responses to the open-ended survey questions were analysed by the lead researcher using a content analysis technique. The overall process is as follows. First, the responses to each open-ended question were extracted into separate Microsoft Word files and each participant’s responses were read thoroughly. Then, recurrent themes from an initial subset of responses were identified and an initial coding scheme was developed. Following this, the coding scheme was systematically applied to all participants’ responses. The initial coding scheme was reviewed and new codes were added as coding proceeded. Finally, the frequencies of each themes were counted to identify response patterns for each open-ended question. Generally, most participants’ responses to the open-ended questions were very short. In some cases their responses consisted of only a few words or phrases and did not provide the depth and details of information often associated with qualitative data.

7.6 Results

7.6.1 Final sample

A total of 368 individuals clicked on the survey link between 24 August and 08 October 2015, averaging eight clicks per day. Of those who viewed the survey, 284 (77.2% participation rate) individuals read the PIS and consented to take part in the survey. Of those who consented, 51 (18%) dropped out of the survey after reading the survey instructions; the remaining 233 (82%) responded to the first question of the survey. Of
those who started the survey, 217 responded to the last question of the survey (93.1%, 217/233, completion rate). Data from 233 respondents were analysed.

7.6.2 Accessing the survey

Two hundred and seventeen respondents indicated how they accessed the survey link (data missing in 16 cases). The majority of respondents (n=144, 66.4%) were recruited via support groups, email from support groups being the primary method of recruitment (n=88, 40.6%) followed by advertisement on a support group’s Facebook page (n=41, 18.9%). Forty respondents (18.4%) accessed the survey through the Auckland University email network (see Table 15).

<table>
<thead>
<tr>
<th>How did you access this survey?</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>It was emailed to me by a patient support group</td>
<td>88</td>
<td>40.6</td>
</tr>
<tr>
<td>From a patient support group Facebook page</td>
<td>41</td>
<td>18.9</td>
</tr>
<tr>
<td>University Junk email</td>
<td>40</td>
<td>18.4</td>
</tr>
<tr>
<td>It was emailed to me by a friend</td>
<td>17</td>
<td>7.8</td>
</tr>
<tr>
<td>From a patient support group webpage</td>
<td>8</td>
<td>3.7</td>
</tr>
<tr>
<td>Word of mouth</td>
<td>8</td>
<td>3.7</td>
</tr>
<tr>
<td>Patient support group e-newsletter</td>
<td>7</td>
<td>3.2</td>
</tr>
<tr>
<td>Other(s)</td>
<td>8</td>
<td>3.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>217</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

7.6.3 Sociodemographic characteristics

Two hundred and seventeen respondents completed questions related to demographics (data missing in 16 cases). The majority of respondents were female (n=157, 72.4%), had undertaken tertiary education (n=171, 78.8%) and self-reported being of NZ European (n=151, 69.6%) ethnicity. There was a relatively even spread across the age categories, with slightly more people being in the 18 to 34 years age brackets (n=77, 35.5%). Self-reported annual household income for more than half of the respondents (n=117, 53.9%) was less than the national average (NZ $93,880), although there were a substantial number (n=60, 27.6%) who reported an annual household income over NZ $100,000. The median and mode household size of survey respondents’ were 3.0 and 2.0 respectively, and 12.4% (n=27) identified themselves as health professionals. Table 16 provides the sociodemographic characteristics of survey respondents.
Chapter 7 An online survey of NZ adults’ medicine sharing behaviours

Table 16: Sociodemographic characteristics of survey respondents (N=217)

<table>
<thead>
<tr>
<th>Socio-demographic variable</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>60</td>
<td>27.6</td>
</tr>
<tr>
<td>Female</td>
<td>157</td>
<td>72.4</td>
</tr>
<tr>
<td><strong>Age in years</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 - 34</td>
<td>77</td>
<td>35.5</td>
</tr>
<tr>
<td>35 - 44</td>
<td>34</td>
<td>15.7</td>
</tr>
<tr>
<td>45 - 64</td>
<td>65</td>
<td>30.0</td>
</tr>
<tr>
<td>65 or older</td>
<td>41</td>
<td>18.9</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Zealand European</td>
<td>151</td>
<td>69.6</td>
</tr>
<tr>
<td>Māori</td>
<td>6</td>
<td>2.8</td>
</tr>
<tr>
<td>Samoan</td>
<td>2</td>
<td>0.9</td>
</tr>
<tr>
<td>Cook Island Māori</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Chinese</td>
<td>8</td>
<td>3.7</td>
</tr>
<tr>
<td>Indian</td>
<td>8</td>
<td>3.7</td>
</tr>
<tr>
<td>Other</td>
<td>41</td>
<td>18.9</td>
</tr>
<tr>
<td><strong>What is the highest education level you have achieved so far?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not attend tertiary education</td>
<td>46</td>
<td>21.2</td>
</tr>
<tr>
<td>Attended tertiary education</td>
<td>171</td>
<td>78.8</td>
</tr>
<tr>
<td><strong>What was your total household income before taxes during the past 12 months?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$30,000 or less</td>
<td>50</td>
<td>23.0</td>
</tr>
<tr>
<td>$30,001 - $70,000</td>
<td>67</td>
<td>30.9</td>
</tr>
<tr>
<td>$70,001 - $100,000</td>
<td>40</td>
<td>18.4</td>
</tr>
<tr>
<td>$100,001 or more</td>
<td>60</td>
<td>27.6</td>
</tr>
<tr>
<td><strong>How many people live in your family home including you?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 or 2 people</td>
<td>103</td>
<td>47.5</td>
</tr>
<tr>
<td>3 people</td>
<td>38</td>
<td>17.5</td>
</tr>
<tr>
<td>4 or more people</td>
<td>76</td>
<td>35.0</td>
</tr>
<tr>
<td><strong>Are you a healthcare professional?</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>27</td>
<td>12.4</td>
</tr>
<tr>
<td>No</td>
<td>190</td>
<td>87.6</td>
</tr>
</tbody>
</table>

### 7.6.4 Prescription status and current health conditions

A total of 217 respondents provided information about past-year prescription status. The majority of respondents (n=199, 91.7%) had been prescribed a medicine by a doctor in the past year, and 18 (8.3%) respondents had not. Females were five times more likely than males to report having a prescription (p=0.002). No significant associations were found between past year prescription status and respondents’ age or education level.

To assess respondents’ current health status, a list of medical conditions was provided to respondents and they were asked to indicate if they currently suffered from any of them. A respondent could tick more than one condition. Overall, 215 respondents provided
information about their medical conditions, and these are reported in Table 17. If respondents reported their medical condition as ‘other’ and described their specific condition in the ‘please specify’ section, it was re-classified based on the information provided. For example, if the reported medical condition was ‘hay fever’, it was re-classified as allergy. In addition, cystic fibrosis, arthritis, and thyroid problems were added to the original list of medical conditions. Allergy (n=62, 28.8%), asthma (n=54, 25.1%) and high cholesterol (n=49, 22.8%) were the three most frequently reported medical conditions. Nine respondents (4.2%) reported not suffering from any medical condition.

Table 17: Respondents’ current health status (N=215)

<table>
<thead>
<tr>
<th>Do you have any of the following medical condition(s)?*</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allergy</td>
<td>62</td>
<td>28.8</td>
</tr>
<tr>
<td>Asthma</td>
<td>54</td>
<td>25.1</td>
</tr>
<tr>
<td>High cholesterol</td>
<td>49</td>
<td>22.8</td>
</tr>
<tr>
<td>High blood pressure</td>
<td>48</td>
<td>22.3</td>
</tr>
<tr>
<td>Diabetes</td>
<td>48</td>
<td>22.3</td>
</tr>
<tr>
<td>Heartburn</td>
<td>42</td>
<td>19.5</td>
</tr>
<tr>
<td>Chronic pain</td>
<td>35</td>
<td>16.3</td>
</tr>
<tr>
<td>Skin condition</td>
<td>35</td>
<td>16.3</td>
</tr>
<tr>
<td>Sleep problem</td>
<td>31</td>
<td>14.4</td>
</tr>
<tr>
<td>Migraine</td>
<td>27</td>
<td>12.6</td>
</tr>
<tr>
<td>Mental health conditions</td>
<td>20</td>
<td>9.3</td>
</tr>
<tr>
<td>Cardiac (heart) condition</td>
<td>19</td>
<td>8.8</td>
</tr>
<tr>
<td>Cystic Fibrosis</td>
<td>15</td>
<td>7.0</td>
</tr>
<tr>
<td>Thyroid problem</td>
<td>14</td>
<td>6.5</td>
</tr>
<tr>
<td>Arthritis</td>
<td>13</td>
<td>6.0</td>
</tr>
<tr>
<td>Gout</td>
<td>9</td>
<td>4.2</td>
</tr>
<tr>
<td>Other(s)</td>
<td>19</td>
<td>8.8</td>
</tr>
<tr>
<td>I don't have any medical conditions</td>
<td>9</td>
<td>4.2</td>
</tr>
<tr>
<td>Total</td>
<td>549</td>
<td>255.3</td>
</tr>
</tbody>
</table>

*Respondents could report having more than one medical condition

7.6.5 Leftover prescription medicines storage practices

Two hundred and eighteen participants responded to questions pertaining to leftover prescription medicines storage practices. Just under three-quarters (n=157, 72%) of respondents reported that there were leftover medicines in their house at the time of the survey and 28% (n=61) said they did not have leftovers. The reasons provided for storing leftover medicines are displayed in Figure 5. Leftover medicines were mainly kept in case they were needed for future use (n=115, 73.2%), but a small number (n=13, 8.3%) of respondents reported that they kept leftover medicines to give away to someone who might need them.
Of the 218 respondents, 30.3% (n=66) reported ever receiving advice from a healthcare provider about the safe disposal of leftover medicines, 56.9% (n=124) answered they had not and 12.8% (n=28) could not remember. More than half of the respondents (n=116, 53.2%) said they had never returned leftover medicines to a pharmacy or GP, 43.6% (n=95) had returned and 3.2% (n=7) could not remember. In bivariable analyses, those who received instructions regarding safe disposal of leftover medicines were six times more likely to return their leftover medicines to a pharmacy or GP than those who never received instructions (p<0.001).

### 7.6.6 Extent of medicine borrowing and reasons for borrowing

Two hundred and thirty two respondents answered questions related to actual medicine borrowing behaviour. Of these respondents, 72.8% (n=169) reported that they would borrow someone else’s prescription medicines for any reason, and 27.2% (n=63) reported they would not.

Out of 232 respondents, 55.6% (n=129) reported having ever borrowed someone else’s medicines and 44.4% (n=103) said they never borrowed. Of the 232 respondents, 29.3% (n=68) reported borrowing in the past year, 70.7% (n=164) said they had not. Of those
Chapter 7 An online survey of NZ adults’ medicine sharing behaviours

who reported borrowing in the past year, 61.8% (n=42) did so on one or two occasions, 25% (n=17) on three to five occasions, and 11.8% (n=8) on six or more occasions (data missing in one case).

Painkillers (n=78, 60.5%) were the most commonly borrowed class of medicines by those who ever borrowed medicines, followed by allergy medicines (n=41, 31.8%), asthma medications (n=35, 27.1%) and antibiotics (n=32, 24.8%) (Figure 6). Some of the medicines categorised under ‘other’ category (N=14, 10.9%) included medicines for cold/flu, cystic fibrosis, thyroid and anxiety as well as different topical creams.

![Figure 6: Frequency of ‘ever borrowed’ by medication class (N=129)](image)

*Respondents could tick more than one option

Of those who ever borrowed medicines, 122 respondents answered the open-ended question asking about the reason(s) for borrowing (data missing in seven cases). The three most frequently reported reasons for borrowing were leaving own medications at home (n=26, 21.3%), having the same medicines or illness as the other person (n=22, 18%), and running out of previously prescribed medicines (n=22, 18%) (Table 18). A few respondents (n=5, 4.1%) also reported borrowing because they could not afford to see a doctor.
Table 18: Reasons for borrowing medicines among those who had ever borrowed* (N=122)

<table>
<thead>
<tr>
<th>Reasons for borrowing</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I left my medicines at home</td>
<td>26</td>
<td>21.3</td>
</tr>
<tr>
<td>Had the same medicines or illness as the other person</td>
<td>22</td>
<td>18.0</td>
</tr>
<tr>
<td>Running out of previously prescribed medicines</td>
<td>22</td>
<td>18.0</td>
</tr>
<tr>
<td>Sudden onset of illness (e.g. asthma attack, allergic reaction, etc.)</td>
<td>18</td>
<td>14.8</td>
</tr>
<tr>
<td>I was not sick enough to see a doctor</td>
<td>10</td>
<td>8.2</td>
</tr>
<tr>
<td>Got the medicine from a family member (or a friend)</td>
<td>10</td>
<td>8.2</td>
</tr>
<tr>
<td>I needed a few doses until I could see a doctor</td>
<td>9</td>
<td>7.4</td>
</tr>
<tr>
<td>Didn't have access to a doctor or a pharmacy</td>
<td>8</td>
<td>6.6</td>
</tr>
<tr>
<td>I couldn't afford to see a doctor</td>
<td>5</td>
<td>4.1</td>
</tr>
<tr>
<td>The lender had medicines that are no longer required</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>I misplaced or lost my own medicines</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>I wanted stronger or better medicines</td>
<td>4</td>
<td>3.3</td>
</tr>
<tr>
<td>Making an appointment to get a prescription takes a while</td>
<td>2</td>
<td>1.6</td>
</tr>
<tr>
<td>I needed the medicines for pain or sleep problems</td>
<td>2</td>
<td>1.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>142</td>
<td><strong>116.4</strong></td>
</tr>
</tbody>
</table>

*Respondents could provide one or more reasons

### Extent of medicine lending and reasons for lending

Two hundred and twenty two respondents answered the questions related to medicine lending behaviour. Of these respondents, 68.5% (n=152) reported that they would lend their prescription medicines to someone else, for any reason. In contrast, 31.5% (n=70) reported they would not lend.

Nearly half of the respondents (n=102, 45.9%) reported having ever lent a prescription medicine to someone else, while 54.1 (n=120) reported never lending medicines. Of the 222 respondents, just under one-third (n=72, 32.4%) of the respondents reported lending medicines during the past year and two-thirds (n=150, 67.6%) said they did not lend. Of those who lent in the past year, 65.3% (n=47) reported lending on one or two occasions, 22.2% (n=16) on three to five occasions and a small number (n=9, 12.5%) did so on six or more occasions.

Similar to the borrowing trend, painkillers (n=55, 53.9%) were the most frequently lent class of medicines by those who ever lent medicines, followed by allergy medicines (n=40, 39.2%), asthma medications (n=36, 35.3%) and antibiotics (n=14, 13.7%). Some of the medicines listed in the ‘other’ category (n=16, 15.7%) included those to treat depression, anxiety, epilepsy and constipation as well as different topical creams (see Figure 7).
Of those who ever lent medicines, 100 respondents provided answers to the question pertaining to reason(s) for lending medicines (data missing in two cases). The three most frequently reported reasons were “having the same medicines and medical problem as the borrower” (n=32, 32%), pain relief (n=20, 20%) and an emergency situation (n=16, 16%) (Table 19). Four responses were recorded under ‘other’ reasons category; these were convenience, better medicine, being asked by the other person, and the lender perceived to have adequate knowledge about medicines.

Table 19: Reasons for lending medicines among those who had ever lent (N=100)

<table>
<thead>
<tr>
<th>Reasons for lending</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>The person had the same problem and medication as me and had run out</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>It was for pain relief</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>It was an emergency situation</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>The person had left theirs at home</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>The person needed it but did not have access to the medicine</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>The person had no money to see a doctor</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>The person needed a few doses of the medicine until they get to a doctor</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>The medical problem was not serious enough to see a doctor</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>I didn't need it anymore</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>The person ran out of medicines while we were on holiday</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>The person did not have time to see a doctor</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Others</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>122</strong></td>
<td><strong>122</strong></td>
</tr>
</tbody>
</table>

*Respondents could provide one or more reasons*
7.6.8 Combined rates of lending and borrowing

Of all participants (N=233), nearly three in five (n=136, 58.4%) respondents reported having ever either borrowed or lent, and two in five (n=93, 39.9%) had either lent or borrowed in the past year. Over a third (n=88, 37.8%) reported both lending and borrowing during their lifetime, and one in five (n=47, 20.2%) had both lent and borrowed during the past year.

7.6.9 General views on medicine sharing

A list of medicines was provided to respondents and they were asked to indicate which medicines they believed were safe and not safe to lend or borrow; 212 respondents provided responses. Cardiac (heart) medications (n=181, 85.4%), blood pressure medications (n=171, 80.7%) and diabetes medications (n=157, 74.1%) were the medicines which respondents most commonly selected as being ones which they would never lend or borrow. A small number of respondents (n=10, 4.7%) indicated that they “would lend or borrow any prescription medicines.” In contrast, painkillers (n=128, 60.4%), allergy medicines (n=76, 35.8%), and asthma medicines (n=76, 35.8%) were the medicines most commonly perceived as being safe to be lent or borrowed. Thirty nine (18.4%) respondents perceived that all prescription medicines are not safe to be lent or borrowed (Table 20).

<table>
<thead>
<tr>
<th>What types of medicines would you never lend or borrow?*</th>
<th>Which medicines do you consider safe to lend or borrow?*</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Cardiac (heart) medicines</td>
<td>181</td>
</tr>
<tr>
<td>Blood pressure medicines</td>
<td>171</td>
</tr>
<tr>
<td>Diabetes medicines</td>
<td>157</td>
</tr>
<tr>
<td>Cholesterol medicines</td>
<td>150</td>
</tr>
<tr>
<td>Antibiotics</td>
<td>140</td>
</tr>
<tr>
<td>Gout medicines</td>
<td>131</td>
</tr>
<tr>
<td>Contraceptive medicines</td>
<td>118</td>
</tr>
<tr>
<td>Acne medicines</td>
<td>94</td>
</tr>
<tr>
<td>Asthma medicines</td>
<td>88</td>
</tr>
<tr>
<td>Allergy medicines</td>
<td>78</td>
</tr>
<tr>
<td>Painkillers</td>
<td>46</td>
</tr>
<tr>
<td>Other(s)</td>
<td>10</td>
</tr>
<tr>
<td>I would lend or borrow any prescription medicines</td>
<td>10</td>
</tr>
</tbody>
</table>

Total 1374 648.1

Total 504 237.7

*Respondents could tick more than one option
Respondents were also asked whether they had ever received advice from healthcare providers about potential harms of borrowing and lending medicines. Of those who answered the question (n=217), almost four-fifths (n=173, 79.7%) reported never having received information from healthcare providers with one-fifth (n=44, 20.3%) having ever received information from healthcare providers. Older respondents (≥ 65 years) were 4.7 times more likely than those in 18 to 35 years age group to report receiving advice from healthcare providers about risks of lending or borrowing medicines (p=0.002). No significant associations were found between receiving advice about risks of lending or borrowing and respondents’ gender, education level or household income.

7.6.10 Negative experiences from borrowed medicines

Two hundred and seventeen respondents provided information about negative experiences from borrowing medicines; the majority (n=212, 97.7%) had never experienced any unpleasant or unexpected side effects or allergies from using someone else’s medicines. Only a few respondents (n=5, 2.3%) had experienced unpleasant or unexpected side effects or allergies from borrowed medicines, such as dizziness, nausea, fatigue, tight neck, vomiting, diarrhoea, confusion, loss of balance, and tummy upsets.

7.6.11 Participants’ attitudes towards borrowing and lending

As has been discussed in section 3.8.5 of Chapter 3, Likert items assessing participants’ attitudes towards borrowing and lending were scored as strongly disagree=1, disagree=2, neither agree nor disagree=3, agree=4 and strongly agree=5. Percentage distribution of participants' responses for each of the attitude statements can be obtained from Appendix 11. For the majority of items assessing lending and borrowing attitudes, responses were fairly evenly distributed, except for two of the 25 items assessing borrowing attitudes and one of the 23 items assessing lending attitudes. No response option had over 50% of the total responses in it.

The majority of the participants (n=210, 90.1%) agreed or strongly agreed with the statement “I am aware of the risks involved in using someone else’s prescription medicines without medical advice”, but a few respondents (n=16, 6.9%) disagreed or strongly disagreed with the statement. However, a large proportion of the respondents agreed or strongly agreed that it was OK to use someone else's prescription medicine if missing the doses of their medicine could have serious health consequences (n=161,
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69.1%), if they forgot to carry around their regular medicines (n=162, 69.6%) and in an emergency situation (n=152, 65.2%). Almost nine in 10 respondents (n=205, 88%) disagreed or strongly disagreed with the statement “I would feel embarrassed to have to carry prescription medicines around with me everywhere I go”, but a few respondents (n=10, 4.3%) either agreed or strongly agreed with the statement. Most of the respondents also ‘disagreed’ or ‘strongly disagreed’ (n=164, 70.4%) with the statement “I have experienced pressure from people around me to borrow prescription medicine from someone else.”

In relation to the statement “Throwing away unused prescription medicines is a waste of money”, responses were fairly polarised with 15.8% of responses being ‘strongly disagree’ and 14.4% ‘strongly agree.’ Most respondents agreed or strongly agreed (n=207, 93.2%) with the statement “I am aware of the risks involved in giving prescription medicines to someone else without medical advice”, and only few (n=10, 4.6%) agreed or strongly agreed with the statement “Medicine lending is second nature (a habit) to me.”

In addition, four in five respondents (n=185, 79.4%) disagreed or strongly disagreed with the statement “If a prescription medicine is being advertised in the media I would consider it safe to lend without a doctor’s approval.” However, the majority of the respondents ‘agreed’ or ‘strongly agreed’ with lending prescription medicines if the other person had forgotten to bring/pack medicines that they rely on (n=125, 56.3%) or if the person had an emergency situation (n=154, 69.4%). One in 10 respondents (n=25, 10.3%) agreed or strongly agreed with the statement “For me, prescription medicine sharing is a way of caring for others during a time of illness.”

7.6.12 Construction of scales measuring attitudes towards borrowing and lending behaviours

Principal component analysis was used to construct latent variables (factors) assessing attitudes towards medicine borrowing and lending and to test the construct validity of the factors. Since borrowing and lending are different behaviours, a separate PCA was conducted for each. As mentioned in section 3.8.7 of Chapter 3, the reliability of the attitude questions was checked using the Cronbach’s alpha test. The results are presented below.
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7.6.12.1 PCA for borrowing behaviour

A total of 233 cases provided valid responses for the 25 items assessing attitudes towards borrowing (9.3 cases per variable) and satisfied the sample size requirement for PCA. Prior to running PCA, the factorability of the 25 items was examined against several criteria (see section 3.8.7 of Chapter 3). Twenty two of the 25 items were moderately correlated (>0.3) with at least one other item, suggesting an adequate relationship among the items to justify the use of PCA. The diagonal of the anti-image correlation matrix was above the threshold value of 0.5, justifying the inclusion of each item in the PCA. The communalities were all above 0.3, further suggesting each item shared some common variance with other items. In the initial iteration of the PCA, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.902, which exceeds the minimum value of 0.5. The Bartlett test of sphericity ($\chi^2=3024.347$, df=300, $p<0.001$) indicated that there was an adequate relationship between the items to run meaningful PCA. All criteria indicated that the 25 items were factorable.

After determining the factorability of the items, an initial PCA of the 25 items assessing borrowing attitudes was conducted with Promax rotation and 0.40 factor loading threshold. As mentioned in section 3.8.7 of Chapter 3, multiple criteria were used to determine the number of factors to be extracted. The Kaiser’s criteria and the Scree test (Figure 8) suggested a five-factor solution that explained 61.81% of the total variance with eigenvalues of 8.509, 2.537, 1.736, 1.578 and 1.092 for the five factors respectively.

![Figure 8: Scree plot for PCA of the 25 items examining borrowing behaviour (N=233)](image)

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However, comparison of actual eigenvalues with eigenvalues of 100 randomly generated variables (using the Parallel Analysis method, see Table 21) indicated that only four of the five originally generated factors should be retained. Moreover, only one item was loaded onto the fifth factor, further supporting the decision to remove this factor.

Table 21: Monte Carlo parallel analysis of 25 items examining borrowing behaviour (N=233)

<table>
<thead>
<tr>
<th>Eigenvalue #</th>
<th>Random Eigenvalue</th>
<th>Standard Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.6558</td>
<td>.0580</td>
</tr>
<tr>
<td>2</td>
<td>1.5510</td>
<td>.0410</td>
</tr>
<tr>
<td>3</td>
<td>1.4690</td>
<td>.0385</td>
</tr>
<tr>
<td>4</td>
<td>1.4008</td>
<td>.0338</td>
</tr>
<tr>
<td>5</td>
<td>1.3436</td>
<td>.0291</td>
</tr>
<tr>
<td>6</td>
<td>1.2869</td>
<td>.0264</td>
</tr>
</tbody>
</table>

A second PCA with Promax rotation was completed fixing the number of factors to be extracted to 4.0. The total variance explained decreased to 57.44%. The result also indicated that three items (items # 2, #4, #23) did not meet the threshold factor loading, and an item (#7) co-loaded onto two factors; these four items were removed and the PCA was repeated. Further iterations of the PCA indicated that one more item (#24) did not meet the threshold loading and this item was also excluded. The final PCA model consisted of 20 items with a Cronbach’s alpha coefficient of 0.905 (items #5 and #11 were reverse coded for the reliability calculation only, and not for the factor analysis). This result suggested that the overall survey subscale consisting of items assessing attitudes towards borrowing is valid and reliable. The final PCA explained 64.69% of the total variance, a substantial improvement from the initial model of 61.81%. In addition, all communalities were above 0.4. Table 22 displays the factor loadings and communalities for the retained items.

Testing for the presence of outliers

To check for outliers, regression factor scores for each of the retained factors were computed, and those with values greater than ±3.0 were considered to be outliers. None of the factor scores for factors 1 and 2 fell outside the acceptable range. However, there were two cases that had scores greater than +3 for the third factor, and six cases had scores greater than +3 for fourth factor. To check if the presence of positive outliers could affect the four-factor solution reported in Table 22, all positive outlier cases were excluded and
Table 22: Factor loadings and communalities of the 20 items retained in the final PCA of medicine borrowing behaviour (N = 233)

<table>
<thead>
<tr>
<th>Items</th>
<th>Mean score</th>
<th>SD</th>
<th>Factor loadings</th>
<th>Communalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>#20. I would use someone else's prescription medicine if the waiting time to see a doctor was long.</td>
<td>2.39</td>
<td>1.148</td>
<td>.932</td>
<td>0.732</td>
</tr>
<tr>
<td>#17 I would use someone else's prescription medicine if I could not afford to visit a doctor.</td>
<td>2.75</td>
<td>1.262</td>
<td>.910</td>
<td>0.823</td>
</tr>
<tr>
<td>#18 I would use someone else's prescription medicine if I could not afford to pay for prescription charges.</td>
<td>2.69</td>
<td>1.283</td>
<td>.882</td>
<td>0.795</td>
</tr>
<tr>
<td>#19 I would use someone else's prescription medicine if my GP's surgery was located a long way away from me.</td>
<td>2.42</td>
<td>1.157</td>
<td>.878</td>
<td>0.785</td>
</tr>
<tr>
<td>#14 Paying to visit my doctor, when only a couple of doses of prescription medicines are required, is a waste of money.</td>
<td>2.73</td>
<td>1.299</td>
<td>.833</td>
<td>0.601</td>
</tr>
<tr>
<td>#16 I would use someone else's prescription medicine if I was too busy to see a doctor.</td>
<td>2.39</td>
<td>1.202</td>
<td>.820</td>
<td>0.739</td>
</tr>
<tr>
<td>#15 I would use someone else's prescription medicine if I was unwell late at night or at the weekend and I could not visit my regular GP.</td>
<td>3.14</td>
<td>1.218</td>
<td>.701</td>
<td>0.662</td>
</tr>
<tr>
<td>#13 I would use someone else's prescription medicine if missing doses of my own medicine could have serious health consequences.</td>
<td>3.66</td>
<td>1.172</td>
<td>.945</td>
<td>0.728</td>
</tr>
<tr>
<td>#3 If my health relied on me taking regular prescription medicines I would use someone else’s if I forgot to bring mine with me.</td>
<td>3.59</td>
<td>1.182</td>
<td>.903</td>
<td>0.734</td>
</tr>
<tr>
<td>#1 It is safe for a person to use someone else's prescription medicine if they are both taking the same medicine.</td>
<td>3.13</td>
<td>1.226</td>
<td>.783</td>
<td>0.644</td>
</tr>
<tr>
<td>#21 I would use someone else's prescription medicines if I had an emergency situation.</td>
<td>3.58</td>
<td>1.191</td>
<td>.757</td>
<td>0.628</td>
</tr>
<tr>
<td>#22 I would use someone else's prescription medicine if I was on a trip and I forgot to pack my medicine.</td>
<td>3.23</td>
<td>1.177</td>
<td>.726</td>
<td>0.702</td>
</tr>
<tr>
<td>#12 I feel the benefits of borrowing prescription medicines outweigh the potential harms.</td>
<td>2.38</td>
<td>1.014</td>
<td>.475</td>
<td>0.423</td>
</tr>
<tr>
<td>#8 I would feel angry if someone was unwilling to lend me a couple of doses of their prescription medicines.</td>
<td>1.94</td>
<td>.938</td>
<td>.786</td>
<td>0.537</td>
</tr>
<tr>
<td>#9 I would feel embarrassed to have to carry prescription medicines around with me everywhere I go.</td>
<td>1.57</td>
<td>.844</td>
<td>.752</td>
<td>0.462</td>
</tr>
<tr>
<td>#25 If a prescription medicine is being advertised in the media I would consider it safe to borrow without a doctor’s approval.</td>
<td>1.87</td>
<td>.917</td>
<td>.669</td>
<td>0.559</td>
</tr>
<tr>
<td>#10 If a prescription medicine worked for a friend with the same illness as me, I would borrow some of theirs to try it.</td>
<td>1.85</td>
<td>.995</td>
<td>.589</td>
<td>0.488</td>
</tr>
<tr>
<td>#6 Medicine borrowing is second nature (a habit) to me.</td>
<td>1.61</td>
<td>.830</td>
<td>.478</td>
<td>0.461</td>
</tr>
<tr>
<td>#5 I am aware of the risks involved in using someone else's prescription medicines without medical advice.</td>
<td>4.21</td>
<td>.905</td>
<td>.900</td>
<td>0.745</td>
</tr>
<tr>
<td>#11 I would be concerned that using a couple of doses of someone else's prescription medicine could negatively affect my own health.</td>
<td>3.76</td>
<td>.969</td>
<td>.811</td>
<td>0.691</td>
</tr>
</tbody>
</table>

| Eigen value | 7.526 2.378 1.658 1.375 |
| Total variance explained = 64.69%; Total Cronbach’s Alpha = 0.905 |

Note: Factor loadings < 0.4 were suppressed; Mean Score = Mean (Xi, Xii, Xiii, Xiv)
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The PCA was repeated. The result indicated that all of the communalities for the PCA excluding outliers were greater than 0.30 and satisfied the minimum requirement. Although factor loadings for each of the retained items were slightly smaller when outliers were excluded, the pattern of the items loadings did not change. Therefore, it was concluded that the presence of outliers had no impact on the overall factor structure and there was no need to exclude the outliers from the final model or to revise the final model.

Naming (labelling) the extracted factors

As shown in Table 22, the first factor consisted of seven items (Items #14 - #20) that asked respondents to rate the extent to which they agree with borrowing medicines when healthcare access, paying for a doctor’s fees or prescription charges is difficult. Thus, this factor was labelled, ‘Access-related issues.’ This factor explained 37.6% of the total variance and had an eigenvalue of 7.526. Items within this factor displayed excellent internal consistency with a Cronbach’s alpha coefficient of 0.933. Based on the average of all the seven items which had 0.40 or greater loadings on this factor, a composite mean score (subscale) was created. Higher mean scores for this subscale indicates a more positive attitudes about medicine borrowing when healthcare is difficult to access including when doctor’s fees or prescription charges are unaffordable.

Six items (Items #1, #3, #12, #13, #21, #22) loaded onto a second factor (eigenvalue = 2.378, variance explained = 11.9%). Most of these items asked respondents to rate the extent to which they agreed with borrowing medicines to avoid negative health consequences of missing doses of regular medicines or in emergency situations. This factor was labelled as ‘Concern about missing doses.’ Items within this factor displayed a Cronbach’s alpha coefficient of 0.877. Based on the average of six items, a subscale was created for this factor, with higher mean scores indicating more positive attitudes about borrowing if missing some doses of the medicine is concerning to the individual.

The third factor (eigenvalues=1.658, variance explained=8.3%) consisted of five items (#6, #8, #9, #10 and #25) that asked participants to indicate the extent to which they agree with different statements describing emotional beliefs about borrowing. Items 6, 8, and 9 were designed to examine the effect of emotion/habit on medicine borrowing. Item 10 measured beliefs about medicine borrowing for the same illness, and item 25 measured beliefs about borrowing advertised medicines. Hence, this factor was labelled, ‘Emotional belief about medicine borrowing.’ Items within this factor demonstrated a Cronbach’s
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alpha coefficient of 0.703. Based on the average of the five items, a subscale was created with higher mean scores for the scale indicating more positive emotional belief about borrowing.

The two items (#5 and #11) that loaded onto the fourth factor (eigenvalue =1.375, variance explained = 6.9%) asked respondents to indicate the extent to which they agreed with statements describing awareness about potential risks of borrowing and concern about the chance of experiencing negative health outcomes from borrowed medicines. This factor was labelled, ‘Perceived risk of harm’, and the two items demonstrated a Cronbach’s alpha coefficient of 0.624. Both items loaded onto this factor are negatively worded items, hence those who scored higher on this subscale were more likely to think that borrowing medicine is harmful.

The above four subscales were used in subsequent analyses as independent variables. Table 23 displays the composite mean scores for each of the subscales.

Correlation between borrowing attitude subscales

To assess how distinct each borrowing attitude subscale was from other subscales in the same matrix, Pearson’s bivariate correlation among all subscales was computed. The results indicated that there were weak to strong correlations between subscales, ranging from -0.060 between ‘perceived risk of harm’ and ‘concern about missing doses’ to 0.503 between ‘concern about missing doses’ and ‘access-related issues’ (Table 23). Presence of strong correlations between the subscales, supported our initial assumption of using oblique (Promax) rotation.

<table>
<thead>
<tr>
<th>Attitude subscales</th>
<th>Number of items</th>
<th>Mean</th>
<th>SD</th>
<th>Chronb’s Alpha</th>
<th>Access-related issues</th>
<th>Concern about missing doses</th>
<th>Emotional belief</th>
<th>Perceived risk of harm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access-related issues</td>
<td>7</td>
<td>2.65</td>
<td>1.03</td>
<td>0.933</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Concern about missing doses</td>
<td>6</td>
<td>3.26</td>
<td>0.91</td>
<td>0.877</td>
<td>0.503**</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Emotional belief</td>
<td>5</td>
<td>1.76</td>
<td>0.61</td>
<td>0.703</td>
<td>0.461**</td>
<td>0.368**</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Perceived risk of harm</td>
<td>2</td>
<td>3.99</td>
<td>0.81</td>
<td>0.624</td>
<td>-0.218**</td>
<td>-0.060</td>
<td>-0.169**</td>
<td>1</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed)
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Overall, the findings presented in this section demonstrate that the hypothetical questions assessing attitudes towards borrowing behaviours were valid and reliable.

7.6.12.2 PCA for lending behaviour

A total of 222 cases provided valid responses to questions (Q32 to Q54) assessing attitudes towards lending behaviour (9.7 cases per item) and satisfied the minimum sample size requirement. Eleven cases did not answer questions assessing attitudes towards lending behaviour and were excluded from analysis. Initially, the factorability of the 23 items was checked. Nineteen of the 23 items had at least a 0.3 correlation with one other item, suggesting factorability of the items. The diagonals of the anti-image correlation matrix were all above 0.6 exceeding the minimum threshold value of 0.5. The communalities for all items were above 0.4, supporting that each item shared common variance with other items. The KMO’s measure of sampling adequacy was 0.877, and Bartlett’s test of sphericity was significant ($\chi^2=2513.388, \text{df}=253, p < 0.001$), supporting an adequate relationship between the items to run PCA. The above indicators strongly supported that all the items could be subjected to PCA.

After determining the factorability of the items, an initial PCA of 23 items examining lending behaviour was conducted with Promax rotation and 0.40 factor loading threshold, and the results were evaluated against predetermined criteria.

Discrepancies were observed among the criteria used to determine the number of factors to be extracted. The Kaiser’s criteria suggested a five-factor solution that explained 62.21% of the total variance with eigenvalues of 7.80, 2.11, 2.06, 1.24 and 1.09 for the five factors respectively. Visual inspection of the scree plot suggested a four-factor solution (Figure 9). Only the first three of the Kaiser’s eigenvalues surpassed the eigenvalues of randomly generated variables by parallel analysis (Table 24), suggesting only three factors should be retained. As indicated in section 3.8.7 of Chapter 3, the Parallel Analysis provides superior estimate over all the other methods, and initially it was decided to extract three factors. However, the three-factor solution resulted in removal of more than 10 items and only explained 52.09% of the total variance. Moreover, the factor structure was difficult to label and interpret. Hence, based on the Scree test, a four-factor solution was tried and resulted in a better factor structure and so was adopted for further analysis.
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Figure 9: Scree plot for PCA of the 23 items examining lending behaviour (N=222)

Table 24: Monte Carlo parallel analysis of the 23 items examining lending behaviour (N=222)

<table>
<thead>
<tr>
<th>Eigenvalue #</th>
<th>Random Eigenvalue</th>
<th>Standard Dev</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1.6330</td>
<td>.0614</td>
</tr>
<tr>
<td>2</td>
<td>1.5176</td>
<td>.0402</td>
</tr>
<tr>
<td>3</td>
<td>1.4420</td>
<td>.0358</td>
</tr>
<tr>
<td>4</td>
<td>1.3736</td>
<td>.0320</td>
</tr>
<tr>
<td>5</td>
<td>1.3142</td>
<td>.0309</td>
</tr>
<tr>
<td>6</td>
<td>1.2549</td>
<td>.0267</td>
</tr>
</tbody>
</table>

The PCA was repeated setting the number of factors to be extracted to 4.0. This model explained 57.49% of the variance. However, three items (#32, #34 and #40) loaded onto more than one factor, and an item (#41) did not meet the threshold factor loading value of 0.40. The PCA was repeated excluding the four problematic items. Three more items were removed due to co-loading (#49 and #50) or not achieving the factor loading threshold (#38). Because of co-loading, items designed to assess knowledge about risks of lending (#32) and its legal consequences (#34) were also removed. The final four-factor solution consisted of 16 items with an overall Cronbach’s alpha of 0.897. To calculate Cronbach’s alpha, items phrased negatively (#36, #37, #42 and #43) were reverse coded. The final model explained 68.89% of the total variance, a substantial improvement from the initial model of 57.49%. In addition, all communalities were above 0.5. Table 25 displayed factor loadings and communalities for the retained items.
Table 25: Factor loadings and communalities of the 16 items retained in the final PCA of medicine lending behaviour (N = 222)

<table>
<thead>
<tr>
<th>Items</th>
<th>Mean score</th>
<th>SD</th>
<th>Factor loadings</th>
<th>Commnality</th>
</tr>
</thead>
<tbody>
<tr>
<td>#47 If someone could not afford to visit a doctor I would lend them a couple of doses of my prescription medicines.</td>
<td>2.52</td>
<td>1.136</td>
<td>.959</td>
<td>0.859</td>
</tr>
<tr>
<td>#48 If someone could not afford to pay for prescription charges I would lend them a couple of doses of my prescription medicines.</td>
<td>2.48</td>
<td>1.136</td>
<td>.943</td>
<td>0.871</td>
</tr>
<tr>
<td>#46 If I had leftover, unused, or unwanted prescription medicines I would pass them on to someone who might need them.</td>
<td>2.24</td>
<td>1.190</td>
<td>.875</td>
<td>0.719</td>
</tr>
<tr>
<td>#53 For me, prescription medicine sharing is a way of caring for others during a time of illness.</td>
<td>2.15</td>
<td>1.025</td>
<td>.559</td>
<td>0.672</td>
</tr>
<tr>
<td>#33 I would lend my prescription medicines if someone forgot medicines that they rely on.</td>
<td>3.34</td>
<td>1.142</td>
<td>.866</td>
<td>0.788</td>
</tr>
<tr>
<td>#51 I would lend my prescription medicines if someone had an emergency situation.</td>
<td>3.63</td>
<td>1.105</td>
<td>.860</td>
<td>0.735</td>
</tr>
<tr>
<td>#45 I would lend a couple of doses of my prescription medicines if someone ran out of their prescription medicines.</td>
<td>3.14</td>
<td>1.183</td>
<td>.775</td>
<td>0.763</td>
</tr>
<tr>
<td>#39 It would be difficult for me to refuse to lend my prescription medicine to someone, knowing that they are sick and in need of the medicine.</td>
<td>3.05</td>
<td>1.206</td>
<td>.681</td>
<td>0.578</td>
</tr>
<tr>
<td>#52 If a prescription medicine is being advertised in the media I would consider it safe to lend without a doctor's approval.</td>
<td>1.87</td>
<td>.901</td>
<td>.840</td>
<td>0.662</td>
</tr>
<tr>
<td>#35 If someone has the same illness as me, then my prescription medicine should work for them.</td>
<td>2.25</td>
<td>1.029</td>
<td>.797</td>
<td>0.512</td>
</tr>
<tr>
<td>#54 I would consider it safe to lend a prescription medicine if the pharmacist or a doctor had not mentioned the risks of lending it.</td>
<td>2.04</td>
<td>1.006</td>
<td>.786</td>
<td>0.671</td>
</tr>
<tr>
<td>#44 If my prescription medicine worked well for me, I might let my friend with a similar illness try some.</td>
<td>2.07</td>
<td>1.038</td>
<td>.597</td>
<td>0.692</td>
</tr>
<tr>
<td>#43 I would be concerned that lending some of my prescription medicine could negatively affect my own health.</td>
<td>3.13</td>
<td>1.136</td>
<td>.797</td>
<td>0.583</td>
</tr>
<tr>
<td>#42 I would be concerned that lending some of my prescription medicine to someone else could negatively affect that person's health.</td>
<td>3.93</td>
<td>.953</td>
<td>.797</td>
<td>0.678</td>
</tr>
<tr>
<td>#37 I would feel angry if someone asked to borrow my prescription medicines.</td>
<td>2.73</td>
<td>1.010</td>
<td>.758</td>
<td>0.673</td>
</tr>
<tr>
<td>#36 I would feel guilty if I lent my prescription medicines to someone else.</td>
<td>3.23</td>
<td>1.214</td>
<td>.637</td>
<td>0.564</td>
</tr>
</tbody>
</table>

Eigen value
- 6.482
- 1.832
- 1.672
- 1.035

Total variance explained =68.887%

Total Alpha =0.897

Note: Factor loadings < 0.4 were supressed. Mean Score = Mean (X_i, X_ii, X_iii, X_iv)
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Testing for the presence of outliers

To detect the presence of outliers, following the rules described in the borrowing section, regression factor scores for each retained factors were calculated. Then, the scores were sorted in ascending order and the presence of outliers (value greater than ±3) were checked.

No outliers were detected for factors 1, 2 and 4. However, two positive outliers (values > +3) were detected for the third factor. The two positive outlier cases were then excluded and the PCA was repeated. When the new model was compared with the model containing all cases, although there were slight changes in the magnitude of the factor loadings and communalities for all items, the overall factor structure and pattern of item loadings did not change. Therefore, there was no need to exclude the outliers or revise the model.

Naming (labelling) the extracted factors

As shown in Table 25, the first factor consisted of four items (Items #46, #47, #48 and #53). Two of the items (#47 and #48) with highest loading in this factor asked respondents to indicate the extent to which they agreed with lending to someone who could not afford doctor’s fees or prescription charges. The other two items asked respondents to rate their willingness to give away unused/leftover medicines to someone who might need them (#46) and if they considered lending medicines to be a way of caring for others (#53). Although the items loaded on this factor were diverse, it was labelled as ‘Willingness to help those who cannot afford medical care.’ This label was chosen to reflect two of the items with highest loading. This factor explained 40.51% of the total variance and had an eigenvalue of 6.482, and items within this factor displayed a Cronbach’s alpha coefficient of 0.895. Based on the average of the four items loaded on the factor, a composite mean score (subscale) was created, with a higher mean score indicating more positive attitudes about lending to those who cannot afford medical care.

The second factor (eigenvalue=1.832, explained variance=11.45%) consisted of four items that were mainly related to lending because of a concern for other people’s health: lending when someone forgot (#33) or had run out of regular medicines (#45) or when someone was desperate for medicines (#39) or in an emergency situation (#51). Therefore, this factor was labelled, ‘Concern for the wellbeing of others.’ Items within this factor demonstrated a Cronbach’s alpha coefficient of 0.842. Based on the average of the four items...
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items a subscale was created, with those who score higher on this subscale having a more strongly held belief that lending has benefits to ensure the wellbeing of others.

Four items loaded onto the third factor (eigenvalue=1.672, variance explained =10.45%). These items assessed respondents’ beliefs and attitudes about the benefits/outcomes and safety of lending in different circumstances, such as if they have the same illness as the other person (#35), if the medicine is effective for themselves (#44), if the medicine is advertised (#52) and if they had not received information about the risks of sharing from healthcare providers (#54). This factor was labelled as ‘Beliefs about the benefits and safety of medicine lending.’ Items within this factor displayed a Cronbach’s alpha coefficient of 0.791. Based on the average of the four items a subscale was created, with those who score higher on this subscale having stronger beliefs that lending has benefits and is safe.

The last factor also consisted of four items (eigenvalue=1.035, variance explained = 6.47). Items in this factor related to negative perceptions about medicine lending (#42 and #43) or anticipated regret of medicine lending decisions (#36 and #37). Hence, this factor was labelled, ‘Perceived risk of harm.’ Items forming this factor demonstrated a Cronbach’s alpha coefficient of 0.767. All items loaded on this factor are negatively worded items, hence those who scored higher on this subscale were more likely to think that lending medicine is harmful.

The subscales were used in subsequent analyses as independent variables. Table 26 displays the mean scores for each of the subscales.

**Correlation between lending attitude subscales**

To evaluate how distinct each lending subscale was from other subscales in the same matrix, Pearson’s bivariate correlations among all subscales were computed. As can be seen from Table 26, the correlations between subscales were strong (> 0.3), supporting the use of the Promax rotation method.

Overall, the findings presented in this section suggest that the hypothetical items examining attitudes towards lending behaviour are valid and reliable.
Table 26: Descriptive statistics and Pearson’s bivariate correlations among PCA subscales of medicine lending behaviour (N=222)

<table>
<thead>
<tr>
<th>Attitude subscales</th>
<th>No. of items</th>
<th>Mean</th>
<th>SD</th>
<th>Chronbach’s alpha</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Willingness to help those who cannot afford medical care</td>
<td>4</td>
<td>2.35</td>
<td>0.98</td>
<td>0.895</td>
<td>1</td>
</tr>
<tr>
<td>Concern for the wellbeing of others</td>
<td>4</td>
<td>3.29</td>
<td>0.95</td>
<td>0.842</td>
<td>.556** 1</td>
</tr>
<tr>
<td>Beliefs about the benefits and safety</td>
<td>4</td>
<td>2.06</td>
<td>0.78</td>
<td>0.791</td>
<td>.605** .363** 1</td>
</tr>
<tr>
<td>Perceived risk of harm</td>
<td>4</td>
<td>3.26</td>
<td>0.83</td>
<td>0.767</td>
<td>-.467** -.361** -.379** 1</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed)

7.6.13 Predictors of borrowing, lending and leftover medicines retaining behaviours

In order to identify predictors of medicine borrowing and lending behaviours, and leftover medicine storing practices, several bivariable and multivariable analyses were conducted; the results are presented below. Due to incomplete data, 16 cases were excluded and multivariable analyses were completed using 217 cases.

Bivariable logistic regression and cross-tab analyses (see Appendix 12) were completed to examine bivariate relationships between explanatory variables and the outcome measures in the absence of confounders. The results indicated that there was strong evidence of a relationship between the explanatory and outcome variables. Based on the findings and evidence from prior studies, five separate multivariable logistic regression models were created to test whether the explanatory variables independently associate with the outcome variables. The results are described below.

7.6.13.1 Medicine borrowing behaviour

Two multivariable logistic regression models were created to examine the relationship between explanatory variables and (I) lifetime and (II) past-year borrowing behaviours. The results are presented below.
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Model 1: Lifetime borrowing behaviour

The outcomes for the multivariable logistic regression of lifetime borrowing behaviour are displayed in Table 27. The multivariable logistic regression model explained enough variation in lifetime borrowing behaviour to be considered as a useful model ($\chi^2= 82.59, df=21, p < 0.001$), with Nagelkerke $R^2 = 0.423$ and Cox and Snell $R^2 = 0.317$. The model correctly classified 74.2% of the respondents, supporting the model efficiency in predicting medicine borrowing behaviour. The Hosmer-Lemeshow test ($p=0.781$) also supported the model fitness.

As can be seen from Table 27, the odds of reporting lifetime borrowing were seven times higher for the oldest group than for the youngest group (AOR=7.005, 95% CI 1.826–26.881, $p=0.005$). A near significant association was also observed between income and lifetime borrowing. The odds of lifetime borrowing were nearly three times greater among those who had an annual household income over NZ $100,000 compared to those who had NZ $30,000 or less household income (AOR=2.822, 95% CI 0.998–7.976, $p=0.050$). No other demographic variable was found to have significant association with lifetime borrowing.

With respect to medical conditions, the odds of reporting lifetime borrowing were 2.5 times higher for those who had asthma than those who did not have asthma (AOR=2.506, 95% CI 1.020–6.158, $p=0.045$). Although not statistically significant, the odds of lifetime borrowing were 51.4% less among those who had high blood pressure compared to those who did not have high blood pressure (AOR=0.486, 95% CI 0.169–1.400, $p=0.182$). No other medical conditions could be shown to be associated with lifetime borrowing.

Three of the four borrowing attitude subscales had significant associations with lifetime borrowing. Each unit increase in the ‘access-related issues’ subscale increased the odds of lifetime borrowing by 74.4% (AOR=1.744, 95% CI 1.154-2.634, $p=0.008$), and a unit increase in the ‘concern about missing doses’ subscale increased the odds of lifetime borrowing by 84.2% (AOR=1.842, 95% CI 1.172-2.893, $p=0.008$). Conversely, a unit increase in the ‘perceived risk of harm’ subscale decreased the odds of lifetime borrowing by 45.1% (AOR=0.549, 95% CI 0.357-0.846, $p= 0.007$). No significant association was found between the ‘emotional belief’ subscale and lifetime borrowing behaviour.
Table 27: Multivariable logistic regression examining the predictors of lifetime medicine borrowing (N=217)

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>Wald</th>
<th>p-value</th>
<th>Adjusted odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>.588</td>
<td>1.994</td>
<td>.158</td>
<td>1.801 (.796-4.076)</td>
</tr>
<tr>
<td>Age in years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 35</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 to 44</td>
<td>.750</td>
<td>1.880</td>
<td>.170</td>
<td>2.116 (.725-6.178)</td>
</tr>
<tr>
<td>45 to 64</td>
<td>.416</td>
<td>.835</td>
<td>.361</td>
<td>1.516 (.621-3.703)</td>
</tr>
<tr>
<td>65 or older</td>
<td>1.947</td>
<td>8.050</td>
<td>.005</td>
<td>7.005 (1.826-26.881)</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not attend college</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attended tertiary education</td>
<td>-.131</td>
<td>.088</td>
<td>.766</td>
<td>.877 (.369-2.085)</td>
</tr>
<tr>
<td>Annual household income (NZ $)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$30,000 or less</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$30,001 to $70,000</td>
<td>.327</td>
<td>.441</td>
<td>.506</td>
<td>1.387 (.528-3.639)</td>
</tr>
<tr>
<td>$70,001 to $100,000</td>
<td>.651</td>
<td>1.310</td>
<td>.252</td>
<td>1.917 (.629-5.844)</td>
</tr>
<tr>
<td>$100,001 or more</td>
<td>1.037</td>
<td>3.830</td>
<td>.050</td>
<td>2.822 (.998-7.976)</td>
</tr>
<tr>
<td>Household size</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 or 2 people</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 people</td>
<td>.879</td>
<td>2.428</td>
<td>.119</td>
<td>2.409 (.797-7.278)</td>
</tr>
<tr>
<td>4 or more people</td>
<td>.317</td>
<td>.481</td>
<td>.488</td>
<td>1.373 (.561-3.361)</td>
</tr>
<tr>
<td>Are you a health professional?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>-.007</td>
<td>.000</td>
<td>.989</td>
<td>.993 (.363-2.718)</td>
</tr>
<tr>
<td>Do you have the following medical conditions?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>.658</td>
<td>1.680</td>
<td>.195</td>
<td>1.930 (.714-5.217)</td>
</tr>
<tr>
<td>Asthma</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>.919</td>
<td>4.013</td>
<td>.045</td>
<td>2.506 (1.020-6.158)</td>
</tr>
<tr>
<td>Allergy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>.232</td>
<td>.301</td>
<td>.583</td>
<td>1.261 (.551-2.889)</td>
</tr>
<tr>
<td>Sleep problem</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>.684</td>
<td>1.542</td>
<td>.214</td>
<td>1.981 (.673-5.829)</td>
</tr>
<tr>
<td>Diabetes</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>.181</td>
<td>.163</td>
<td>.686</td>
<td>1.198 (.499-2.877)</td>
</tr>
<tr>
<td>High blood pressure</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>-.721</td>
<td>1.785</td>
<td>.182</td>
<td>.486 (.169-1.400)</td>
</tr>
<tr>
<td>Borrowing attitude subscales</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Access related issues</td>
<td>.556</td>
<td>6.973</td>
<td>.008</td>
<td>1.744 (1.154-2.634)</td>
</tr>
<tr>
<td>Concern about missing dose</td>
<td>.611</td>
<td>7.019</td>
<td>.008</td>
<td>1.842 (1.172-2.893)</td>
</tr>
<tr>
<td>Emotional belief</td>
<td>.342</td>
<td>.920</td>
<td>.337</td>
<td>1.408 (.700-2.834)</td>
</tr>
<tr>
<td>Perceived risk of harm</td>
<td>-.599</td>
<td>7.398</td>
<td>.007</td>
<td>.549 (.357-.846)</td>
</tr>
</tbody>
</table>
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Model 2: Past year borrowing behaviour

Table 28 displays the findings of the multivariable logistic regression analysis of past-year borrowing behaviour. This regression model explained enough variation in past-year borrowing behaviour ($\chi^2= 75.382$, df=21, $p<0.001$), with Nagelkerke $R^2=0.416$ and Cox and Snell $R^2=0.293$. Examination of the model efficiency showed that it could correctly classify 82.0% of the responders as medicine borrowers and non-borrowers. The Hosmer-Lemeshow test supported the overall model fitness ($p=0.625$).

There were some associations between explanatory variables and past-year borrowing. The odds of reporting past-year borrowing were four times greater for females than males (AOR=4.075, 95% CI 1.430–11.613, $p=0.009$), and the odds of past-year borrowing were nearly four times higher among those who had household income over NZ $100,000 compared to those who had household income NZ $30,000 or less (AOR=3.841, 95% CI 1.125-13.116, $p=0.032$). Furthermore, the odds of reporting past-year borrowing were over six times higher for the oldest group than the youngest group (AOR=6.258, 95% CI 1.362-28.743, $p=0.018$).

The odds of past-year borrowing were four times higher among those who had sleep problems compared to those who did not have (AOR=3.937, 95% CI 1.336–11.600, $p=0.013$). Likewise, the odds of past-year borrowing were 2.6 times higher among those who had asthma compared to those did not have (AOR=2.558, 95% CI 1.088–6.015, $p=0.031$). In addition, the odds of reporting past-year borrowing were three times higher for those who had chronic pain than those who did not have (AOR=2.963, 95% CI 1.042–8.423, $p=0.042$).

For borrowing attitude subscales, ‘emotional belief’ was the strongest predictor of borrowing; a unit increase in ‘emotional belief’ subscale increased the odds of past-year borrowing by 111.2% (AOR=2.112, 95% CI 1.027-4.343, $p=0.042$). ‘Concern about missing doses of medications’ also predicted past-year borrowing. A unit increase in ‘concern about missing doses’ subscale increased the odds of past-year borrowing by 106% (AOR=2.060, 95% CI 1.180-3.598, $p=0.011$). No significant associations were found between the ‘access-related issues’ and ‘perceived risk of harm’ subscales and past-year borrowing behaviour.
Chapter 7 An online survey of NZ adults’ medicine sharing behaviours

Table 28: Multivariable logistic regression examining the predictors of past-year medicine borrowing (N=217)

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>Wald</th>
<th>p-value</th>
<th>Adjusted odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1.405</td>
<td>6.916</td>
<td>.009</td>
<td>4.075(1.430-11.613)</td>
</tr>
<tr>
<td>Age in years</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 to 34</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35 to 44</td>
<td>.440</td>
<td>.615</td>
<td>.433</td>
<td>1.553(.517-4.670)</td>
</tr>
<tr>
<td>45 to 64</td>
<td>.645</td>
<td>1.703</td>
<td>.192</td>
<td>1.906(.723-5.022)</td>
</tr>
<tr>
<td>65 or older</td>
<td>1.834</td>
<td>5.558</td>
<td>.018</td>
<td>6.258(1.362-28.743)</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not attend college</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attended tertiary education</td>
<td>.135</td>
<td>.070</td>
<td>.791</td>
<td>1.144(.423-3.097)</td>
</tr>
<tr>
<td>Annual household income (NZ $)</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>$30,000 or less</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$30,001 to $70,000</td>
<td>.479</td>
<td>.704</td>
<td>.401</td>
<td>1.614(.528-4.939)</td>
</tr>
<tr>
<td>$70,001 to $100,000</td>
<td>1.010</td>
<td>2.340</td>
<td>.126</td>
<td>2.745(.753-10.011)</td>
</tr>
<tr>
<td>$100,001 or more</td>
<td>1.346</td>
<td>4.613</td>
<td>.032</td>
<td>3.841(1.125-13.116)</td>
</tr>
<tr>
<td>Household size</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 or 2 people</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 people</td>
<td>-.406</td>
<td>.474</td>
<td>.491</td>
<td>.667(.210-2.116)</td>
</tr>
<tr>
<td>4 or more people</td>
<td>.646</td>
<td>1.697</td>
<td>.193</td>
<td>1.907(.722-5.039)</td>
</tr>
<tr>
<td>Are you a health professional?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>-.163</td>
<td>.077</td>
<td>.781</td>
<td>.850(.270-2.674)</td>
</tr>
<tr>
<td>Do you have the following medical conditions?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chronic pain</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>1.086</td>
<td>4.151</td>
<td>.042</td>
<td>2.963(1.042-8.423)</td>
</tr>
<tr>
<td>Asthma</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
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<td>Yes</td>
<td>.939</td>
<td>4.636</td>
<td>.031</td>
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</tr>
<tr>
<td>Allergy</td>
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<td></td>
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</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>-.142</td>
<td>.104</td>
<td>.747</td>
<td>.868(.368-2.048)</td>
</tr>
<tr>
<td>Sleep problem</td>
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</tr>
<tr>
<td>No</td>
<td>1.00</td>
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<tr>
<td>Diabetes</td>
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<tr>
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<td>.611</td>
<td>1.522</td>
<td>.217</td>
<td>1.843(.698-4.868)</td>
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<tr>
<td>High blood pressure</td>
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<td>.433</td>
<td>.510</td>
<td>.669(.202-2.217)</td>
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<td>Access related issues</td>
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<td>2.284</td>
<td>.131</td>
<td>1.448(.896-2.342)</td>
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<td>.011</td>
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<td>.042</td>
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Chapter 7 An online survey of NZ adults’ medicine sharing behaviours

7.6.13.2 Medicine lending behaviour

Two separate multivariable logistic regressions were conducted to examine the association between explanatory variables and (I) lifetime and (II) past-year lending behaviour.

Model 1: Lifetime lending behaviour

The outcomes of the lifetime medicine lending regression analysis are reported in Table 29. Assessment of model fitness and predictive accuracy showed that the model could explain enough variation in lifetime lending behaviour ($\chi^2=93.183$, df=22, $p<0.001$), with Nagelkerke $R^2 = 0.466$ and Cox and Snell $R^2 = 0.349$. The model correctly classified 77.9% of the respondents as lifetime lenders and non-lenders. The Hosmer-Lemeshow test ($p=0.339$) further supported the overall model fitness.

The findings suggest that there was an association between lifetime lending and age and with household size. The odds of lifetime lending were 2.6 times higher for those who were in the 45 to 64 years old age bracket than the younger, 18 to 34 years old, age group (AOR=2.584, 95% CI 1.001–6.672, $p=0.050$), and the odds of lifetime lending were nearly 5.4 times higher among the oldest, 65 years old and above age, group compared to the youngest group (AOR=5.376, 95% CI 1.338–21.598, $p=0.018$). The odds of ever lending medicines were 3.5 times higher among those who lived in three-person households compared to those who lived in one or two-person households (AOR=3.521, 95% CI 1.138–10.888, $p=0.029$). No other demographic variable was found to have a significant association with lifetime lending.

In addition, the odds of lifetime lending were nearly 2.5 times higher among those who had asthma (AOR=2.528, 95% CI 1.062–6.015, $p=0.036$) or allergy (AOR=2.336, 95% CI 1.011–5.397, $p=0.047$) than those who did not have those problems. Conversely, the odds of lifetime lending were 82.6% less among those who had high blood pressure compared to those who did not have high blood pressure (AOR=0.174, 95% CI 0.054–0.558, $p=0.003$).

In regards to the lending attitude subscales, a unit increase in the ‘concern for the wellbeing of others’ subscale increased the odds of lifetime lending by 113.5% (AOR=2.135, 95% CI 1.321–3.451, $p=0.002$), whereas a unit increase in the ‘perceived risk of harm’ subscale decreased the odds of lifetime lending by 64.3% (AOR=0.357, 95% CI 0.211–0.603, $p<0.001$). Higher scores in ‘beliefs about the benefits and safety of
### Table 29: Multivariable logistic regression examining the predictors of lifetime medicine lending (N=217)

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>Wald</th>
<th>p-value</th>
<th>Adjusted odds ratio (95% CI)</th>
</tr>
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<td>.712</td>
<td>2.635</td>
<td>.105</td>
<td>2.039 (.863-4.819)</td>
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<td><strong>Age in years</strong></td>
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</tr>
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<td>5.376 (1.338-21.598)</td>
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<td></td>
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<tr>
<td>Attended tertiary education</td>
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<td>.840</td>
<td>.887 (.277-2.836)</td>
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<td>$100,001 or more</td>
<td>.410</td>
<td>.537</td>
<td>.464</td>
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</tr>
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<td><strong>Household size</strong></td>
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<tr>
<td>1 or 2 people</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 people</td>
<td>1.259</td>
<td>4.775</td>
<td>.029</td>
<td>3.521 (1.138-10.888)</td>
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<td>4 or more people</td>
<td>.159</td>
<td>.120</td>
<td>.729</td>
<td>1.172 (.477-2.877)</td>
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<td><strong>Are you a health professional?</strong></td>
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<td>1.00</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Yes</td>
<td>.675</td>
<td>1.682</td>
<td>.195</td>
<td>1.963 (.739-3.980)</td>
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<tr>
<td><strong>Have you got leftover medicines?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td></td>
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<td>1.578</td>
<td>.209</td>
<td>1.715 (.739-3.980)</td>
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<td>1.00</td>
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<td>Yes</td>
<td>.819</td>
<td>2.399</td>
<td>.121</td>
<td>2.269 (.804-6.398)</td>
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<td>1.00</td>
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<td>Yes</td>
<td>.927</td>
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<td>.036</td>
<td>2.528 (1.062-6.015)</td>
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<td>Yes</td>
<td>.848</td>
<td>3.944</td>
<td>.047</td>
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<tr>
<td>No</td>
<td>1.00</td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>.518</td>
<td>.880</td>
<td>.348</td>
<td>1.678 (.569-4.947)</td>
</tr>
<tr>
<td><strong>Diabetes</strong></td>
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<td></td>
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</tr>
<tr>
<td>No</td>
<td>1.00</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>.356</td>
<td>.543</td>
<td>.461</td>
<td>1.428 (.553-3.686)</td>
</tr>
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<td><strong>High blood pressure</strong></td>
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<tr>
<td>No</td>
<td>1.00</td>
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<td>Yes</td>
<td>-1.747</td>
<td>8.653</td>
<td>.003</td>
<td>.174 (.054-.558)</td>
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<td><strong>Lending attitude subscales</strong></td>
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<td>Willingness to help those who cannot afford medical care</td>
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<td>.077</td>
<td>1.707 (9.43-3.091)</td>
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<td>Perceived risk of harm</td>
<td>-1.031</td>
<td>14.799</td>
<td>.000</td>
<td>.357 (.211-.603)</td>
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</table>
medicines’ subscale was also marginally associated with increased odds of lifetime lending (AOR=1.707, 95% CI 0.943-3.091, p=0.077).

**Model 2: Past-year lending behaviour**

Table 30 displays the outcomes of the regression analysis of past-year lending. The model examination indicated that it could explain enough variation in past-year lending behaviour ($\chi^2=68.209, df=22, p<0.001$), with Nagelkerke $R^2 = 0.381$ and Cox and Snell $R^2 = 0.273$. The model correctly classified 77.4% of the cases as those who had and had not lent medicines in the past year. The Hosmer-Lemeshow test was not significant (p=0.574), further supporting the model overall fitness.

The results showed that none of the socio-demographic variables were significantly associated with past-year lending. Likewise, no significant associations were found between keeping leftover medicines at home and past-year lending.

However, the odds of past-year lending were 3.5 times greater among those who had chronic pain compared to those who did not have (AOR=3.478, 95% CI 1.315–9.202, p=0.012). Similarly, the odds of past-year lending were 2.6 times greater among those who had asthma compared to those who did not (AOR=2.551, 95% CI 1.097-5.932, p=0.030). Conversely, at the level of marginal significance, the odds of past-year lending were 68.8% lower among those who had high blood pressure compared to those who did not (AOR=0.312, 95% CI 0.094-1.031, p=0.056).

The findings also indicated that a unit increase in the ‘concern for the wellbeing of others’ subscale increased the odds of past-year lending by 115.4% (AOR=2.154, 95% CI 1.315-3.527, p=0.002). Likewise, a unit increase in the ‘beliefs about the benefits and safety of medicine lending’ subscale increased the odds of past-year lending by 79.1% (AOR=1.791, 95% CI 1.015-3.160, p=0.044). In contrast, a unit increase in the ‘perceived risk of harm’ subscale decreased the odds of past-year lending by 50.7% (AOR=0.493, 95% CI 0.292-0.833, p=0.008).
Table 30: Multivariable logistic regression examining the predictors of past-year medicine lending (N=217)

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>Wald</th>
<th>p-value</th>
<th>Adjusted odds ratio (95% CI)</th>
</tr>
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<tbody>
<tr>
<td><strong>Gender</strong></td>
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<tr>
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<td>1.00</td>
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<td></td>
</tr>
<tr>
<td>Female</td>
<td>.874</td>
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<td>.072</td>
<td>2.396(.925-6.208)</td>
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<tr>
<td><strong>Age in years</strong></td>
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<tr>
<td>18 to 34</td>
<td>1.00</td>
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<td></td>
</tr>
<tr>
<td>35 to 44</td>
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<td>.088</td>
<td>.767</td>
<td>1.168(.418-3.267)</td>
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<td>45 to 64</td>
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<td>.328</td>
<td>.567</td>
<td>1.307(.523-3.266)</td>
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<td>.716</td>
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<td><strong>Education level</strong></td>
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</tr>
<tr>
<td>Did not attend college</td>
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</tr>
<tr>
<td>Attended tertiary education</td>
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<td>$30,000 or less</td>
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<td><strong>Household size</strong></td>
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<td>1-2 people</td>
<td>1.00</td>
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<td>3 people</td>
<td>.461</td>
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<td>.383</td>
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<td>.312</td>
<td>.576</td>
<td>.773(.313-1.909)</td>
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<td><strong>Are you a health professional?</strong></td>
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<td>.261</td>
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<td>.337</td>
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<td></td>
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<td>Yes</td>
<td>-1.165</td>
<td>3.646</td>
<td>.056</td>
<td>.312(.094-1.031)</td>
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<td>Willingness to help those who cannot afford medical care</td>
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<td>3.726</td>
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<td>Concern for the wellbeing of others</td>
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<td>.583</td>
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<td>.044</td>
<td>1.791 (1.015-3.160)</td>
</tr>
<tr>
<td>Perceived risk of harm</td>
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<td>.008</td>
<td>.493 (.292-.833)</td>
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</table>
Chapter 7 An online survey of NZ adults’ medicine sharing behaviours

7.6.13.3 Leftover prescription medicines storing practices

Table 31 presents the results of the multivariable logistic regression analysis of respondents’ leftover medicine storing practices. The model examination indicated that it had limited ability to explain the variation in leftover medicine keeping practices ($\chi^2=23.726$, df =18, p=0.164), with Nagelkerke $R^2 = 0.150$ and Cox and Snell $R^2 = 0.104$. However, the model correctly classified 76.5% of the cases as those kept and did not keep leftover medicines at home. The Hosmer-Lemeshow test supported the overall model fitness (p=0.870).

Except for household income, none of the variables were significantly associated with leftover medicine storing practices. The odds of having leftover prescription medicines at home were 3.7 times higher for those who had a household income over NZ $100,000 compared to those who had a household income NZ $30,000 or less (AOR=3.661, 95% CI 0.292-0.833, p=0.008)

7.7 Discussion

Through employing a more comprehensive and theoretically underpinned questionnaire than previously used this study has built upon previous work in this thesis and other research.1,2,5,12,14,15,32 As indicated in Chapter 2, previous surveys have focused on quantifying medicine sharing instances and examining the relationship between demographics and sharing behaviours, and as such did not provide insight into other aspects of sharing. This study has provided detailed information on different dimensions of sharing, including the proportion of people who have shared and/or intend to share medicines, reasons for and predictors of sharing and the consequences of sharing. Particularly, this study has identified a number of modifiable predictors of sharing behaviours (such as access-related issues, perceived risks of harm from borrowing or lending), and the findings can be used to identify key risk factors underlying medicine sharing behaviours and to address problems associated with sharing. The data analysis largely relied on PCA and multivariable logistic regression. The interpretation of the main findings is presented in this section.
Table 31: Multivariable logistic regression examining the predictors of leftover medicines storing practices (N=217)

<table>
<thead>
<tr>
<th></th>
<th>B</th>
<th>Wald</th>
<th>p-value</th>
<th>Adjusted odds ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Female</td>
<td>0.252</td>
<td>0.447</td>
<td>0.504</td>
<td>1.286 (.615-2.689)</td>
</tr>
<tr>
<td><strong>Age in years</strong></td>
<td></td>
<td></td>
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<tr>
<td>18 to 34</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>35 to 44</td>
<td>-0.442</td>
<td>0.700</td>
<td>0.403</td>
<td>0.643 (.228-1.811)</td>
</tr>
<tr>
<td>45 to 64</td>
<td>-0.756</td>
<td>2.846</td>
<td>0.092</td>
<td>0.469 (.195-1.130)</td>
</tr>
<tr>
<td>65 or older</td>
<td>-0.236</td>
<td>0.149</td>
<td>0.700</td>
<td>0.790 (.239-2.616)</td>
</tr>
<tr>
<td><strong>Education level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Did not attend college</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Attended tertiary education</td>
<td>0.206</td>
<td>0.249</td>
<td>0.618</td>
<td>1.228 (.548-2.753)</td>
</tr>
<tr>
<td><strong>Annual household income (NZ $)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>$30,000 or less</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>$30,001 to $70,000</td>
<td>0.479</td>
<td>1.225</td>
<td>0.268</td>
<td>1.615 (.691-3.775)</td>
</tr>
<tr>
<td>$70,001 to $100,000</td>
<td>0.894</td>
<td>2.881</td>
<td>0.090</td>
<td>2.445 (.871-6.864)</td>
</tr>
<tr>
<td>$100,001 or more</td>
<td>1.298</td>
<td>6.334</td>
<td>0.012</td>
<td>3.661 (1.333-10.059)</td>
</tr>
<tr>
<td><strong>Household size</strong></td>
<td></td>
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<tr>
<td>1 or 2 people</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>3 people</td>
<td>1.053</td>
<td>3.557</td>
<td>0.059</td>
<td>2.867 (1.960-8.567)</td>
</tr>
<tr>
<td>4 or more people</td>
<td>0.628</td>
<td>2.035</td>
<td>0.154</td>
<td>1.874 (.791-4.440)</td>
</tr>
<tr>
<td><strong>Are you a health professional?</strong></td>
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<tr>
<td>No</td>
<td></td>
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<td></td>
<td>1.00</td>
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<tr>
<td>Yes</td>
<td>-0.480</td>
<td>0.929</td>
<td>0.335</td>
<td>0.619 (.233-1.643)</td>
</tr>
<tr>
<td><strong>Do you have the following medical conditions?</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td><strong>Chronic pain</strong></td>
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<td></td>
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<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Yes</td>
<td>0.420</td>
<td>0.791</td>
<td>0.374</td>
<td>1.522 (.603-3.846)</td>
</tr>
<tr>
<td><strong>Asthma</strong></td>
<td></td>
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<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Yes</td>
<td>-0.492</td>
<td>1.540</td>
<td>0.215</td>
<td>0.612 (.281-1.330)</td>
</tr>
<tr>
<td><strong>Allergy</strong></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Yes</td>
<td>-0.232</td>
<td>0.361</td>
<td>0.548</td>
<td>0.793 (.373-1.689)</td>
</tr>
<tr>
<td><strong>Sleep problem</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Yes</td>
<td>0.487</td>
<td>0.901</td>
<td>0.343</td>
<td>1.627 (.596-4.443)</td>
</tr>
<tr>
<td><strong>Diabetes</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Yes</td>
<td>0.276</td>
<td>0.414</td>
<td>0.520</td>
<td>1.317 (.569-3.050)</td>
</tr>
<tr>
<td><strong>High blood pressure</strong></td>
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<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Yes</td>
<td>-0.054</td>
<td>0.012</td>
<td>0.912</td>
<td>0.948 (.366-2.451)</td>
</tr>
<tr>
<td><strong>Have you ever received advice from HCPs regarding leftover medicines?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Yes</td>
<td>-0.219</td>
<td>0.366</td>
<td>0.545</td>
<td>0.804 (.396-1.631)</td>
</tr>
</tbody>
</table>
Validit y and reliability of the questionnaire

Experts’ comments and pilot test participants’ feedback on the content and clarity of the survey helped to improve face validity. The construct validity of items assessing attitudes towards lending and borrowing behaviours were examined using PCA.

PCA of borrowing behaviour resulted in the removal of five items due to their failure to load (<0.4) onto any of the factors or due to co-loading. Two of those items (#23 and #24) had been originally included to assess the effect of social influence on borrowing behaviour. Those items might have been poorly worded or ambiguous. Alternatively, social influence might have a weaker relationship with borrowing behaviour; however, qualitative evidence from this thesis and other studies supports the relationship between social influence and medicine borrowing.\(^{37-39}\) Although “having the same illness as the other person” (#4) and “not sick enough to see a doctor” (#2) were among the most frequently cited reasons for medicine borrowing, these items also failed to load onto any of the borrowing attitudes factors. However, lower factor loading does not necessarily mean that the items are less useful in explaining borrowing behaviour. Rather, it is an indication of a weak correlation between removed items and other items retained in the factor analysis. Therefore, future research should try to assess the influence of removed items individually rather than including them in a factor structure. Due to the relatively small sample size, in this study it was not possible to include the removed items as individual independent variables in the multivariable logistic regression models.

Generally there were few co-loading problems in the borrowing PCA; only one item was removed because of co-loading (#7). This item asked respondents if they felt guilty about borrowing medicines and it was included to assess the influence of ‘automatic motivation’ on medicine borrowing behaviour. Apart from those problematic items, the remaining 20 items strongly loaded onto each factor and had excellent overall internal consistency (total alpha=0.905), supporting the construct validity and reliability of retained items.

PCA of lending behaviours resulted in the removal of seven items because of co-loading (#32, #34, #40, #49 and #50) or failure to load (#38 and #41). It is worth noting that, like borrowing behaviour, two of the items removed were those assessing the relationship between social influence (#49 and #50) and medicine lending. Perhaps the presence of these items might not allow other items to load onto appropriate factors and could potentially contribute to the removal of more items. Items assessing knowledge about risks
of lending (#32) and its legal consequence (#34) were also removed; these items were included to assess the influence of ‘psychological capability’ on medicine lending decision. Questions assessing the influence of habit on lending (#38) and attitudes about benefits of lending (#41) failed to load, indicating these items have less correlation with the retained items. The remaining 16 items had strong communality and factor loadings and their internal consistency was good (total alpha=0.897), supporting the construct validity and reliability of items retained.

**Leftover prescription medicines storing practices**

Nearly three in four respondents reported having leftover prescription medicines at home, which is higher than percentages (50% to 62%) reported by other studies in NZ. The difference could be partially explained by the fact that most of the current survey respondents had chronic diseases and were likely to be taking regular medicines, hence had a greater opportunity to store leftovers. In accordance with Gascoyne’s study, leftover medicines were mainly stored in case they were needed later (73.2%), but a small number of respondents (8.3%) stored leftover medicines specifically to pass on to someone who might need them; this finding adds to earlier findings which suggest improvement in health condition, treatment change, and excess supply as the main reasons for storing leftover medicines in NZ. Braund et al speculated that the increased volume of leftover medicines storage practices in NZ homes could be due to the increased volumes of dispensed medicines (e.g. three months’ supply dispensed at one time for some medicines) and lower prescription charges.

Over half of the participants had never been informed about the safe disposal of leftover medicines, and 53.2% of participants had never returned leftover medicines to a pharmacy or GP surgery. Interestingly, in the bivariable analysis, those who received instructions regarding safe disposal practice were six times more likely to return leftover medicines to a pharmacy or GP surgery (p<0.001). It is possible that a lack of knowledge about safe disposal practice or a lack of understanding about the risks of leftover medicines might be a factor associated with storing leftover medicines. This finding indicates the importance of educating and motivating patients to take their leftover medicines to a pharmacy.

**Extent of borrowing and lending**

This study found that more than half of the participants (55.6%) had ever borrowed prescription medicines, which is higher than the prevalence rates reported amongst adults.
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in previous studies using a similar recall period.\textsuperscript{12,18} For instance, a study of a nationally representative sample of adults in the US reported a lifetime borrowing rate of 23.2%,\textsuperscript{12} and another study reported an 18% ‘ever borrowed’ rate among adults recruited from urban medical centres in New York.\textsuperscript{18} In the present study, 29.3% also reported borrowing medicines in the past year. This percentage is consistent with other study reports. Gascoyne et al reported a 25.4% past year borrowing rate among community pharmacy customers in Auckland,\textsuperscript{32} and another study documented a 26.9% past-year borrowing rate among nationally representative adults in the US.\textsuperscript{2} With regards to lending, in this study 45.9% of respondents reported having ever lent their prescription medicines to someone else. This percentage is also higher than the lifetime lending prevalence rates documented among nationally representative US adults.\textsuperscript{12} No other studies have reported lifetime lending prevalence among adults. The past-year lending proportion of 32.4% documented in this study is also higher than past-year lending rates (6% to 24.1%) reported by previous investigations.\textsuperscript{2,32,45,59}

Methodological differences between previous research and the present study might have contributed towards the higher proportions of borrowing and lending reported in this study. The previous investigations used either in-person or postal surveys and respondents might be hesitant to disclose socially undesirable behaviours such as lending and borrowing, particularly when the data collection takes place in healthcare settings.\textsuperscript{18,32,40,59} This study was an anonymous, online survey and respondents were informed that no personal information would be collected, including their computer IP address, and this may have facilitated disclosure of sharing behaviours.\textsuperscript{346} Self-selection bias might have also some contribution; those with lending or borrowing experiences might have been more interested to take part in the online survey. However, none of the other recruitment methods used were free from selection-bias,\textsuperscript{347} so this is an unlikely explanation. Apart from methodological differences, discrepancies in the extent of sharing reported among the studies could be due to differences in the samples and contexts. The current study participants were mainly patients with common chronic medical conditions and could be more likely to have more medicines available for sharing.

Besides actual medicine borrowing and lending, intended medicine borrowing and lending behaviour is clearly relevant; as intention is most likely to predict actual behaviour.\textsuperscript{327} The findings of this study showed that more people had an intention to borrow (72.8%) or lend (68.5%) medicines than those who actually borrowed or lent medicines. Asking people
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their intention to share medicines during prescribing or dispensing may help to identify those who are at risk of sharing high risk prescription medicines.

Borrowing and lending frequency

Many of the borrowers (61.8%) and lenders (65.3%) reported doing so only on one or two occasions in the past year, and 25% borrowers and 22.2% lenders reported having done so on three to five instances during past year. Although medicine borrowing and lending were fairly infrequent occurrences, rates in this study are higher than those reported by other studies. For example, in a US study of adults’ sharing behaviours, 58.5% had lent or borrowed on one or two occasions in the past year.12 In New York study 50% of participants reported borrowing once or more in the past year, but 2.6% reported borrowing at least once a month.18 In the Auckland study, the majority of borrowers (85.3%) and lenders (80.7%) reported doing so on one to five occasions.32 Many other studies did not report the frequency of borrowing and lending among their samples.2,5,45 The discrepancies in sharing frequencies between the studies could be due to differences in the methods of data collection and the samples. Unlike the current study which used an online survey, the other studies have used either face-to-face or mail surveys to collect data. Therefore, as medicine sharing is largely considered socially undesirable, it is likely that the data collection methods employed by the other studies might have contributed to the lower rates of medicine sharing frequencies reported.

Types of borrowed or lent medicines

Painkillers and allergy treating medicines were the two most frequently borrowed and lent medicines. This finding is consistent with those reported by Goldsworthy et al,2,13 Petersen et al12 and Ellis et al45. Conversely, the finding is inconsistent with that of Gascoyne et al32, Ward et al18 and Caviness et al.53 While pain medications were the most frequently shared medicines in those studies, the second most frequently shared was different. In Ward’s study, anxiety and depression treating medications were the second most frequently shared medicines. In Gascoyne’s study, antibiotics were the second most frequently shared, and in Caviness’s study sleeping medications were the second most frequently shared. In Gascoyne’s study, participants were given a predetermined list of medicines to choose from and antibiotics were second in the list; this might have contributed to antibiotics being selected more frequently. In another study, contraceptive pills and antibiotics were found to be the most frequently shared medicines; however, the
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study only involved those aged between 18 and 25 years old and the findings may not be comparable to our study.\textsuperscript{15} Poverty,\textsuperscript{38} cultural and linguistic barriers to see a doctor,\textsuperscript{39,313} financial constraints to visit a doctor\textsuperscript{53} and convenience\textsuperscript{18} could all explain some of the sharing of these medicines.

Asthma treating medications and antibiotics were the third and fourth most frequently shared medicines among the participants of this study. While antibiotics were among the three most commonly shared medicines in many of the studies cited above,\textsuperscript{2,12,13,15,32} only one of these reported asthma medications in the list of commonly shared medicines.\textsuperscript{32} Self-medication with antibiotics which are obtained from friends and relatives is a widespread problem\textsuperscript{24,31,348,349} and has been noted to be one of the underlying causes of microbial resistance.\textsuperscript{348}

Also noted is that medicines to treat pain, allergy and asthma were the top three medicines the study participants believed safe to be lent or borrowed. Conversely, participants indicated medicines to treat cardiac problems, high blood pressure and diabetes are not safe to be lent or borrowed, through stating they would never lend or borrow them. In-depth interviews are needed to explore why people think some classes of medicines carry more risks than others. Another notable observation was in this study a number of participants (\(n=34\)) believed that acne medicines are safe to be lent or borrowed. Although it was not clear which acne medicines they were referring to, given the teratogenic effect of some acne medicines,\textsuperscript{1,20} this finding is concerning.

Reasons for borrowing and lending

While most of the previous studies used a predetermined list of reasons for sharing medicines and asked participants to choose from them,\textsuperscript{2,12,18,32} in this study open ended questions were used to capture reasons for sharing medicines.

Forgetting to carry around one’s own medicines, having the same illness or medicines as the other person, and running out of previously prescribed medicines were the most frequently cited reasons for borrowing. This indicates that people tend to use someone else’s medicines when they have previous experience with the medicine or when they think they know how to treat their illness. However, misdiagnosis, delay in seeking medical care, and complications of simple medical conditions are potential consequences of such actions.\textsuperscript{4,5} This study’s findings are fairly consistent with other studies in this respect.\textsuperscript{1,2,12,32,45} In accordance with other studies, sudden onset of illness, an emergency
or not feeling sick enough to see a doctor were also mentioned by participants as reasons for borrowing.\textsuperscript{2,15,32,45} Only a small number of respondents reported having borrowed medicines to avoid a doctor’s fee or prescription charges; this finding is discordant with other studies which reported the cost of medical visits as one of the main reasons for using someone else’s medicines.\textsuperscript{12,15,37,45} Possibly, the discrepancies are due to differences in healthcare system and health insurance availability across the studies. The lack of ‘prompting’ in this study with a predetermined list is also a methodological difference.

Having the same illness and medicines as the other person, the need for pain relief, and an emergency were the three most commonly cited reasons for lending medicines. Respondents had also lent their medicines to those who forgot to bring their own medicines or did not have access to medicines. It is noteworthy that none of the participants mentioned ‘direct to consumer advertisements’ or the Internet as reasons for borrowing and lending, which were reported by previous investigations.\textsuperscript{1,2,12}

**Negative experiences from borrowed medicines**

In Mayhorn and Goldsworthy’s study, among 2,773 nationally representative participants, 25.1\% (n=149) of those who borrowed medicines had experienced side effects from borrowed medicines.\textsuperscript{5} In contrast, only a small number (2.3\%) of the participants in the current study reported ever experiencing unpleasant or unexpected side effects or allergies from borrowed medicines, such as dizziness, tight neck, vomiting, diarrhoea, confusion, and loss of balance. Given the high proportion of medicine borrowers, this finding is unexpected. For a lay person, it could be challenging to differentiate expected side effects from unpleasant or unexpected side effects or allergies, and this might lead to underreporting. Unlike Goldsworthy’s study, which used a face to face survey, this study used an online data collection method and it was not possible to explain to people the difference between expected and unexpected side effects.

**Advice about potential risks of sharing**

Four in five participants in this study reported never receiving information about risks of sharing medicines from healthcare providers. This study and the qualitative studies in this thesis suggest that providing advice on the risks of sharing is not currently a priority in NZ. However, it is not also clear if providing information on risk would potentially avert harms associated with medicine sharing. This is an interesting area for future research.
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Predictors of borrowing, lending and leftover medicines storing behaviours

Both similarities and differences were observed when socio-demographic characteristics influencing medicine sharing behaviours were compared to those identified in other studies. In some studies gender, age, household income, employment, ethnicity, and household size have been found to have significant associations with medicine sharing behaviours. However, other studies did not find associations between such demographics and sharing behaviours. This study failed to prove the association between lending/borrowing behaviours and education level. However, gender, age, household income, and household size were found to have significant associations with some of the sharing behaviours.

In the multivariable analyses, the odds of past-year borrowing were higher for females than males, but this relationship was not observed for past-year lending and lifetime borrowing or lending behaviours. The findings are discordant with prior studies, that did not find an association between gender and sharing behaviours and those which found that females were more likely to lend than males. The majority of the study participants were females and this could have affected the results. The reason for the observed gender difference in past-year borrowing is unclear. However, previous studies noted that females are, in general, more likely than males to engage in self-medication, and more specifically to self-treat actual or perceived pain, and some of the borrowed medicines might have been used for such purposes. Furthermore, in general, mothers are gatekeepers for the health of the family and the convenience of easily accessing prescription medicines at a time of illness could be appealing for them.

Previous studies reported that younger adults were more likely to lend or borrow medicines compared to older adults. In contrast, in this study the odds of lifetime borrowing and lifetime lending were higher for older adults (65+ years) than the youngest group. The odds of lifetime lending were also higher for those in the 45 to 64 years age category than the youngest group. Possibly, this is because older people are more likely to take many medicines than younger patients and might have more medicines to share. Alternatively, one might argue that the lifetime prevalence of sharing is likely to increase with age since older individuals have had more time to share medicines. In contrast to this expectation, reported prevalence of lifetime borrowing and lending behaviours have tended to be higher among younger than older persons in other studies, hence this is an unlikely explanation. Nevertheless, an ageing physiology and the use of many
medicines make older people more vulnerable to adverse drug events and medicine sharing among this group could further increase the risk. Pharmacists can provide useful assistance to elderly patients by explaining the potential harms of using someone else’s medicines when counselling them about their dispensed medications, particularly for high risk medicines.

Existing evidence on the influence of income on sharing behaviours is contradictory. While a study of 26,289 nationally representative adults in US found a positive association between household income and medicine lending or borrowing behaviour, another study among US teenagers documented an inverse relationship between household income and lending or borrowing behaviours. A recent study in the US did not find any association between household income and lending or borrowing behaviour. In the present study, the odds of lifetime and past-year borrowing behaviours were higher for those who had household income over NZ $100,000 than those who had household income NZ $30,000 or less, but income had no significant influence on lifetime and past-year lending. Perhaps, convenience or ease of access to prescription medicines might explain the observed relationship.

Those who lived in three-person households were more likely to have ever lent than those who lived in one or two-person households. The finding is congruent with previous investigations which found positive associations between household size and lifetime lending or borrowing behaviour. However, household size is not a robust predictor of medicine sharing. For example, no association was found between household size and lifetime borrowing, past year borrowing and lending behaviours. Similarly, in the Auckland study, household size was not associated with past-year borrowing and lending behaviours.

In accordance with previous research findings, having asthma is a robust, positive predictor of lifetime and past-year lending and borrowing behaviours. Some of the possible interpretations are economic factors - some asthma inhalers are partially subsidised (e.g. Ventolin®) by government, and people might have shared those inhalers to save money. As Pai et al noted there is also often a sense of reciprocity between those who have asthma, and medicine sharing could be part of this wider social interaction. Some people might have shared inhalers during an emergency; as our qualitative study findings indicated, some people might not consider asthma inhalers as ‘real medicines’
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and might think nothing bad will happen to themselves or friends if they share inhalers. However, the reality is that like any other medicines, sharing asthma inhalers can have potential negative health outcomes. For instance, although sharing inhalers during emergency could be lifesaving, if it is done on a regular basis the sharing practice may compromise medication adherence\textsuperscript{324,356} and could increase the chance of asthma complications and hospital admission. Furthermore, the practice could be viewed as unhygienic.

As indicated above, the medicines most frequently borrowed and lent were painkillers. Furthermore, our data suggest that those with chronic pain were more likely to lend or borrow during past year than those who did not have chronic pain. One interpretation is that as patients are usually not instructed to take the entire dose of painkillers, they might keep unused doses just in case they need them again and then later pass them on to others. Although this could reduce the time taken to experience pain relief and save doctors’ fees and prescription charges, sharing some painkillers (e.g. opioid analgesics) could have several negative consequences, such as addiction, physical dependence, respiratory depression and death.\textsuperscript{336,357} For instance, in 2011, there were 16,917 opioid analgesics-related deaths in the USA,\textsuperscript{358} and friends and relatives were the main sources of these medicines.\textsuperscript{359} As indicated in the preceding chapter, one way of reducing the sharing of pain medications is through limiting the amount of prescribed pain medicines to the actual need of the patient. However, this can be difficult to accurately assess and any effort to limit the sharing of pain medications should not compromise the availability of those medicines to those who need them.\textsuperscript{357} Furthermore, having an allergy and a sleep problem were significantly associated with lifetime lending and past year borrowing behaviours respectively. Altruism, convenience, emergency (in case of allergy), and desire to save money could explain these associations. However, like opioid analgesics, sharing and misuse of some sleeping medications (e.g. benzodiazepines) can result in dependence, hospitalisation and death.\textsuperscript{358} It is also worth noting that most research on non-recreational sharing has focused on the potential negative health outcomes of such practices to the end users, and little is known about the direct costs of sharing for the healthcare system and third-party insurance payers. It is an interesting area of research for a pharmacoepconomist.

Those with hypertension were less likely to report lifetime lending. This finding is consistent with that of Gascoyne et al.\textsuperscript{32} Patients might consider hypertension to be a
complex condition, and they might not want to put others at risk by giving medicines not meant for them.

It appears from the findings that patients have their own unique way of evaluating the risks of sharing certain medicines and might be uncomfortable sharing medicines when they think that the risk of doing so outweighs the benefits. Educating patients about the negative consequences of medicine sharing could be a promising strategy for increasing risk perception and reducing harms related to sharing. However, for this educational strategy to be effective, it is first of all important to understand how patients interpret and assess the risks and benefits of sharing specific classes of medicines. It would be reasonably expected that there will be differences between lay and healthcare providers’ understandings and interpretation of risk. Therefore, interventions focusing on increasing risk perception need to take into account the patient’s beliefs and attitudes towards sharing specific classes of medicines.

In a large UK survey, being female, of a younger age, having a higher educational achievement and knowledge about medicines were identified as risk factors for storing leftover antimicrobials. Although the present study covered all medication classes, with the exception of household income, none of the demographic and health related variables were associated with having leftover medicines at home. The odds of having leftover medicines at home were higher for those who had household income over NZ $100,000 than those who had NZ $30,000 or less. Possibly, those who have a higher income may have been prescribed more prescription medicines and some of them were unused. Alternatively, those with low incomes might have paid lower doctor visit fees and discarding leftovers do not cost them a lot, whereas those with high incomes might have paid more for doctor’s visits, and they may have considered throwing away their unused medicines as waste of money. It has been suggested that educational campaigns about safe medicines disposal and matching the amount of dispensed medicines to the actual need of the patient may reduce the likelihood of having leftover medicines.

**Modifiable risk factors (predictors)**

Those who scored higher on the ‘access-related issue’ borrowing attitude subscale were more likely to have ever borrowed medicines. This indicates that if people cannot easily access health services or cannot afford available services, they are more likely to borrow medicines. This finding fits with the COM-B hypothesis that physical opportunity (such
as resource, time, location, physical ‘affordance’) may facilitate the occurrence of a behaviour. The finding is also congruent with other studies which have found positive relationships between medicine borrowing and financial hardship and lack of health insurance. Qualitative evidence has also indicated that those without health insurance, who cannot afford a doctor’s visit and those who live in poverty are more likely to borrow medicines. The lack of association between the ‘access related issues’ subscale and past-year borrowing behaviour could be due to the small number of people who reported borrowing in the past-year and a consequent lack of statistical power.

The odds of lifetime and past-year borrowing were higher for those who scored higher in the ‘concern about missing doses of medicines’ subscale. This suggests that if people believe missing doses of a medication has serious health consequences or if they feel the benefit of borrowing outweighs risk, then they are more likely to borrow. COM-B hypothesises that ‘reflective motivation’ (e.g. beliefs about what is good and bad) may activate behaviour, this study finding supports this hypothesis. Educating patients about the risks of using another person’s medicines and helping patients to make educated borrowing decision could potentially minimise the harms of borrowing.

Higher scores in ‘emotional belief about medicine borrowing’ was also a significant positive predictor of past-year borrowing behaviour. This means that emotional feelings (reactions) or habit may influence borrowing behaviour. This finding is compatible with the COM-B hypothesis which suggests that behaviour may be activated by ‘automatic motivation’.

On the other hand, those who scored higher on the ‘perceived risk of harm’ borrowing attitude subscale were less likely to have ever borrowed medicines. This suggests that those who are aware of the risks associated with using someone else’s medicines and who have concerns about doing so are less likely to borrow medicines. This finding is also congruent with the COM-B hypothesis, which indicates that ‘psychological capability’ (e.g. having adequate information or knowledge) is an important predictor of performing or not performing a behaviour.

In regards to lending behaviour, the ‘concern for the wellbeing of others’ subscale was positively associated with lifetime and past-year lending. This suggests that patients are more likely to lend their medicines if the other person runs out of medicines or in an emergency situation out of concern for the person’s health. Perhaps this finding indicates
that altruism can play a major role in medicine lending decisions. Conversely, the ‘perceived risk of harm’ of lending subscale was negatively associated with lifetime and past-year lending behaviours, suggesting those who have concerns or awareness about the risks of lending medicines are less likely to lend. The ‘automatic’ and ‘reflective’ motivation components of the COM-B model can explain these findings, which indicate that people evaluate the risks and benefits of performing a behaviour.47

Stronger ‘beliefs about the benefits and safety of lending’ was significantly associated with increased past-year lending, and marginally associated with increased lifetime lending. This indicates that people with favourable attitudes towards medicine lending are more likely to lend, and this is consistent with the COM-B hypothesis, which indicates that those who anticipate positive outcomes (‘reflective motivation’) of performing a behaviour are more likely to engage in the behaviour.47

7.8 Strengths and limitations

7.8.1 Strengths

The use of a comprehensive questionnaire to examine different aspects of sharing behaviours is one of the strengths of this study. To the lead researcher’s knowledge, it is also the first study to apply a behaviour change model and factor analysis to examine a range of underlying factors determining sharing behaviours. In particular, the factor analysis helped to group coherent Likert scale items assessing attitudes towards sharing and to identify latent variables predicting sharing behaviours that could not be directly observed or measured. The use of the online survey also has many advantages over other data collection methods. For example, participants could complete the survey at a convenient time and they were able to take as much time as they needed to answer each of the survey questions. Allowing participants to complete the survey at their own pace and preferred time have been noted to have advantages in reducing common method bias,362 that is, a bias attributable to the measurement method rather than the measurement construct which is often a problem in surveys assessing health behaviour.362 In addition, the inclusion of a number of reverse scored items in the Likert scale items assessing attitudes towards borrowing and lending might help to reduce acquiescent response bias, which is a tendency to answer affirmatively irrespective of the content of the question.363 Furthermore, ‘forced response’ options (where participants must answer a question before
Chapter 7 An online survey of NZ adults’ medicine sharing behaviours proceeding) were not used for any of the survey questions, and this might have improved survey completion rates.

7.8.2 Limitations

While interpreting the findings, the limitations of the research should be noted. The study data are based on self-report and subject to recall and social desirability biases. The list of the most commonly borrowed and lent medicines was included in the questionnaires to minimise recall problems. To discourage under and over-reporting of borrowing and lending, the questions assessing these behaviours were formulated in a neutral way. The cross-sectional nature of the study also makes it difficult to establish causal or temporal relationships between explanatory and outcome variables. However, to partially assess medicine sharing trends overtime, respondents were asked to report their sharing experiences in the past year and during their lifetime. Longitudinal studies can be designed to prove causal relationships, and to examine trends in sharing medicines overtime. Since the respondents were mainly members of selected patient support groups, the findings have also limited generalisability to the general public. Those who are less educated, non-English speakers, not members of support groups, indigenous people and other ethnic minorities were not well represented. In addition, because of the nature of the study only those with access to the internet could participate.

Questions about lifetime sharing behaviours addressed only instances of borrowing and lending, and frequency of lifetime lending and borrowing behaviours were not explored. Therefore, respondents who shared on one occasion and those who might have shared regularly were both classified as borrowers and lenders. However, sharing on a few occasions might not bear the same risks or benefits as frequent sharing behaviours. Furthermore, because of the strict definition of lending and borrowing behaviours, some forms of medicine sharing behaviours may not have been captured, for example, trading one type of medicine for another. There was also little control over the selection of participants and there might have been some degree of self-selection bias. Generally, people are more likely to take part in the survey if they see questions which interest them or if they are attracted by large incentives offered for participation, thus survey respondents might have different characteristics than those who did not take part. Therefore, in this study those who had and/or intended to share medicines or those who had an interest in the research topic might have been more interested to take part.
However, this is also a limitation of other survey modes which are based on voluntary participation. For example, in a large, population-based prospective cohort study of Norwegian mothers and children, using mail survey, self-selection resulted in biased prevalence estimates of exposure and outcomes. In addition, in this study as most participants were patients with chronic medical conditions and members of patient support groups, they were likely to receive information about the safe use of medicines from their respective support groups, hence be more aware of risks associated with sharing than the general public.

Another limitation is that, due to the relatively small sample size and possibly inadequate statistical power, certain effects or relationships that actually exist may not have been detected. Although this study applied widely accepted statistical techniques and thresholds, factor analysis techniques have many limitations, and rotation method choice and thresholds for inclusion or removal of variables are arbitrary. In addition, CFA is needed to examine the robustness of underlying factors identified in this study using a new dataset. Finally, the hypothetical questions assessing attitudes towards lending and borrowing behaviours were primarily designed to measure respondents’ intention to borrow and lend medicines in different circumstances, and to see if their intention can predict actual medicine borrowing and lending. Intention does not necessarily translate into actual behaviour; however, there is strong evidence that supports the correlation between intention and actual behaviour.

7.9 Summary

In summary, prescription medicine sharing may have negative health outcomes, although there are situations when it may also be beneficial, as well as have important social meaning. Much has been proposed to reduce the diversion of abusable prescription medicines. In contrast, little is known about strategies that may reduce the risks of non-recreational sharing. The main findings of this study offer insights about the extent of sharing, types of shared medicines, reasons for sharing and predictors of sharing behaviours among adults in NZ, thus it is a valuable addition to the current sparse knowledge. The data also contribute to developing strategies to reduce harms associated with sharing.
Chapter 7 An online survey of NZ adults’ medicine sharing behaviours

Overall, medicine borrowing and lending were more common in this sample compared to previous research from NZ\textsuperscript{32} and national studies elsewhere.\textsuperscript{1,2,5,12} Painkillers, allergy medicines, asthma inhalers and antibiotics were the most frequently lent and borrowed medicines, signifying the need to target intervention efforts towards these medicines. Many different reasons were cited for sharing medicines, indicating the multidimensional nature of medicine sharing and the need for broader harm-reduction efforts which recognises the way medicine sharing is viewed by patients. This study has also identified the characteristics of individuals most likely to share medicines, such as females, older age, those with asthma, allergy, sleep problems or chronic pain. Although largely non-modifiable, these characteristics can be used to identify priority groups for interventions. In addition, this research expands the current knowledge of medicine sharing predictors by examining underlying behavioural factors which predict sharing behaviours and that can be modified by interventions.

The combined rates of borrowing and lending were also high; 37.8\% reported ever borrowing and lending and 20.2\% both borrowing and lending in the past year. Many of the risk factors for borrowing also operate in a similar fashion for lending, further supporting the relationship between the two behaviours. Therefore, an intervention proposed for one behaviour should also be able to influence the other.

Finally, this research suggests using a multifaceted harm-reduction interventions which consider aspects of medication types, health condition, economic, behavioural, and psychosocial factors which appear to contribute to borrowing and lending.
CHAPTER 8. FINAL DISCUSSION

8.1 Chapter overview

This thesis has explored different aspects of prescription medicine sharing behaviours among NZ adults, focusing on non-recreational sharing, the extent and reasons for sharing, types of commonly shared medicines, the positive and negative consequences of sharing, predictors of sharing behaviours and potential intervention strategies have been explored.

The chapter is organised as follows. First, the significant and important findings of the thesis are summarised and triangulated. This is followed by a discussion of strengths and limitations of the research as a whole. The broader contribution of the findings to literature, and implications for practice and policy are then discussed. Finally, directions for future research are presented.

8.2 Key findings of the thesis

This thesis was designed to explore the non-recreational prescription medicine sharing behaviours of NZ adults. The central research questions were: “Why do adults share medicines and how do they decide to share?” The research aims were:

- To understand patients’ and healthcare providers’ experiences and attitudes towards medicine sharing
- To understand how adults decide to share medicines, including their reasons for sharing medicines
- To describe prescription medicine sharing behaviours, including the consequences of sharing, the extent of sharing and the types of commonly shared medicines.
- To identify factors that may contribute to medicine sharing and to examine the strength of the association between identified factors and medicine sharing behaviours.
- To propose intervention that may reduce the potential risks and harms of medicine sharing using a ‘harm reduction’ approach.
8.2.1 Summary and triangulation

The survey findings from this thesis suggest that medicine borrowing and lending behaviours were more common in this sample than in samples of other similar studies. The difference can be partially explained by the fact that most of the current survey respondents self-reported having chronic diseases and were likely to have more medicines to share. Additionally, unlike other studies, which used face-to-face data collection methods, this research employed an online data collection method, and this might have minimised social desirability bias and improved accuracy of reporting of sharing practices. Overall, in combination with the results of an earlier study in Auckland, the thesis findings have shown that a substantial number of adults admit to sharing prescription medicines in NZ.

The thesis has used a combination of qualitative (exploratory) and quantitative (explanatory) methods, and the triangulation of these results is presented below. Triangulating data sources helps to increase the validity and reliability of the research and decreased subjectivity in interpretation of findings. Furthermore, triangulation provides richer and comprehensive information about medicine sharing and minimised the inadequacies of qualitative and quantitative data collection methods.

The qualitative and quantitative data indicated that the reasons for medicine sharing are complex. The qualitative studies revealed a wide range of personal (internal) and environmental (external) factors influencing sharing behaviours. Personal factors included a lack of knowledge about the risks of sharing, forgetting to carry around own medicines, altruism, illness denial and embarrassment about seeing a doctor and a fear of the negative consequences of missing doses of medicines supposed to be taken regularly. Economic, sociocultural and health system-related factors were found to be among the external factors influencing sharing behaviours. Some of these factors are a lack of access to healthcare, the inconvenience of visiting a doctor, the cost of a medical consultation, having leftover, unused or an oversupply of medicines at home, cultural and linguistic barriers, and having the same illness or medicines as the other person.

In contrast to the qualitative data, the responses of survey participants to the open-ended questions pertaining to reasons for medicine borrowing and lending indicated that the reasons for sharing related mainly to forgetting to carry around own medicines, having the same medicines or illness as the other person, running out of previously prescribed
medicines, emergency situations and a lack of access to or the inconvenience of obtaining professional medical care at the time of illness. Cultural and linguistic barriers, a lack of knowledge about the risks of sharing and embarrassment about seeing a doctor were not cited as major reasons for sharing by survey participants. This may be due to under-representation of culturally and linguistically diverse groups in the survey sample; the majority of participants self-identified as NZ European and are less likely to experience cultural and linguistic barriers compared to other groups (e.g. indigenous people and other ethnic minorities).

In regards to the positive consequences of medicine sharing, the patient interview participants reported that sharing helped them to avoid treatment costs and the inconvenience associated with medical visits such as booking appointments, waiting at busy surgeries and arranging transport. Most of the healthcare provider interview participants also believed that sometimes the benefits of sharing outweighed the potential risks, for example, in an emergency situation or to comply with doses of regular medicines. In addition, the positive impact of sharing on social relationships was noted by both groups of interview participants. The survey participants also cited most of the above benefits under the reasons for sharing medicines. The benefit of sharing in an emergency situation,\textsuperscript{37} when doctors’ fees are unaffordable\textsuperscript{37,38} or when a healthcare system does not satisfy the needs and expectations of people have also been reported by other studies\textsuperscript{37-39}; however, these studies did not provide a detailed explanation as to the benefits of sharing.

Unanticipated side effects, allergic reactions, overdosing and taking inappropriate medicines were the main adverse consequences reported by qualitative and quantitative study participants. In addition, the qualitative study participants noted the potential public health risks of medicine sharing, such as increased antimicrobial resistance and a decrease in the quality of pharmacovigilance data. Overall, the qualitative study with patient participants revealed a broader range of adverse effects than revealed by the survey participants. One possible explanation is that the survey participants were asked only about their actual negative experiences from shared medicines, while the qualitative study participants discussed both hypothetical and actual negative consequences of shared medicines. Of note is that, unlike in the qualitative interviews, it was not possible to prompt/probe the survey participants and, as a result, the survey did not result in the same level of detail and a full range of reasons for sharing medicines, thus the interpretation of these results in comparison with the qualitative results needs to be treated with caution.
This research also aimed to identify the types of medicines commonly shared among adults in NZ. The qualitative interviews provided an overall picture of medicines commonly shared by patients and findings were used to determine the list of medicines to be included in the online survey. The online survey findings suggested that painkillers, antihistamines, asthma inhalers, and antibiotics were the most frequently borrowed and lent medicines. Generally, there were more similarities than differences between the qualitative and quantitative findings. For example, the patient interviews revealed that medicines meant for ‘complicated’ medical conditions are less likely to be shared. Similarly, medicines used for ‘complicated’ conditions, such as heart problems, high blood pressure and diabetes were the medicines which were most commonly perceived by the survey respondents as unsafe to be lent or borrowed. The findings regarding the most frequently borrowed and lent medicines are largely consistent with previous reports.2,12,13,15,32

The other aim of this thesis was to explore the predictors of medicine borrowing and lending behaviours. As has been discussed in section 7.6.13 of Chapter 7, this research has identified two types of medicine sharing predictors: non-modifiable and modifiable. Although the focus of this research was on modifiable predictors, non-modifiable predictors are also important. Findings regarding non-modifiable predictors are mixed with respect to the extant literature. For example, although previous studies have documented negative associations between age and medicine borrowing or lending behaviours,12,32,63 in this research it was found that the odds of borrowing and lending were higher for the oldest group than the youngest group. These inconsistencies indicate the need for further research. On the other hand, the consistent finding across studies is a higher odds of borrowing and lending for females, and should not be overlooked.1,2,12,59 Intervention designers might, for example, pay attention to individuals with history of asthma and chronic pain as the odds of borrowing and lending were higher for these subgroups. Such information, when interpreted in a culturally appropriate way and in a non-judgemental manner, might allow us to target appropriately designed interventions.

Unlike prior studies,1,2,12-14,32 this research was not limited to examining non-modifiable predictors of sharing. Through factor analysis, a number of potentially modifiable latent variables, which can predict sharing behaviours, were explored. For example, the odds of borrowing were higher among those who scored higher in the ‘access-related issues’, ‘concern about missing doses’ and ‘emotional belief’ subscales. Moreover, the odds of
lending were higher among those who scored higher in the ‘concern for the wellbeing of others’ and ‘beliefs about the benefits and safety of lending’ subscales. Conversely, higher ‘perceived risk of harm’ of borrowing and lending was inversely related to borrowing and lending behaviours respectively. Nevertheless, as findings from a cross-sectional survey do not prove causal relationships, care should be exercised when interpreting the results. Although the qualitative studies revealed potentially modifiable sociocultural factors influencing sharing behaviours, these factors were not found to be significant predictors of sharing (see section 7.7 of Chapter 7 for more discussion). In addition, although this research applied the COM-B model and factor analysis to examine as many modifiable predictors as possible, given the multiple factors involved in medicine sharing, this research might not capture all predictors of sharing. Future investigations might help to identify additional risk factors for sharing medicines and to inform more comprehensive interventions.

Leftover medicine storage practices were also investigated as part of this thesis. While storing leftover medicines is not always an undesirable practice, the research findings found that a large proportion of participants (72%) stored leftover medicines, and this may create opportunity for sharing.

### 8.2.2 The use of the COM-B Model

Examining various dimensions of medicine sharing using behaviour change models was not among the original aims of the thesis. The introduction of the BCW framework and the associated COM-B model later in the PhD provided insight into the relationships between a wide range of factors influencing medicine sharing and indicated potential targets for intervention. Based on the COM-B analysis, reasons for medicine sharing (discussed above) were categorised into ‘Capability’ (e.g. lack of knowledge about risks of sharing), ‘Opportunity’ (e.g. cost of medical visit, inconvenience of medical visits or cultural and linguistic barriers) and ‘Motivation’ (e.g. altruism, embarrassment to seeing a doctor or carrying around own medicines) related factors, and theoretically underpinned interventions to address each of the factors influencing sharing were proposed (discussed below). In general, the COM-B analysis provided a theoretically underpinned description of factors influencing sharing behaviours, an explanation for the mechanism of change and a systematic procedure for designing intervention. However, while the present research is a useful first attempt at connecting non-recreational sharing behaviours with
models of health behaviour, future studies using larger sample sizes and different target populations could assess whether the COM-B model can provide a complete understanding of sharing behaviours. Future research should also attempt to use other social and behavioural models and theories (such as the integrative model of behaviour prediction\textsuperscript{133} and the social ecological model\textsuperscript{369}) to look beyond epidemiological data and demographic determinants so as to inform a well-thought out prevention efforts.

8.2.3 Proposed intervention

As has been discussed in Chapter 6, based on the BCW and COM-B analyses of the qualitative data, this research has proposed a multifaceted intervention that may reduce potential risks and harms of medicine sharing. The proposed intervention encompassed several specific intervention functions, which included: (i) education, such as providing information on safe disposal of leftover medicines; (ii) persuasion, such as explaining the potential risks of sharing to change patients’ attitude towards safe use of medicines; (iii) enablement – for example, removing/reducing the cost of medical visits for those who have financial problems or helping patients to assess the risks of sharing and make an informed choice; (iv) environmental restructuring, such as a service collecting leftover medicines from households; and (v) restriction – for example, avoiding oversupply of prescription medicines by prescribing smaller quantities of medicines such as painkillers.

The intervention functions (strategies) outlined above are in line with a ‘harm reduction’ philosophy. The primary emphasis of the overall intervention is to minimise the potential risks and harms of sharing rather than abolishing sharing behaviours. The strategies are pragmatic, in that they are based on an acceptance that, while we are unlikely to be able to eliminate medicine sharing and that all sharing carries risks, some forms of sharing are safer than others, and that helping patients to share medicines in safer ways can reduce unnecessary harms. The strategies emphasise proactively discussing the potential risks of medicine sharing with patients so as to help them make informed decisions. In addition, the strategies encourage healthcare providers to be non-judgmental while dealing with patients who have and/or intended to share medicines. In line with a ‘harm reduction’ perspective, the strategies include respecting the rights and dignity of the patient\textsuperscript{370}; people should not be criticised for sharing medicines. Instead, patients should be informed about the risks and benefits of sharing. The strategies also prioritise providing information, resources or services, such as distributing pamphlets or collecting leftover medicines from
households, which reduce the risks of unsafe sharing practices over abolishing medicine sharing practices. This is because when the risks are reduced, harms are likely to be avoided or significantly reduced as well. However, the strategies have yet to be piloted, and there is no guarantee of their feasibility or even their effectiveness. It is also worth noting that, although the use of a behaviour change model and a ‘harm reduction’ approach may shed light on the best ways to reduce the risks and harms related to medicine sharing, there is no simple solution to the problems associated with medicine sharing, or indeed most risky health behaviours in general.

### 8.3 Strengths of the research

The sequential, exploratory mixed method design used in this thesis helped to capitalise on the strengths of both qualitative and quantitative approaches and has provided a comprehensive understanding of medicine sharing behaviours. The main strength of the qualitative phase was the depth of information obtained from analysing the experience of patients and healthcare providers regarding medicine sharing. The multi-layered, analytic approach used in the qualitative studies allowed for a deeper understanding of sharing behaviours and led to the development of more specific research questions in the quantitative follow-up phase, whereas the quantitative phase helped to assess the extent of sharing and to identify predictors of sharing behaviours.

Triangulating qualitative and quantitative data also improved the validity of the research findings and level of variation and strengthened the overall quality of the research. Triangulating data provides an opportunity to combine the strengths of both qualitative and quantitative methods and provides a broader perspective and insights that are beyond the scope of any single method of data collection.

The sequential, exploratory design allowed each form of data to be analysed individually and decreased the potential for mixing methodological assumptions. The sequential, exploratory design method has also led to uncovering unexpected (or emergent) themes and information that would not have otherwise been discovered, such as sociocultural and behavioural aspects of sharing. In addition, choosing the sequential design over concurrent mixed methods approaches enabled the qualitative study findings to guide variables selection for the online survey, in a way that would not have otherwise been possible.
Chapter 8 Final discussion

This design also guided the selection of the survey study variables and hence reduced the uncertainty surrounding the selection of variables for quantitative research.44

Previous examination of predictors of medicine sharing has typically been limited to basic patient characteristics (e.g. demographics) and the relationships between other variables and sharing behaviours were not fully explored. This thesis has expanded knowledge in relation to (predictors) risk factors for medicine sharing by identifying a range of latent variables (e.g. psychosocial and behavioural factors) underlying these sharing behaviours through the qualitative work and subsequent COM-B and PCA analyses. Apart from identifying previously unreported predictors, such as ‘perceived risk of harm’, ‘concern for the wellbeing of others’, ‘concern about missing doses’, ‘emotional beliefs’ and ‘beliefs about the benefits and safety of lending’, this thesis also re-evaluated previously identified patient characteristics associated with medicine sharing.

As mentioned in section 8.2, previous research into medicine sharing behaviours generally has not been underpinned by or subjected to theoretical scrutiny. This research has extended our understanding of sharing behaviours by exploring theoretical explanations for medicine sharing and attempting to explain the mechanisms through which factors influencing sharing behaviours, operate. To the researcher’s knowledge, it is also the first study to propose a systematically developed and theory-based behaviour change intervention for minimising harms related to non-recreational sharing (see Chapter 6). This approach has been helpful for identifying appropriate targets for intervention.134

In addition, this research used a ‘harm reduction’ philosophy as a basis for understanding non-recreational sharing behaviours. This approach helped to focus on potential harms of sharing while acknowledging the importance and benefits of sharing in some circumstances, and the fact that it is a behaviour which may be difficult to change. Therefore, taking a ‘harm reduction’ approach provides a different lens through which to view how to manage risks associated with medicine sharing.

8.4 The research limitations

The studies forming this thesis have several limitations. Limitations related to each study were explained in preceding chapters; in this section the overall limitation of the thesis will be discussed. First, the shortcomings of medication sharing definitions and measures
will be discussed, followed by the limitations associated with the samples and the research methodologies.

8.4.1 Definition and measures

Despite the recent increase in non-recreational, medicine sharing research, there is still inconsistency in defining and measuring medicine sharing behaviours. These discrepancies could potentially affect interpretation and comparison of the research findings with existing literature. Broadly speaking, non-recreational sharing is described as non-prescribed use of prescription medicines and a form of drug diversion. However, a decision was taken to avoid the use of the term ‘diversion’ as it comprises a range of behaviours including both non-medical and recreational use of medicines. Several definitions have been suggested for non-recreational sharing, and each definition has its own limitations. Some of these definitions include ‘medication exchange’, ‘medication swapping’, ‘sharing or receiving’, ‘extra-medical use’, ‘acquisition or redistribution’, ‘sharing, trading or selling’, ‘loaning or borrowing’, ‘lending or borrowing’, and ‘sharing or borrowing’. The major limitation of all these definitions is that they only indicate exchange of medicines between individuals and not whether the person receiving the medicines actually used them or if the medicines are replaced back into the supply of the lender. A similar limitation thus applies to this research.

Some studies have also used only one question to assess both lending and borrowing behaviours, and it is difficult to determine which behaviour is actually measured by such studies. In order to minimise the above limitations, this research used separate questions for assessing borrowing and lending behaviours, and detailed definitions and descriptions of both behaviours were given to each study participant so as to help them differentiate the behaviours.

Another challenge in measuring sharing behaviours is that some medicines (e.g. allergy and pain relievers) can be obtained either on prescription or OTC, and it was not possible to verify whether the medicines reported to be shared were actually prescription only medicines. This might have resulted in an overestimation of the extent of sharing behaviours. To minimise this problem, survey respondents were informed that a prescription medicine does not include those medicines which can be obtained OTC or from stores. However, some people might not have been able to differentiate between which medicines are OTC or prescription only.
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This research only explored non-recreational sharing behaviours; however, it is worth noting that medication abuse or misuse (defined in this research as recreational sharing) and non-recreational sharing behaviours are not always mutually exclusive. Some medication use behaviours which are often defined as medication abuse could be a health necessity and might not always be motivated by sensation seeking. For example, the motivation for abusing opioid analgesics could be for the alleviation or modulation of mental or emotional distress that has not been diagnosed and treated by a healthcare provider. In this respect, the motive for abuse or misuse can be considered as self-treating a problem rather than sensation seeking and hence can be classified as non-recreational sharing. In hindsight, it might have been worthwhile exploring all forms of sharing and later differentiating into recreational (or medication abuse) and non-recreational based on the motives or reasons for sharing. The initial decision to exclude any form of drug abuse was due to the fact that medication abuse is often linked with illicit drug abuse, and as such is linked to a population well researched, whilst this research sought to explore a less well understood topic and explored other population.

Comparing the data from this thesis with those of other studies is also limited as studies have used a range of recall periods, and in some studies recall periods were not specified.

8.4.2 Risks and harms from medicine sharing

As has been discussed in Chapter 1, non-recreational sharing can have several, potential negative consequences. However, this thesis did not attempt to quantify the negative health outcomes of medicine sharing. Instead, this research extrapolated possible harmful outcomes from other studies and an assumption was made about the risks and harms resulting from sharing. Also noted is that quantifying negative outcomes of sharing is difficult. For instance, as mentioned in section 7.7 of Chapter 7, in 2011, opioid analgesics were involved in 16,917 drug-poisoning deaths in the US and friends and relatives were the main source of these opioids. However, although a death can be associated with the use of an opioid analgesic, practically it may be difficult to establish a cause-effect relationship on the basis of medical records alone (such as death certificates) as often there might be concomitant exposures.
8.4.3 The samples

The samples for all the studies in this thesis were overrepresented by female participants. Twelve out of 17 patient interview participants, 72.4% of survey respondents, and all but two healthcare provider interview participants were females; this could affect the generalisability of findings to males. A higher proportion of female representation is also a limitation of other studies exploring the same issue\textsuperscript{2,5,15,18,32} and health research in general.\textsuperscript{364} It has been noted that females are more likely than males to seek health information\textsuperscript{353} and to volunteer for participation in health related surveys.\textsuperscript{364}

Over three-quarters (78.8%) of survey respondents and all but two patient interview participants had attended tertiary education. The lack of variation in the samples made the findings regarding education inconclusive. In addition, about 70% of survey respondents and 10 out of 17 patient interview participants self-reported their ethnic identity as NZ European. Although great effort was made to increase the participation of indigenous and minority ethnic groups, it was not successful. Therefore, comparison of findings by ethnicity was not possible. Whilst ethnicity has not been shown to be a robust predictor of sharing behaviours, internationally,\textsuperscript{5,18,32,40} further research is required to explore the cultural context of sharing, and implications of this for health and health-related interventions. Generally, the findings of this research may be more generalisable to Caucasian, educated women than other groups. Nevertheless, the overall findings of the research are fairly consistent with another study conducted in NZ\textsuperscript{32} and other international studies that have used representative samples.\textsuperscript{1,12} Although the current survey participants were fairly well distributed by age, age categories across studies are different and comparison of findings should be treated cautiously.

8.4.4 Methodological limitations

Detailed methodological limitations for each study have been discussed in preceding chapters. This section takes a broad overarching approach.

This research employed a sequential exploratory, mixed method design.\textsuperscript{44} Although this design provided the needed overall structure and strategy for collecting qualitative and quantitative data, it has also posed some challenges. Due to the emergent nature of this research design strategy, the planning of the online survey did not commence until the qualitative studies were completed. This was because the quantitative research questions
and the contents of the survey questionnaire were determined by the first phase findings. Any kind of research could have been undertaken depending on the first phase findings. For example, if the patient interviews had revealed a completely unanticipated phenomenon, then another qualitative study could have been undertaken to understand the new phenomenon.

Most of the data in this research were gathered using self-report methods and it is not possible to guarantee the accuracy and trustworthiness of the responses. Some participants might have provided responses that may not reflect their actual behaviour or genuine attitudes despite many efforts to reduce the likelihood of this. In addition, the quality of self-reported data might have been affected by the accuracy of respondents’ recall.

8.4.5 Transferability of findings

Research participants were recruited using purposive and convenience sampling methods. Therefore, some groups of the NZ population have been under- or over-represented in the samples, and the generalisability of the findings beyond the samples is limited. Furthermore, this research was undertaken in a developed country setting and may not be transferable to other settings. Differences in healthcare systems, access to medicines, medicines regulations, economy and culture could also affect the transferability of findings. Nevertheless, the research findings have relevance to countries with similar healthcare systems. The research also lays foundations for expanding medicine sharing research to developing countries, where access is an issue and higher rates of medicine sharing may exist. Future research can improve transferability by including larger and more representative samples, and controlling for other relevant variables not examined in this research.

8.5 Contribution of the thesis to what is known about non-recreational medicine sharing

This research has made several contributions to the body of literature on medicine sharing. Non-recreational medicine sharing is an under-researched topic and currently there is a lack of in-depth understanding of sharing behaviours. This thesis has taken a
Chapter 8 Final discussion

comprehensive look at non-recreational sharing behaviours, and the findings will add to the growing literature concerning medicine sharing.

The current research has updated our understanding of medicine sharing. The systematic review and the online survey results have indicated large discrepancies in reported prevalence rates of sharing behaviours.

Most of the evidence around non-recreational medicine sharing has been from cross-sectional surveys and has taken a medical perspective,\textsuperscript{1,2,5,12,13,18,45,59} that is, sociological or patient perspectives are largely overlooked. This thesis has tried not to introduce such a bias to the data collection and interpretation, by giving equal voice to both positive and negative aspects of sharing, and exploring the views of patients as well as healthcare providers. The qualitative components of the thesis have also helped to uncover reasons for medicine sharing and results indicate where future research could focus.

From our findings, it appears that people are sharing their prescription medicines in an attempt to be helpful, and do not intend to put others at risk. Sharing can be seen as a cooperative and altruistic behaviour, thus it is possible that the social values of sharing, concern for the wellbeing of others (or empathy) and the joy of helping others are likely to evoke feelings of altruism to share medicines. Therefore, understanding people’s attitudes towards helping others at a time of illness may shed light on their decision to share medicines.

Other external factors, such as limited access to medical care, emergency situations or the cost of treatment appear also to shape the person’s attitude towards sharing, and perhaps, in these circumstances, sharing may reduce potential negative health outcomes. Additionally, good medicine sharing practices are likely to save resources (such as time and money) from being wasted on unnecessary medical visits for minor ailments and may reduce absenteeism from work due to minor medical conditions.

However, sharing medicines is not a risk-free behaviour. Previous studies have raised concerns about the extent of medicine sharing among people and the potential adverse consequences,\textsuperscript{2,5,16,18} and the present research further confirmed these concerns. Incorrect choice of medications, inadequate or excessive dosage, failure to recognise contraindications, interactions or allergies, failure to report previously shared medicines to prescribing doctor or pharmacist and failure to report adverse drug events of shared
medicines are some of the potential risks of sharing.\textsuperscript{4,5,13} Furthermore, unsafe medicine sharing practices could potentially result in an increase in public expenditure.

Non-recreational sharing may also be a gateway behaviour to drug abuse.\textsuperscript{6} As noted by Goldsworthy, children often grow up seeing their parents self-medicating their illnesses and sharing medicines, and this may have contributed to growing drug abuse practices reported among adolescents.\textsuperscript{6}

### 8.6 Implications for practice and policy

The findings of this research and the previous study in Auckland\textsuperscript{32} indicate that a significant number of individuals are sharing prescription medicines, including opioid analgesics, antibiotics and other ‘high risk’ medicines. This suggests that screening for medication sharing practices could be a useful part of routine prescribing and dispensing practices in NZ, particularly for high risk medicines, such as opioid analgesics and antibiotics. As has been discussed in Chapter 6, screening should include non-threatening questions and be undertaken in non-judgmental manner. Available electronic medication records can also assist the screening process. Additionally, the fact that painkillers were the most frequently shared medicines highlights the need for healthcare providers, particularly pharmacists, to ensure that patients know how to assess the potential risks of sharing strong painkillers. Patients should also be informed about safe disposal practices of no longer needed pain medicines at the time of dispensing.

The finding that an increased perception of harm was negatively associated with lending and borrowing behaviours indicates that informing patients about the potential risks of sharing at the time of prescribing and/or dispensing may reduce inappropriate sharing practices. Posters and leaflets which show the potential risks of sharing medicines could be used to increase risk awareness.

The thesis results are also in line with previous research findings in that individuals who could not afford a doctor’s fee or who could not easily access medicines were more likely to use someone else’s medicines.\textsuperscript{37,38} This suggests the need to improve access to medicines and healthcare, to minimise the likelihood of sharing medicines among patients, particularly for those on lower incomes. This effort should not be limited to making medicines available, but also include addressing structural barriers to healthcare access, such as transportation costs incurred whilst travelling to and from health facilities.
Chapter 8 Final discussion

However, it is worth noting that addressing structural barriers is a large and multifaceted issue and future studies should focus on assessing specific barriers to accessing medical care and patient characteristics that predict visiting healthcare facilities at a time of illness.

The online survey results are consistent with previous research which has demonstrated that a significant number of people store medicines which are no longer needed, at home and fewer than one-third of respondents received information from healthcare providers about safe disposal of medicines. Community pharmacists are the most accessible health professionals and they are in a unique position to inform patient about safe disposal of leftover medicines. Subsidising community pharmacies to promote the collection and safe disposal of unused or leftover medicines may help to reduce the volume of leftovers in households and hence the opportunity for sharing. In addition, non-compliance with medications is likely to increase the amount of leftover medicines, thus adherence counselling is crucial to reduce the amount of leftover medicines and hence the opportunity for sharing. It is also important to incorporate questions assessing medicine sharing behaviours in routine medication reconciliation activities and diagnosis practices. Minimising the oversupply of some medications (e.g. pain relievers) might also help to reduce leftover medicines.

To date, no studies have been published which describe potential interventions for non-recreational medicine sharing. This is the first study to explore the possibilities for medicine sharing, harm reduction interventions. Therefore, the findings in conjugation with theoretical explanations will assist health planners in designing targeted interventions.

Multiple sources of data allowed the researcher to examine sharing behaviours in detail and to make general and more specific policy suggestions. With about half of survey participants reporting sharing medicines, policy efforts to reduce inappropriate use of medications should include the issue of medication sharing. Medicine sharing could also be viewed as an issue of self-diagnosis and self-medication and could be related to a range of factors determining self-treatment, such as insufficient access to healthcare or dissatisfaction with healthcare system.

The healthcare provider interviews revealed that currently in NZ, there are no clear guidelines explaining the circumstances in which medicines should and should not be shared, nor what healthcare providers should do if they suspect this behaviour might be
harmful. Therefore, providing guidelines for doctors and pharmacists on good practices with respect to medicine sharing may help them to knowledgeably advise patients who have and/or intend to share medicines. Workshops and professional development articles may also help to raise healthcare providers’ awareness of the potential risks of sharing.

Many of the implications for practice can also be applied to policy. For example, to reduce leftover medicines being stored at home, policy makers may want to target prescribing practices by creating awareness among prescribers to limit unnecessary or overprescribing of medicines. Policy interventions that strengthen and promote leftover medicines return or safe disposal programmes are also required, for example, through providing incentives for pharmacies to increase their capacity to collect and safely dispose of unused medicines. In situations where medicine return programmes are less feasible, educating patients about other safe disposal practices and the risks of sharing could be helpful. For some classes of medicines (e.g. painkillers), shorter periods of supply can also be considered. However, the advantages and disadvantages of shortening the period of supply for each medicine should be investigated.

In order for individuals to be able to make educated medicine sharing decisions, they must have adequate health literacy. Those with adequate health literacy are more likely to have the knowledge required to obtain, analyse and comprehend medication related information, which might be useful when trying to decide when and what to share and not to share. On the other hand, those with low health literacy may not have the ability to navigate the healthcare system, including locating and appropriately communicating with healthcare providers, and sometimes they may access medicines through alternative sources, such as medicine sharing. Therefore, healthcare providers should consider the health literacy of their patients while prescribing or dispensing medicines in order to increase their ability to access and understand relevant information on medications and to reduce opportunity for unsafe medicine sharing.

This thesis and the results of other studies have indicated consistently that antibiotics are among the most commonly shared medicines. Apart from saving money and time, it is possible that people might be sharing antibiotics due to a lack of awareness of antimicrobial resistance and the potential for allergic reactions. Therefore, to address this, health planners should consider providing more information to the general public, such as through mass media, posters and brochures. There is sufficient evidence supporting the effectiveness of educational campaigns in changing the public knowledge and attitudes
towards antimicrobial resistance. Additional educational and persuasion strategies are outlined in Chapter 6.

8.7 Directions for future research

Medicine sharing is a complex behaviour that involves not only human factors, but also environmental factors. In general, the overall aim of future research should be to exploit the potential benefits of sharing and to reduce the risks of sharing. Understanding the relative benefits and risks of sharing has important implications for choosing the type of interventions that is appropriate.

A lack of national medicine sharing prevalence data means estimates of sharing prevalence in NZ is still warranted. One way of estimating the prevalence of sharing is through incorporating specific questions assessing non-recreational sharing into large existing health behaviour surveys, for example into the annual NZ Health Survey.

This research has identified several health system issues influencing sharing, such as the inconvenience of visiting a doctor, medication costs, limited access to medications or health facilities, wait times and missed appointments. Therefore, future research should focus not only on medicine sharing itself, but also on the health system and the health professionals who regularly advise patients. Potential research questions could be: “What are the health system-related factors preventing people from obtaining their own prescription medicines?” It is worth noting that medicine sharing may be a coping strategy or a response to the existing healthcare system that might not satisfy the needs and expectations of some people (e.g. not fitting with certain cultural norms) and should not always be seen as a negative behaviour.

While medicine sharing can have several negative health consequences, little is known about the nature and extent of these adverse events. No published estimates of harms from shared medicine could be identified. However, the qualitative interviews in this thesis revealed some harms of sharing, such as allergies, taking inappropriate doses or wrong medicines and poor treatment outcomes. In order to quantify the harms from the use of shared medicines, future research should utilise different forms of data and data collection, such as emergency department visit records, adverse drug reaction reports, death certificate registries or NZ National Poison Centre records. Potential research questions could be: (i) What is the extent of harm (such as death, poisoning, hospitalisation) as a
result of medicine sharing? (ii) What proportion of medicine sharing results in delays in seeking medical care? (iii) What is the extent of bypassing medication instructions while sharing medicines? (iv) How does medicine sharing affect the quality of adverse drug reactions reporting/clinical trial data? and (v) What proportion of antibiotic resistance is attributable to medicine sharing? It is also essential to differentiate the primary (e.g. accidental overdose) and secondary harms (e.g. decrease in quality of adverse drug reaction reporting) of medicine sharing across populations and different settings.

To date, research on adverse outcomes of medicine sharing has largely focused on negative health outcomes.3-5,13 Future investigations should look into the negative social and economic impacts of sharing to provide a complete picture of the adverse consequences of sharing..

Risk factors for medication sharing will differ based on medication type. Due to the relatively small sample size, the risk factors for sharing by medication types were not examined in this thesis. Taking into account the limitations of this research, risk factors for sharing specific types of medicines needs to be researched. Medicines which are reported to be frequently shared could be a starting point, particularly high risk medicines such as strong painkillers, antibiotics and oral acne medicines. However, other medicines should not be ruled out. Increasing our knowledge of the risk factors for the sharing of each type of medicine is critical for proposing/developing optimal harm-reduction strategies which can then be adapted to meet the unique needs of individuals sharing each types of medicines. For example, the survey findings showed that those who had a stronger belief that harm can result from borrowing or lending prescription medicines had lower odds of medicine borrowing and lending. Past research has also documented a negative association between a higher perceived risk and engaging in other potentially risky health behaviours.390 However, the perception of risk or harm may be influenced by sociocultural factors, individual experiences with the target behaviour (i.e. sharing in this research context) and environmental factors.360 Therefore, further research which considers a number of interacting variables is needed in order to expand our understanding of the relationships observed in this research. A potential research question is: “How do people perceive the risks/harms of sharing certain types of medicines?” This research question can be framed around risk/behaviour theoretical models, such as ‘behaviour motivation hypothesis’, which explain how perceived risk could affect engaging in risky health
behaviours. Research exploring how patients assess potential risks and benefits is also required.

This research has shown that some classes of medicines are more likely to be borrowed or lent than others. Closer investigation is required in order to understand why this occurs. For example, is it because of a difference in risk perception or is it simply because some medicines are more available to share than others?

In the online survey, those who did not report medicine sharing were not asked for their reasons for not sharing medicines. This was in order to limit the number of survey questions to maximise the response rate. This is an important question for future research, as it may help to uncover factors which protect against risky sharing behaviours. In addition, the current research only investigated the general reasons for sharing medicines, but reasons for sharing each kind of medicine can be different and needs more detailed investigation.

While the thesis focused on adults, medicine sharing among young people should also be explored. To date, there is no research evidence about young New Zealanders’ (< 18 years of age) non-recreational medicine sharing behaviours. While the types of medicines being shared and the reasons for sharing could be potentially different for this subgroup, it has been noted that medicine sharing behaviours are also common among young people. Social networking sites, such as Facebook and Twitter, offer an easy access to a broader range of adolescents and young people and novel ways of collecting data. A possible research question could be: “What are the characteristics and motivations associated with non-recreational medicine sharing behaviours among young people living in NZ?”

Due to a lack of participation of ethnic minorities and methodological limitations, this study did not specifically explore medicine sharing practices among indigenous people, immigrants and disadvantaged minority subgroups. Cultural differences (such as language, family values, and beliefs about medications) and difficulty of accessing health services may result in medicine sharing rates being higher among these subgroups. Future qualitative studies (e.g. using ethnographic or anthropological designs, and which are both culturally appropriate and culturally informed) are needed to identify any unique factors contributing to sharing practices among these subgroups.

This research could also be replicated in different settings, such as in resource limited settings and among non-English speaking communities. Current research evidence about
medicine sharing is largely from English speaking, Western countries and it is important to expand this research to other countries and cultures for a more inclusive and comprehensive understanding of borrowing and lending behaviours.

Psychological aspects of sharing are also important. Sharing results in gratitude and happiness.\textsuperscript{392} Therefore, one can argue that medicine sharing which involve the exchange of lifesaving commodities may invoke gratitude between individuals. Gratitude is a source of happiness in many ways; it is a facilitator of personal and social wellbeing, a motivator of pro-social behaviour, and an inhibitor of negative interpersonal manners.\textsuperscript{393} However, no research has yet examined the relationship between medication sharing and gratitude. It is important to look into how people feel when they share medicines and its subsequent effect on gratitude and happiness.

The biopsychosocial aspect of medicine sharing should also be explored. It has been hypothesised that sharing things may increase the release of oxytocin,\textsuperscript{392} a hormone known for its control of social behaviours.\textsuperscript{394} Oxytocin has a role in the regulation of emotion and pro-social behaviours such as reciprocity, social interactions and generosity.\textsuperscript{394,395} It also has an anti-stress effect, modulating the immune system, and building trust in social interactions.\textsuperscript{396,397} Experience of empathy has been observed to have a positive influence on the release of oxytocin and its subsequent effect on generosity.\textsuperscript{395} The findings of the survey indicate empathetic feelings for others (such as concern for the well-being of others) may influence people to share medicines. Therefore, to fully understand the complex interrelationships between bio-behavioural determinants of medicine sharing, extensive empirical (observational) experiments are needed. It is also worth further examining the relationship between altruism and medicine sharing behaviours. For example, people’s feelings, beliefs and behaviours related to helping others can be assessed using a validated self-reported altruism scale\textsuperscript{398} and medicine sharing behaviour can be compared among those who scored higher and lower on the scale.

The research findings suggest that medicine sharing may strengthen social relationships. Stronger social relationships in turn have been shown to be correlated with good health and decreased mortality.\textsuperscript{399} This research has also identified several sociocultural issues influencing sharing behaviours and medicine sharing should be considered within a wider social interaction. Hence, it is important to further examine the mechanism through which medicine sharing may influence social relationships and its subsequent impact on health.
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<tr>
<th>Key findings</th>
<th>Implications for policy and/or practice</th>
<th>Implications for future research</th>
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<tr>
<td><strong>High prevalence of sharing:</strong></td>
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<tr>
<td>• Ever borrowed = 55.6%</td>
<td>Screening for medication sharing practices should be part of routine medication reconciliation, dispensing</td>
<td>An ongoing, basic epidemiological study, regarding the extent and patterns of non-</td>
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<td>• Borrowed in the past year = 29.3%</td>
<td>and prescribing practices, particularly for high risk medicines (e.g. antibiotics or opioid analgesics) or</td>
<td>recreational sharing of prescription medicines and their consequences is needed</td>
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<td>• Ever lent = 45.9%</td>
<td>vulnerable groups (e.g. asthma patients)</td>
<td>Incorporating specific questions assessing non-recreational sharing into large existing</td>
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<td>• Lent in the past year = 32.4%</td>
<td>Policy efforts to reduce inappropriate use of medicines should include the issue of medicine sharing</td>
<td>health surveys, such as NZ Health Survey to estimate the national prevalence of sharing</td>
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<td><strong>Combined rates:</strong></td>
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<tr>
<td>• Ever borrowed and lent = 37.8%</td>
<td>Intervention efforts should be targeted towards the most frequently shared medicines</td>
<td>Closer investigation is required in order to understand why some classes of medicines are</td>
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<tr>
<td>• Borrowed and lent in the past year = 20.2%</td>
<td>Health planners should consider providing more information about the potential risks of sharing medicines to</td>
<td>more likely to be shared than others.</td>
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<td>the general public, such as through mass media, workshops, posters and brochures</td>
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<td>Matching prescribing quantities to the actual need of the patient (e.g. avoiding oversupply of painkillers)</td>
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<td>hence to minimise the opportunity for sharing</td>
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<td><strong>Types of shared medicines:</strong></td>
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<tr>
<td>• A range of medicines reported to be shared,</td>
<td>Intervention efforts should be targeted towards the most frequently shared medicines</td>
<td>The social meanings given to medicines are complex and needs deeper investigation to</td>
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<td>painkillers, allergy medicines, asthma medicines</td>
<td>Health planners should consider providing more information about the potential risks of sharing medicines to</td>
<td>understand medicine sharing behaviours.</td>
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<tr>
<td>and antibiotics were chief among them.</td>
<td>the general public, such as through mass media, workshops, posters and brochures</td>
<td>Research exploring how patients assess potential risks and benefits is required.</td>
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<td></td>
<td>Matching prescribing quantities to the actual need of the patient (e.g. avoiding oversupply of painkillers)</td>
<td>The relationship between altruism and medicine sharing behaviours should be further examined</td>
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<td>hence to minimise the opportunity for sharing</td>
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<td><strong>Perceived benefits of sharing:</strong></td>
<td>Sharing could be a coping strategy or a response to the existing healthcare system that might not satisfy the</td>
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<td>• To avoid treatment costs and the inconvenience</td>
<td>need and expectations (e.g. not fitting to cultural context) and should not always be seen as a negative</td>
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<td>associated with medical visits such as booking</td>
<td>behaviour.</td>
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<td>appointments, waiting at busy surgeries and</td>
<td>Healthcare providers may want to consider advising patients what should and should not be shared in non-</td>
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<td>arranging transport</td>
<td>confrontational way.</td>
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<td>• In an emergency situation</td>
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<td>• To ensure high adherence to a medication</td>
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<td>regimen when, temporarily, no personal supply is</td>
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<td>available</td>
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<td>• Strengthening social relationships</td>
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<td><strong>Negative consequences of sharing:</strong></td>
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<tr>
<td>• Unanticipated side effects or allergies</td>
<td>Unsafe medicine sharing practices may in part arise from a lack of knowledge about the potential risks of</td>
<td>While medicine sharing can have several negative health consequences, little is known about the</td>
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<tr>
<td>• Sharing inappropriate medicines</td>
<td>sharing, thus policy interventions which focus on increasing patient/public awareness regarding risks of</td>
<td>nature and extent of these adverse events. In order to quantify harms from shared medicines, future research</td>
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<td>• Antimicrobial resistance</td>
<td>medicine sharing and their ability to correctly assess</td>
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### Chapter 8 Final discussion

- Decrease in quality of pharmacovigilance data
- Unhygienic in some cases and can facilitate spread of infections

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<th>Challenges and Solutions</th>
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<tr>
<td>Decrease in quality of pharmacovigilance data</td>
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<tr>
<td>Unhygienic in some cases and can facilitate spread of infections</td>
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#### Factors influencing sharing behaviours:

- **Personal (internal) factors**, e.g., lack of knowledge about potential risks of sharing, misconceptions about the safety of certain medicines, forgetting to refill regular medicines, altruism, illness denial, embarrassment to seeing a doctor or carrying around own medicines, habit, and fear of negative health consequences from missing a few doses of medicines.

- **Environmental (external) factors**, e.g., lack of healthcare access, the cost of medical visits, inconvenience of visiting a doctor, waiting times at health facilities, linguistic and cultural barriers, poor quality communication with healthcare providers, having the same medicines or illness as the other person and having leftover medicines.

Medicine sharing behaviours can be influenced by many factors and interventions that address several key factors are likely to be the most successful. Increasing healthcare access for those who cannot afford doctors’ fees or prescription charges should be an important element of any intervention targeting medicine sharing.

- This research only investigated the general reasons for sharing medicines, but reasons for sharing each kind of medicine can be different and needs more detailed investigation.
- Future research should focus not only on individuals sharing medicines, but also on environmental and health system factors influencing sharing.
- Satisfaction with healthcare providers may also influence medicine sharing. Therefore, additional information on patient-healthcare provider relationship and patient satisfaction may increase our understanding of medicine sharing determinants.
Predictors of sharing behaviours:

- **Non-modifiable positive predictors:**
  - female gender, older age, history of asthma, allergies, sleep problems or chronic pain.
- **Modifiable positive predictors:**
  - access-related issues, strong emotional beliefs about borrowing, higher concerns about missing doses, higher concern for the wellbeing of others, strong beliefs about the benefits and safety of lending.
- **Negative predictors of sharing** (protective factors):
  - history of hypertension (for lending), higher perceived risk of harm of borrowing, and higher perceived risk of harm of lending.

Although difficult to change, non-modifiable predictors can help to identify priority groups for intervention. The effect of modifiable predictors (risk factors) can be reduced by interventions. Many of the risk factors (predictors) for borrowing operate in a similar fashion for lending, supporting the relationship between the two behaviours. Therefore, most interventions proposed for one behaviour should also be able to influence the other.

The fact that perceiving great harm can result from borrowing and lending medicines reduces the odds of medicine borrowing and lending respectively, indicates that informing patients about the potential risks of sharing at the time of dispensing or prescribing may reduce inappropriate sharing practices.

Increasing our knowledge of risk factors for each type of medicine is critical to be able to best adapt harm-reduction strategies to the unique needs of individuals sharing each types of medicines. Medicines which are reported to be frequently shared could be a starting point, particularly high risk medicines such as strong pain relievers, antibiotics and acne medicines.

Further research which considers a number of other interacting risk factors is needed in order to expand our understanding of the relationships observed in this research.

Medicine sharing harm-reduction interventions:

- **Education**, such as providing information on safe disposal of leftover medicines
- **Persuasion**, such as explaining the potential risks of sharing to change patients’ attitude towards safe use of medicines
- **Enablement** – for example removing/reducing the cost of medical visits for those who have financial problems or helping patients to assess the risks of sharing and make an informed choice
- **Environmental restructuring**, such as collecting leftover medicines from households; and
- **Restriction** – for example, avoiding oversupply of prescription medicines.

Interventions for problems associated with medicine sharing should focus on minimising the potential risks and harms of sharing rather than trying to abolish sharing behaviours.

Interventions focusing on improving the public’s ability to assess risks of sharing need to take into account lay beliefs and attitudes towards sharing specific classes of medicines.

A ‘harm reduction’ approach provides a useful conceptual framework to deal with the problems of medicine sharing.

Healthcare providers’ views about using a ‘harm reduction’ approach for non-recreational sharing should be explored.

There is no one simple solution to the problems associated with medicine sharing, the outlined interventions need to be piloted for their effectiveness and feasibility.
| A large proportion of survey respondents (72%) stored prescription medicines which were not currently needed at home. | Healthcare providers should inform patients about the safe disposal of leftover medicines. |
| Improving the effectiveness of medication adherence counselling may reduce the number/amount of leftover. |
| Creating awareness among prescribers to limit unnecessary or overprescribing of medicines. |
| Policy interventions that strengthen and promote leftover medicines take-back programmes are required, for example, through providing incentives for pharmacies to increase their capacity to collect and safely dispose of leftover medicines. |
| For some classes of medicines (e.g. painkillers), shortening the number of days’ of supply of a medication prescribed can be considered. |
| The advantages and disadvantages of shorter periods of supply for some types of medicines should be investigated. |
CHAPTER 9. CONCLUSIONS

The majority of previous research into non-recreational, prescription medicine sharing behaviours has been epidemiological in nature with the aim of assessing prevalence and demographic correlates of these behaviours; therefore, little was known about other aspects of sharing. The current research was designed to provide an in-depth explorations into the extent of sharing, the types of commonly shared medicines, and the consequences, predictors and reasons for sharing medicines. In addition, this research incorporates theoretical paradigms to underpin and explore non-recreational medicine sharing behaviours, to frame analyses and to propose comprehensive interventions to reduce the risks and harms associated with medicine sharing.

The research findings have shown that prescription medicine borrowing and lending practices are common among NZ adults. A range of medicines was found to be shared and painkillers, allergy medicines, asthma medicines and antibiotics were chief among them. Both positive and negative consequences of sharing were reported, and sharing was influenced by personal (such as knowledge, attitude, and motivation) and environmental factors (such as cost, access, and sociocultural factors). Sharing was also shown to be driven by pro-social behaviours, such as altruism.

This research has identified both modifiable and non-modifiable predictors of medicine sharing. Modifiable risk factors that health planners can act on include: ‘access-related issues’, ‘concern about missing doses’, ‘emotional beliefs about borrowing’, ‘concern for the wellbeing of others’, ‘beliefs about the benefits and safety of lending’ and ‘perceived risk of harm of lending/borrowing.’ Non-modifiable predictors include certain demographics (e.g. female gender, older age, higher household income, and living in three-person household) and health status variables (e.g. a history of asthma, chronic pain, sleep problem or allergies).

Analysing data using the BCW and the associated COM-B model offered insight into the underlying causes of medicine sharing and a systematic way of designing interventions. Findings suggest different interventions to reduce the potential risks and harms of sharing, including increasing patients’ and healthcare providers’ awareness about the risks of sharing, improving access to medicines and healthcare, collecting leftover medicines from households, and limiting the supply of prescription medicines to the actual need of the
Chapter 9 Conclusions

patient. However, these strategies need to be tested and evaluated to assess their effectiveness and feasibility. The research findings can assist healthcare providers and policy makers to choose effective and feasible approaches to combat problems associated with medicine sharing. Future longitudinal research based on behaviour change theories is needed to look beyond epidemiological patterns and to identify causal risk factors amenable to change.
LIST OF APPENDICES

Appendix 1: Copyright permission

March 2, 2016

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“Prescription Medication Sharing: A Systematic Review of the Literature”

Beyene
American Journal of Public Health
April 2014; 104(4): e15-e26

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Regards,

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(on behalf of The American Public Health Association)
Appendices

Appendix 2: Patient interview schedule

Opening question

1. What do you think prescription medicine sharing is?
2. What might be the benefits of lending or borrowing medicines?
3. What do you think are the disadvantages of lending or borrowing medicines?

Lending

4. Have you ever lent any prescription medicines to anyone? If No, why?

If ‘YES’, the following questions will follow:

A. Could you tell me in what circumstances you have lent your medicines?
Prompts: Did you lend the medicine to help out the person or for any other reason?

B. Who have you shared your medicines with?
Prompts: Have you ever lent to your family members, relatives, or close friends?

C. Which kind of medicines did you lend? And why?
Prompts: Where did you get these medicines from? Was the medicine a leftover?

D. Do you think sharing some types of prescription medicines is important? Tell me more about why you think this?

E. Can you think of any types of prescription medicines which are not safe to be lent?

F. Have you been influenced by TV/Radio/Internet Ads and commercials to lend medicines?

G. How did you decide whether the medicines were ok/safe to be given to that person?
Prompts:
   i. Did you try to check if the medicine you have lent was suitable for the person?
      If yes, could you tell me more how you have checked if the medicine was suitable for the person?
   ii. Did you tell the person how to take the medicine you have lent? If yes, what did you tell him/her?

H. Do you think any possible harms or risks of lending prescription medicines?
Prompts: Based on the answer: Why do you think these are the major harms/risks? What do you think the possible ways to prevent these harms are?
Appendices

If the respondent answers either YES or NO to question #4, these questions will follow:

- Could you tell me in what circumstances you would be willing to lend your medicines?

Prompts: Would you lend if someone from your family or friends ask you to borrow? Which of your prescription medicines you prefer to lend? And Why? Are you willing to give some of your prescription medicines for someone who is unable to afford for the medicines?

Borrowing

5. Have you ever borrowed a prescription medicine from someone else? If No, Why?

If yes #5, the following questions will follow

A. Which kind of medicines did you borrow? And why?
B. Was the medicine you have borrowed similar to those you had been taking?
C. Have you ever borrowed because of an inability to pay for medicines in the pharmacy or costs related to a GP visit? Was borrowing convenient for you compared to a GP visit to get prescriptions? Why?
D. Have you been influenced by TV/Radio/Internet Ads and commercials to borrow medicines?
E. Did the person who lent you the medicines give you written or verbal instructions and/or warnings for the medicines you have borrowed?

Prompts: What kind of instructions did you receive? Do you think the instructions you have been provided was sufficient to take the medicine safely?

F. Have you ever had a bad experience from taking borrowed medicines? If yes, please tell me more.

Prompts: Did your health condition get worse after taking the medicine you have borrowed? Have you ever had an allergic reaction from borrowed medicines? If yes, what did you do when you got the allergic reaction?

G. Did you visit your healthcare provider after borrowing medicines for your illness? What happened?

Prompts: Did you tell your doctor or pharmacist about the medicine you have borrowed during your visit for the same illness or during your other visits? If yes, can you tell me a
Appendices

bit more about that instance/case? If no, why? What advice/warning did you receive from your doctor or pharmacist when you inform them about your borrowing behaviour?

H. Do you think any possible harms or risks of taking someone else’s prescription medicines?
Prompts: Based on the answer: Why do you think these are the major harms/risks? How can these harms damage the borrower? What do you think the possible ways to prevent these harms are?

For those who answer either YES or NO to question #5, these questions will follow:

6. Would you be willing to borrow medicines from others?
Prompts: Under what circumstances? From whom? What type of medicines?

Thank you very much for your participation in this interview
Appendices

Appendix 3: Demographic questionnaire for patient interview

Questionnaire to assess the socio-demographics of Participants

1. Gender   a. Male       b. Female
2. Age in years  ......................
3. Which ethnic group do you belong to?
   a. New Zealand European  f. Māori
   b. Cook Islands Māori    g. Chinese
   c. Tongan                 h. Samoan
   d. Niuean                 i. Other, please specify....................
   e. Indian
4. What is the highest education level you have achieved?
   a. Illiterate
   b. Primary school
   c. Secondary School (three years or less)
   d. Secondary School (more than three years)
   e. Tertiary education (college or university)
5. Which of the following best describes your current working status?
   a. Working full-time    d. Student
   b. Working part-time    e. Retired
   c. Unwaged
6. What is your average monthly income? Rough estimate ..........................  
7. Have you been taking any prescribed medications in the past one year?  
   A. Yes
   B. No
Appendices

Appendix 4: Ethics approval for patient interviews

Office of the Vice-Chancellor
Research Integrity Unit

UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE

11-Jul-2013

MEMORANDUM TO:
Assoc Prof Janie Sheridan
Pharmacy

Re: Application for Ethics Approval (Our Ref. 9830)

The Committee considered your application for ethics approval for your project entitled Patients Sharing Medicines: Why and What?.

Ethics approval was given for a period of three years.

The expiry date for this approval is 11-Jul-2016.

If the project changes significantly, you are required to submit a new application to UAHPEC for further consideration.

In order that an up-to-date record can be maintained, you are requested to notify UAHPEC once your project is completed.

The Chair and the members of UAHPEC would be happy to discuss general matters relating to ethics approvals if you wish to do so. Contact should be made through the UAHPEC Ethics Administrators at humanethics@auckland.ac.nz in the first instance.

All communication with the UAHPEC regarding this application should include this reference number: 9830.

(This is a computer generated letter. No signature required.)

UAHPEC Administrators
University of Auckland Human Participants Ethics Committee
c.c. Head of Department / School, Pharmacy
Dr Trudi Aspden
Mr Kebede Beyene
Appendices

**Appendix 5: Healthcare providers interview schedule**

**Opening definition to be read out**

Non-recreational sharing means the lending (giving) or borrowing (taking) of prescription medicines for medical purposes or ‘altruistic’ reasons; for example, sharing antibiotics, anti-hypertensive or anti-diabetic medications. However, it does not include medicines shared to “get high or relax”

**Opening questions**

1. Why do you think people share prescription medicines?
2. What might be the benefits of sharing prescription medicines?

Prompts: Can you think of any other benefits?

3. What do you think are the possible disadvantages/risks of lending or borrowing medicines?

Prompts: What are the potential risks of lending? What are the potential risks of borrowing? Why do you think these are the major harms/risks? How can these harms damage the borrower? What do you think the possible ways to prevent these harms are?

**Central Questions**

4. Can you think of any types of prescription medicines which are not safe to be lent? Why?
5. Have you ever advised patients about medicine sharing? If yes, why? If no, why not?
6. What do you usually discuss with your patients regarding leftover prescription medicines?

Prompts: When you refill prescription do you usually ask the patient what happened to his or her previous refills? Tell me more about the types of advice you give [for pharmacists]

7. Have you encountered a patient who has shared his or her prescription medicines? If yes, please tell me more about that instance

Prompts: How frequently have you encountered such patients? Which medicines are commonly shared?

8. How do you think the cost of treatment affects people’s decision to share medicines?
Appendices

Prompts: How do you see the cost of unsubsidised medicines? Do you think cost of GP visit is fair?

9. What do you think about advertising prescription medicines to the public?

Prompts: How do you think this might affect people’s sharing practices?

10. How do you think prescription medication sharing might affect treatment outcomes either in a positive or negative way?

11. Was there any instance where you have tried to track adverse events as a result of sharing? If yes, please tell me more about that instance

12. Prescription medicine sharing is illegal. What do you think about this?

Prompts: How do you think the law in place is strict?

13. Would you like to receive further training or guidelines to counsel patients about potential risks of sharing medicines?

14. Do you think people need to be educated about prescription medicine sharing?

Prompts: What do you think people should know? What should be done to minimise the risks of sharing?

15. Do you have anything to add?

Thank you for your participation in this interview!
Appendices

Appendix 6: Demographic questionnaire healthcare provider interview

Questionnaire to assess the demographics and practice pattern of informants

1. Gender  
   a. Male  b. Female
2. Age in years
3. How would you describe your current occupation?
   a. Medical doctor
   b. Nurse
   c. Dentist
   d. Pharmacist
   e. Other, specify …………….
4. What is your speciality? …………………………………………………
5. Your current job position (title): ………………………………………
6. Number of years in the current post: …………………
7. On average how many patients do you meet per day? ………………
8. How would you describe the type of institution you are currently employed in?
   a. Private
   b. Public
   c. University/Research Facility
   d. Non-Governmental Organization/Faith based organisation
   e. Others, specify …………………………….
Appendices

Appendix 7: Ethics approval for healthcare provider interviews

UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE

02-Dec-2013

MEMORANDUM TO:

Assoc Prof Janie Sheridan
Pharmacy

Re: Application for Ethics Approval (Our Ref. 010928)

The Committee considered your application for ethics approval for your project entitled Prescription Medicine Sharing: A Qualitative Exploration of Health Care Providers’ Experiences.

Ethics approval was given for a period of three years with the following comment(s):

1. Recruitment – Please ask the professional associations to pass on your invitation through their mailing lists rather than requesting that they give you copies of their mailing lists.

2. Informed consent – Please clarify in the PIS and CF what the voucher is, e.g. $20 petrol or supermarket voucher.

3. Please make the following corrections:
   a. CF: At the top of the form “and I have agreed to participate” should be in the present tense because they have not yet signed the form.
   b. CF: “approximately about” One of these 2 words is redundant.
   c. PIS: Moreover, if you would be interested receive the summary . . .” needs “to” added between “interested receive”.
   d. PIS: “the digital recording to be stopped for sometimes and . . .” the words “for sometimes” can be deleted.

The expiry date for this approval is 02-Dec-2016.

If the project changes significantly you are required to resubmit a new application to UAHPEC for further consideration.

In order that an up-to-date record can be maintained, you are requested to notify UAHPEC once your project is completed.

The Chair and the members of UAHPEC would be happy to discuss general matters relating to ethics approvals if you wish to do so. Contact should be made through the UAHPEC ethics administrators at humanethics@auckland.ac.nz in the first instance.

All communication with the UAHPEC regarding this application should include this reference number: 010928.
Appendices

Appendix 8: Ethics approval for online survey

UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE (UAHPEC)

19-May-2015

MEMORANDUM TO:

Assoc Prof Janie Sheridan
Pharmacy

Re: Application for Ethics Approval (Our Ref. 013536): Approved with comment

The Committee considered your application for ethics approval for your project entitled Barriers and facilitators of medicine sharing practices: A cross sectional survey of New Zealand adults using COM-B theoretical framework.

Ethics approval was given for a period of three years with the following comment(s):

1. Thank you for the care taken with making the amendments requested. Please note that all consent forms need to be kept for six years, even for the pilot study. These could be kept separately from the other study CFs.

The expiry date for this approval is 19-May-2018.

If the project changes significantly you are required to resubmit a new application to UAHPEC for further consideration.

In order that an up-to-date record can be maintained, you are requested to notify UAHPEC once your project is completed.

The Chair and the members of UAHPEC would be happy to discuss general matters relating to ethics approvals if you wish to do so. Contact should be made through the UAHPEC Ethics Administrators at ro-ethics@auckland.ac.nz in the first instance.

All communication with the UAHPEC regarding this application should include this reference number: 013536.

(This is a computer generated letter. No signature required.)

Secretary
University of Auckland Human Participants Ethics Committee
Appendix 9: Online survey questionnaire

WHY DO PEOPLE SHARE PRESCRIPTION MEDICINES?

We are interested in exploring people’s opinions on prescription medicine sharing. Would you be willing to tell us about your views and experiences of prescription medicine sharing? If you are, then we are looking for you! The information you provide will help us to develop ways of reducing the possible harms of sharing medicines. The survey should only take between 15 and 20 minutes, and your responses are completely anonymous and confidential.

Before you start, please carefully read the Participant Information Sheet on the next page, to decide whether or not you want to take part in the study.

We really appreciate your input!

 Orwell here to proceed to the participant information sheet

PARTICIPANT INFORMATION SHEET [SURVEY PARTICIPANTS]

WHY DO PEOPLE SHARE PRESCRIPTION MEDICINES?

Introduction and purpose

My name is Kebede Beyene; I am a PhD student working with my supervisors Associate Professor Janie Sheridan and Dr Trudi Aspden in the School of Pharmacy, the University of Auckland. I would like to invite you to participate in a research project looking into the things that make the sharing of prescription medicines by adults in NZ more and less likely. You do not necessarily need to have had an experience of medicine sharing to participate in this study.

Why am I being invited to take part in this study?

You may have either received an email as part of being a member of a patient support group or may have seen the project on patient support group Websites, Facebook pages, or other electronic media.

Am I eligible to take part?

This survey is only for individuals who are aged 18 years or older and who are currently living in New Zealand.

What will I need to do if I participate?

If you agree to participate in this study, you will be asked to complete a short 15 to 20 minutes online survey in which you will be asked about your attitudes and experiences of prescription medicine sharing, and some general information about yourself such as your age, gender, and education status.

What are the benefits of my participation?

The information you provide will be used to help develop ways of reducing the possible harms which might result from sharing medications. If you complete the survey, you can enter a prize draw to win one of FIVE $100 gift vouchers.

Is my participation confidential?
Appendices

This is an anonymous online survey, and your participation is entirely confidential. All information you provide will be collected using online survey software called Qualtrics. Qualtrics uses Transport Layer Security encryption to maintain high security for all transmitted data, and data will only be accessible to the researchers. We will not ask for your name or any identifying information, and it should be impossible to identify you.

The link to the survey has been sent to you via the patient support group administrator for a group which you are currently a member of, or posted on a website etc by the group administrator, so that the researchers will not have any personal information about you. However, the results will come directly to us, the researchers, and not to the patient support group.

If you would like to enter into the prize draw, at the end of the survey you will be invited to visit a separate, unlinked webpage to leave your e-mail address. Your email address will not be linked to your survey responses.

All the information you provide will be stored on a password protected computer, and after six years the data will be permanently deleted.

What are my rights?

Your participation in the survey is completely voluntary. You can discontinue your participation at any time prior to submitting the survey. However, once the survey is submitted, we cannot remove the information you provided, as all responses are anonymous.

Can I ask for the summary results?

If you wish to receive the results of the survey, a summary of findings can be requested from Kebede Beyene via email: k.beyene@auckland.ac.nz.

What if I need more information about the study?

If you have any inquiries about this study, please contact me - Kebede Beyene via email (k.beyene@auckland.ac.nz), or alternatively contact the Principal Investigator of the study, Associate Professor Janie Sheridan via telephone 09 373-7599 ext. 85247 or email (j.sheridan@auckland.ac.nz). Professor Julia Kennedy, the Head of the School of Pharmacy, can be reached at 09 373-7599 ext. 86260.

For any queries regarding ethical concerns you may contact the Chair, The University of Auckland Human Participants Ethics Committee, The University of Auckland, Research Office, Private Bag 92019, Auckland 1142. Telephone 09 373-7599 ext. 83711. Email: ro-ethics@auckland.ac.nz

Approved by THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE on 19 May 2015 for three years, Reference Number 013536.

Providing Consent

I have read and understood the Participant Information Sheet.

I am aged 18 years or older.

I currently live in New Zealand.

I give my consent to participate in this research.

⊙ Yes

⊙ No
Appendices

Some important information to read before you start the questionnaire

There are no right or wrong answers to any of the survey questions and we would just like to explore your views and experiences of prescription medicine sharing (lending and borrowing). We are only interested in non-recreational sharing practices, for example sharing prescription medicines to self-treat an illness or when a supply of medicines has run out. We do not want to know about medicines you might share for relaxation or to ‘get high’.

Please carefully read the definitions of the following terms before completing the survey.

A prescription medicine is a medicine that is prescribed to you by a licensed doctor, dentist, nurse, or midwife. However, it does not include medicines (such as Panadol®, paracetamol, vitamins and so forth) which you have bought “over-the-counter” in a pharmacy or in other stores.

Prescription medicine borrowing means using someone else’s prescription medicine (whether or not you return it later).

Prescription medicine lending means giving some of your prescription medicine to someone else (whether or not you expect it to be given to you later).

Section - A: Borrowing Prescription Medicines

Prescription medicine borrowing means using someone else’s prescription medicine (whether or not you return it later).

The statements below relate to hypothetical or imaginary events, that is, you do not need to have borrowed a medicine to answer the questions. We are just asking you to imagine what you would do in the situations outlined in each statement.

Please indicate to what extent you disagree or agree with each statement.

SD=Strongly disagree, D=Disagree, N=Neither agree nor disagree, A=Agree, SA=Strongly agree

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<thead>
<tr>
<th>Items</th>
<th>SD</th>
<th>D</th>
<th>N</th>
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<td>1. It is safe for a person to use someone else’s prescription medicine if they are both taking the same medicine.</td>
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<td>2. I would use someone else’s prescription medicine if I did not consider myself sick enough to see a doctor.</td>
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<td>3. If my health relied on me taking regular prescription medicines I would use someone else’s if I forgot to bring mine with me.</td>
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<td>4. If someone has the same illness as me, then their prescription medicine should work for me.</td>
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<td>5. I am aware of the risks involved in using someone else’s prescription medicines without medical advice.</td>
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<td>6. Medicine borrowing is second nature (a habit) to me.</td>
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<td>7. I would feel guilty if I used someone else’s prescription medicines.</td>
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<td>8. I would feel angry if someone was unwilling to lend me a couple of doses of their prescription medicines.</td>
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<td>9. I would feel embarrassed to have to carry prescription medicines around with me everywhere I go.</td>
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10. If a prescription medicine worked for a friend with the same illness as me, I would borrow some of theirs to try it.

11. I would be concerned that using a couple of doses of someone else’s prescription medicine could negatively affect my own health.

12. I feel the benefits of borrowing prescription medicines outweigh the potential harms.

13. I would use someone else’s prescription medicine if missing doses of my own medicine could have serious health consequences.

14. Paying to visit my doctor, when only a couple of doses of prescription medicines are required, is a waste of money.

15. I would use someone else’s prescription medicine if I was unwell late at night or at the weekend and I could not visit my regular GP.

16. I would use someone else’s prescription medicine if I was too busy to see a doctor.

17. I would use someone else’s prescription medicine if I could not afford to visit a doctor.

18. I would use someone else’s prescription medicine if I could not afford to pay for prescription charges.

19. I would use someone else’s prescription medicine if my GP’s surgery was located a long way away from me.

20. I would use someone else’s prescription medicine if the waiting time to see a doctor was long.

21. I would use someone else’s prescription medicines if I had an emergency situation.

22. I would use someone else’s prescription medicine if I was on a trip and I forgot to pack my medicine.

23. I value my friends’ opinions on whether or not it is OK to borrow someone else’s prescription medicine.

24. I have experienced pressure from people around me to borrow prescription medicine from someone else.

25. If a prescription medicine is being advertised in the media I would consider it safe to borrow without a doctor’s approval.

Now please think about your actual medicine borrowing experiences and answer the following questions.

26. Would you ever borrow someone else’s prescribed medicine, for any reason?
   A. Yes
   B. No

27. Have you ever borrowed a prescription medicine from someone else?
   A. Yes
   B. No

   If ‘No’ go to question #32
28. Which kind(s) of prescription medicine(s) did you borrow? (You can pick more than one option, so please check all that apply)
   A. Diabetes medicine
   B. Gout medicine
   C. Asthma medicine
   D. Antibiotics
   E. Contraceptive medicine
   F. Acne medicine
   G. Cardiac(heart) medicine
   H. Blood pressure medicine
   I. Cholesterol medicine
   J. Painkillers
   K. Allergy medicine

29. Other(s), please specify ....Have you borrowed a prescription medicine in the last 12 months?
   A. Yes
   B. No
   If ‘No’ go to question #31

30. In the last 12 months, how many times have you borrowed someone else’s prescription medicine?
   A. 1-2 occasions
   B. 3-5 occasions
   C. 6-10 occasions
   D. More than 10 occasions

31. Why did you borrow prescription medicines from someone else? (more than one reason can be given) ...........................................................

Section – B: Lending Prescription Medicines

Prescription medicine lending means giving some of your prescription medicine to someone else (whether or not you expect it to be given to you later).

The statements below relate to hypothetical or imaginary events, that is, you do not need to have lent a medicine to answer the questions. We just ask you to imagine what you would do in the situation outlined in each statement.

Please indicate to what extent you disagree or agree with each statement.

SD=Strongly disagree, D=Disagree, N=Neither agree nor disagree, A=Agree, SA=Strongly agree
<table>
<thead>
<tr>
<th>Items</th>
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<th>D</th>
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<tr>
<td>32. I am aware of the risks involved in giving prescription medicines to someone else without medical advice.</td>
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<td>33. I would <strong>lend</strong> my prescription medicines if someone forgot medicines that they rely on.</td>
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<td>34. I am aware of the legal consequences of <strong>lending</strong> my prescription medicines to someone else.</td>
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<td>35. If someone has the same illness as me, then my prescription medicine should work for them.</td>
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<td>36. I would feel guilty if I <strong>lent</strong> my prescription medicines to someone else.</td>
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<td>37. I would feel angry if someone asked to <strong>borrow</strong> my prescription medicines.</td>
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<td>38. Medicine <strong>lending</strong> is second nature (a habit) to me.</td>
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<td>39. It would be difficult for me to refuse to <strong>lend</strong> my prescription medicine to someone, knowing that they are sick and in need of the medicine.</td>
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<td>40. Throwing away unused prescription medicines is a waste of money.</td>
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<td>41. I feel the benefits of <strong>lending</strong> prescription medicines outweigh the potential harms.</td>
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<td>42. I would be concerned that <strong>lending</strong> some of my prescription medicine to someone else could negatively affect that person’s health.</td>
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<td>43. I would be concerned that <strong>lending</strong> some of my prescription medicine could negatively affect my own health.</td>
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<td>44. If my prescription medicine worked well for me, I might let my friend with a similar illness try some.</td>
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<td>45. I would <strong>lend</strong> a couple of doses of my prescription medicines if someone ran out of their prescription medicines.</td>
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<td>46. If I had leftover, unused, or unwanted prescription medicines I would pass them on to someone who might need them.</td>
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<td>47. If someone could not afford to visit a doctor I would <strong>lend</strong> them a couple of doses of my prescription medicines.</td>
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<td>48. If someone could not afford to pay for prescription charges I would <strong>lend</strong> them a couple of doses of my prescription medicines.</td>
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<td>49. I value my friends’ opinions on whether or not it is <strong>OK to lend</strong> prescription medicines.</td>
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<td>50. I have experienced pressure from people around me to <strong>lend</strong> my prescription medicines to someone else.</td>
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<td>51. I would <strong>lend</strong> my prescription medicines if someone had an emergency situation.</td>
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<td>52. If a prescription medicine is being advertised in the media I would consider it safe to <strong>lend</strong> without a doctor’s approval.</td>
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<td>53. For me, prescription medicine <strong>sharing</strong> is a way of caring for others during a time of illness.</td>
<td></td>
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</tr>
<tr>
<td>54. I would consider it safe to <strong>lend</strong> a prescription medicine if the pharmacist or a doctor had not mentioned the risks of lending it.</td>
<td></td>
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</tr>
</tbody>
</table>
Now please think about your actual medicine lending experiences and answer the following questions.

55. **Would you ever lend** any of your prescriptions medicine to someone else, for any reason?
   A. Yes
   B. No
56. **Have you ever lent** a prescription medicine to someone else?
   A. Yes
   B. No
   A. If no go to question #61
57. Which kind(s) of prescription medicine(s) did you lend? (You can pick more than one option, so please check all that apply)
   A. Diabetes medicine
   B. Gout medicine
   C. Asthma medicine
   D. Antibiotics
   E. Contraceptive medicine
   F. Acne medicine
   G. Cardiac(heart) medicine
   H. Blood pressure medicine
   I. Painkillers
   J. Allergy medicine
   K. Other(s), please specify ……..
58. Have you lent a prescription medicine in **the last 12 months**?
   A. Yes
   B. No
   If no go to question #60
59. In **the last 12 months**, how many times have you lent a prescription medicine to someone else?
   A. 1-2 occasions
   B. 3-5 occasions
   C. 6-10 occasions
   D. More than 10 occasions
60. Why did you lend your prescription medicines? (more than one reason can be given)................

**Section-C: General view on medicine sharing**

61. What types of prescription medicines would you **NEVER** lend or borrow? (You can pick more than one option, so please check all that apply )
   A. Diabetes medicine
   B. Gout medicine
   C. Asthma medicine
   D. Antibiotics
   E. Contraceptive medicine
   F. Acne medicine
   G. Cardiac(heart) medicine
   H. Blood pressure medicine
I. Cholesterol medicine
J. Painkillers
K. Allergy medicine
L. Other(s), please specify ..................................
M. I would lend or borrow any prescription medicines

62. Which prescription medicines do you consider SAFE to lend or borrow? (You can pick more than one option, so please check all that apply)
   A. Diabetes medicine
   B. Gout medicine
   C. Asthma medicine
   D. Antibiotics
   E. Contraceptive medicine
   F. Acne medicine
   G. Cardiac(heart) medicine
   H. Blood pressure medicine
   I. Cholesterol medicine
   J. Painkillers
   K. Allergy medicine
   L. Other(s), please specify……
   M. It is not safe to lend or borrow any prescription medicines

Section – D: Leftover, unwanted, or unused prescription medicine(s)

63. Have you got any leftover, unused, or unwanted prescription medicine(s) in your household?
   A. Yes
   B. No

64. If ‘No’ go to question #65 Why do you keep unused medicine(s)? (You can pick more than one option, so please check all that apply)
   A. In case they are needed later
   B. Don’t want to waste them
   C. To pass on to someone who might need them
   D. Not sure how to dispose of them
   E. To keep a stockpile in case of shortages
   F. Other(s), please specify ..........

65. Have you ever received any advice or instructions from a health care provider (e.g. doctor, pharmacist or nurse) regarding what to do with leftover, unused, or unwanted prescription medicines?
   A. Yes
   B. No
   C. Can’t remember

66. Have you ever returned your leftover, unused, or unwanted prescription medicines to a pharmacy or GP?
   A. Yes
   B. No
   C. Can’t remember
Section – E: General health

67. Has a doctor prescribed a medicine for you in the last 12 months?
   A. Yes
   B. No

68. Do you have any of the following medical condition(s)? (You can pick more than one option, so please check all that apply)
   A. Chronic pain
   B. Asthma
   C. Allergy
   D. Skin condition
   E. High blood pressure
   F. Sleep problem
   G. Migraine
   H. Heartburn
   I. Mental health conditions
   J. Diabetes
   K. Cardiac(heart) condition
   L. Cholesterol
   M. Gout
   N. Other(s), specify ………….
   O. I don’t have any medical conditions

69. Have you ever had any unpleasant or unexpected side effects or allergies from using someone else’s prescription medicine?
   A. Yes
   B. No
   If yes, please describe your unpleasant or unexpected side effect or allergy (more than one event can be described) …………………………………………………

70. Have you ever received advice from a health care provider (e.g. doctor, pharmacist or nurse) about the potential harms of lending or borrowing a prescription medicine?
   A. Yes
   B. No

Section – F: Information about yourself

71. I am:   A. Male   B. Female
72. My age is:
   A. 18 – 24 years
   B. 25 – 34 years
   C. 35 – 44 years
   D. 45 – 54 years
   E. 55 – 64 years
   F. 65 years or older

73. Which ethnic group do you belong to?
A. New Zealand European
B. Māori
C. Samoan
D. Cook Island Māori
E. Tongan
F. Niuean
G. Chinese
H. Indian
I. Other, please state: ………

74. What is the highest education level you have achieved so far?
   A. No schooling completed
   B. Primary school
   C. Secondary School (three years or less)
   D. Secondary School (more than three years)
   E. Tertiary education (polytechs, college, or university)

75. What was your total household income before taxes during the past 12 months?
   A. zero income
   B. less than $10,000
   C. $10,000 – $20,000
   D. $20,001 – $30,000
   E. $30,001 – $40,000
   F. $40,001 – $50,000
   G. $50,001 - $60,000
   H. $60,001 – $70,000
   I. $70,001 – $100,000
   J. $100,001 or more

76. How many people live in your family home including you?
   A. 1
   B. 2
   C. 3
   D. 4
   E. 5
   F. 6 or more

77. Are you a health-care professional?
   a. Yes
   b. No

78. How did you access this survey?
   A. It was emailed to me by a patient support group
   B. From a patient support group Webpage
   C. From a patient support group Facebook page
   D. From a patient support group Tweets
   E. It was emailed to me by a friend
   F. Word of mouth
   G. Other(s), please state: …………………
Finally, would you like to take part in prize draw for one of FIVE $100 vouchers?

Yes                                    No

QUESTIONNAIRE NOW SPLITS OFF

Please enter your email here (it will not be linked to the answers from the questionnaire)

........................................................................................................................................................................

SUBMIT

Debriefing message

THANK YOU FOR COMPLETING THE SURVEY.

Information on risks of sharing medicines

Sometimes people choose to share their medicines for all sorts of reasons; however, sharing medicines can have some unwanted consequences. Here are some examples:

- If you treat your illness using a medicine meant for another person it might not cure your illness, and your condition might get worse.
- If doctors are unaware of the medicines you have borrowed from someone else, they may inadvertently prescribe another medicine which should not be taken with the borrowed medicine.
- When you borrow medicines you may not receive written or verbal medicine instructions or warnings and as a result you may suffer unexpected consequences, for example - side effects or the medicine might not work.

Thank you again for your participation
Appendix 10: Patient support group questionnaire

Name of support group/organisation _________________________________

Patient support group questionnaire

1. Please indicate the type(s) of support your group offer to its members (Tick all that apply)
   a. Financial support
   b. Transport assistance
   c. Food
   d. Accommodation
   e. Childcare
   f. Psychosocial and emotional support
   g. Advocacy
   h. Information support
   i. Cultural support
   j. Safe medication use
   k. Other(s), specify ......................

2. Does your group promote safe use of prescription medication among its members?
   a. Yes If No go to #4
   b. No

   If yes, please describe some of the major topics in the past year

   ........................................................................................................................................

3. How do you promote safe medication use practices among your members?
   a. Website
   b. Face to face education/discussion
   c. Flyers/brochures
   d. News letter
   e. Other, please specify.................................................................

4. Number of current members? .........................
### Appendix 11: Participants’ attitudes towards medicine sharing behaviours

#### Frequency and percentage distribution of participants' scores on items assessing attitudes towards medicine borrowing (N=233)

<table>
<thead>
<tr>
<th>Statements</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. It is safe for a person to use someone else’s prescription medicine if they are both taking the same medicine.</td>
<td>30(12.9)</td>
<td>49(21)</td>
<td>36(15.5)</td>
<td>96(41.2)</td>
<td>2(9.4)</td>
</tr>
<tr>
<td>2. I would use someone else’s prescription medicine if I did not consider myself sick enough to see a doctor.</td>
<td>71(30.5)</td>
<td>74(31.8)</td>
<td>25(10.7)</td>
<td>56(24)</td>
<td>7(3)</td>
</tr>
<tr>
<td>3. If my health relied on me taking regular prescription medicines I would use someone else’s if I forgot to bring mine with me.</td>
<td>24(10.3)</td>
<td>19(8.2)</td>
<td>28(12)</td>
<td>119(51.1)</td>
<td>43(18.5)</td>
</tr>
<tr>
<td>4. If someone has the same illness as me, then their prescription medicine should work for me.</td>
<td>67(28.8)</td>
<td>96(41.2)</td>
<td>40(17.2)</td>
<td>23(9.9)</td>
<td>7(3)</td>
</tr>
<tr>
<td>5. I am aware of the risks involved in using someone else’s prescription medicines without medical advice.</td>
<td>7(3)</td>
<td>9(3.9)</td>
<td>7(3)</td>
<td>116(49.8)</td>
<td>94(40.3)</td>
</tr>
<tr>
<td>6. Medicine borrowing is second nature (a habit) to me.</td>
<td>135(57.9)</td>
<td>64(27.5)</td>
<td>25(10.7)</td>
<td>9(3.9)</td>
<td>0</td>
</tr>
<tr>
<td>7. I would feel guilty if I used someone else’s prescription medicines.</td>
<td>17(7.3)</td>
<td>45(19.3)</td>
<td>69(29.3)</td>
<td>72(30.9)</td>
<td>30(12.9)</td>
</tr>
<tr>
<td>8. I would feel angry if someone was unwilling to lend me a couple of doses of their prescription medicines.</td>
<td>86(36.9)</td>
<td>97(41.6)</td>
<td>32(13.7)</td>
<td>15(6.4)</td>
<td>3(1.3)</td>
</tr>
<tr>
<td>9. I would feel embarrassed to have to carry prescription medicines around with me everywhere I go.</td>
<td>141(60.5)</td>
<td>64(27.5)</td>
<td>18(7.7)</td>
<td>8(3.4)</td>
<td>2(0.9)</td>
</tr>
<tr>
<td>10. If a prescription medicine worked for a friend with the same illness as me, I would borrow some of theirs to try it.</td>
<td>107(45.9)</td>
<td>79(33.9)</td>
<td>25(10.7)</td>
<td>19(8.2)</td>
<td>3(1.3)</td>
</tr>
<tr>
<td>11. I would be concerned that using a couple of doses of someone else’s prescription medicine could negatively affect my own health.</td>
<td>9(3.9)</td>
<td>19(8.2)</td>
<td>38(16.3)</td>
<td>119(51.1)</td>
<td>48(20.6)</td>
</tr>
<tr>
<td></td>
<td>Question</td>
<td>Frequency</td>
<td>Percentage</td>
<td>Total</td>
<td>Average</td>
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<td>--------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>12.</td>
<td>I feel the benefits of borrowing prescription medicines outweigh the</td>
<td>50(21.5)</td>
<td>50(21.5)</td>
<td>82(35.2)</td>
<td>82(35.2)</td>
</tr>
<tr>
<td></td>
<td>potential harms.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13.</td>
<td>I would use someone else’s prescription medicine if missing doses of my</td>
<td>19(8.2)</td>
<td>19(8.2)</td>
<td>23(9.9)</td>
<td>23(9.9)</td>
</tr>
<tr>
<td></td>
<td>own medicine could have serious health consequences.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14.</td>
<td>Paying to visit my doctor, when only a couple of doses of prescription</td>
<td>48(20.6)</td>
<td>48(20.6)</td>
<td>65(27.9)</td>
<td>65(27.9)</td>
</tr>
<tr>
<td></td>
<td>medicines are required, is a waste of money.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15.</td>
<td>I would use someone else’s prescription medicine if I was unwell late</td>
<td>24(10.3)</td>
<td>24(10.3)</td>
<td>58(24.9)</td>
<td>58(24.9)</td>
</tr>
<tr>
<td></td>
<td>at night or at the weekend and I could not visit my regular GP.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>I would use someone else’s prescription medicine if I was too busy to</td>
<td>58(24.9)</td>
<td>58(24.9)</td>
<td>94(40.3)</td>
<td>94(40.3)</td>
</tr>
<tr>
<td></td>
<td>see a doctor.</td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>17.</td>
<td>I would use someone else’s prescription medicine if I could not afford</td>
<td>43(18.5)</td>
<td>43(18.5)</td>
<td>73(31.3)</td>
<td>73(31.3)</td>
</tr>
<tr>
<td></td>
<td>to visit a doctor.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>I would use someone else’s prescription medicine if I could not afford</td>
<td>49(21)</td>
<td>49(21)</td>
<td>74(31.8)</td>
<td>74(31.8)</td>
</tr>
<tr>
<td></td>
<td>to pay for prescription charges.</td>
<td></td>
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<tr>
<td>19.</td>
<td>I would use someone else’s prescription medicine if my GP’s surgery was</td>
<td>51(21.9)</td>
<td>51(21.9)</td>
<td>96(41.2)</td>
<td>96(41.2)</td>
</tr>
<tr>
<td></td>
<td>located a long way away from me.</td>
<td></td>
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<tr>
<td>20.</td>
<td>I would use someone else’s prescription medicine if the waiting time to</td>
<td>54(23.2)</td>
<td>54(23.2)</td>
<td>92(39.5)</td>
<td>92(39.5)</td>
</tr>
<tr>
<td></td>
<td>see a doctor was long.</td>
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<td></td>
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</tr>
<tr>
<td>21.</td>
<td>I would use someone else’s prescription medicines if I had an emergency</td>
<td>20(8.6)</td>
<td>20(8.6)</td>
<td>27(11.6)</td>
<td>27(11.6)</td>
</tr>
<tr>
<td></td>
<td>situation.</td>
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<tr>
<td>22.</td>
<td>I would use someone else’s prescription medicine if I was on a trip and</td>
<td>25(10.7)</td>
<td>25(10.7)</td>
<td>44(18.9)</td>
<td>44(18.9)</td>
</tr>
<tr>
<td></td>
<td>I forgot to pack my medicine.</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>23.</td>
<td>I value my friends’ opinions on whether or not it is OK to borrow someone</td>
<td>31(13.3)</td>
<td>31(13.3)</td>
<td>60(25.8)</td>
<td>60(25.8)</td>
</tr>
<tr>
<td></td>
<td>else’s prescription medicine.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>24.</td>
<td>I have experienced pressure from people around me to borrow prescription</td>
<td>93(39.9)</td>
<td>93(39.9)</td>
<td>71(30.5)</td>
<td>71(30.5)</td>
</tr>
<tr>
<td></td>
<td>medicine from someone else.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>25.</td>
<td>If a prescription medicine is being advertised in the media I would</td>
<td>96(41.2)</td>
<td>96(41.2)</td>
<td>89(38.2)</td>
<td>89(38.2)</td>
</tr>
<tr>
<td></td>
<td>consider it safe to borrow without a doctor’s approval.</td>
<td></td>
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</tr>
</tbody>
</table>

Frequency and percentage distribution of participants' scores on items assessing attitudes towards medicine lending (N=222)
<table>
<thead>
<tr>
<th>Statements</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>32. I am aware of the risks involved in giving prescription medicines</td>
<td>5(2.3)</td>
<td>2(0.9)</td>
<td>8(3.6)</td>
<td>104(46.8)</td>
<td>103(46.4)</td>
</tr>
<tr>
<td>to someone else without medical advice.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33. I would lend my prescription medicines if someone forgot medicines</td>
<td>24(10.8)</td>
<td>24(10.8)</td>
<td>49(22.1)</td>
<td>102(45.9)</td>
<td>23(10.4)</td>
</tr>
<tr>
<td>that they rely on.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>34. I am aware of the legal consequences of lending my prescription</td>
<td>29(13.1)</td>
<td>66(29.7)</td>
<td>33(14.9)</td>
<td>71(32)</td>
<td>23(10.4)</td>
</tr>
<tr>
<td>medicines to someone else.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35. If someone has the same illness as me, then my prescription medicine</td>
<td>55(24.8)</td>
<td>91(41)</td>
<td>47(21.2)</td>
<td>23(10.4)</td>
<td>6(2.7)</td>
</tr>
<tr>
<td>should work for them.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36. I would feel guilty if I lent my prescription medicines to someone</td>
<td>16(7.2)</td>
<td>57(25.7)</td>
<td>46(20.7)</td>
<td>65(29.3)</td>
<td>38(17.1)</td>
</tr>
<tr>
<td>else.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37. I would feel angry if someone asked to borrow my prescription</td>
<td>21(9.5)</td>
<td>76(34.2)</td>
<td>77(34.7)</td>
<td>37(16.7)</td>
<td>11(5)</td>
</tr>
<tr>
<td>medicines.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38. Medicine lending is second nature (a habit) to me.</td>
<td>133(59.9)</td>
<td>64(28.8)</td>
<td>15(6.8)</td>
<td>7(3.2)</td>
<td>3(1.4)</td>
</tr>
<tr>
<td>39. It would be difficult for me to refuse to lend my prescription</td>
<td>32(14.4)</td>
<td>44(19.8)</td>
<td>41(18.5)</td>
<td>90(40.5)</td>
<td>15(6.8)</td>
</tr>
<tr>
<td>medicine to someone, knowing that they are sick and in need of the</td>
<td></td>
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</tr>
<tr>
<td>medicine.</td>
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<td></td>
</tr>
<tr>
<td>40. Throwing away unused prescription medicines is a waste of money.</td>
<td>35(15.8)</td>
<td>50(22.5)</td>
<td>37(16.7)</td>
<td>68(30.6)</td>
<td>32(14.4)</td>
</tr>
<tr>
<td>41. I feel the benefits of lending prescription medicines outweigh the</td>
<td>44(19.8)</td>
<td>79(35.6)</td>
<td>74(33.3)</td>
<td>20(9)</td>
<td>5(2.3)</td>
</tr>
<tr>
<td>potential harms.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>42. I would be concerned that lending some of my prescription medicine</td>
<td>8(3.6)</td>
<td>14(6.3)</td>
<td>19(8.6)</td>
<td>126(56.8)</td>
<td>55(24.8)</td>
</tr>
<tr>
<td>to someone else could negatively affect that person’s health.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>43. I would be concerned that lending some of my prescription medicine</td>
<td>18(8.1)</td>
<td>55(24.8)</td>
<td>50(22.5)</td>
<td>78(35.1)</td>
<td>21(9.5)</td>
</tr>
<tr>
<td>could negatively affect my own health.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
44. If my prescription medicine worked well for me, I might let my friend with a similar illness try some.  & 78(35.1) & 83(37.4) & 31(14) & 28(12.6) & 2(0.9) \\
45. I would lend a couple of doses of my prescription medicines if someone ran out of their prescription medicines.  & 28(12.6) & 42(18.9) & 37(16.7) & 100(45) & 15(6.8) \\
46. If I had leftover, unused, or unwanted prescription medicines I would pass them on to someone who might need them.  & 74(33.3) & 77(34.7) & 19(8.6) & 47(21.2) & 5(2.3) \\
47. If someone could not afford to visit a doctor I would lend them a couple of doses of my prescription medicines.  & 49(22.1) & 70(31.5) & 47(21.2) & 51(23) & 5(2.3) \\
48. If someone could not afford to pay for prescription charges I would lend them a couple of doses of my prescription medicines.  & 49(22.1) & 79(35.6) & 38(17.1) & 51(23) & 5(2.3) \\
49. I value my friends’ opinions on whether or not it is OK to lend prescription medicines.  & 50(22.5) & 58(26.1) & 49(22.1) & 53(23.9) & 12(5.4) \\
50. I have experienced pressure from people around me to lend my prescription medicines to someone else.  & 86(38.7) & 90(40.5) & 22(9.9) & 20(9) & 4(1.8) \\
51. I would lend my prescription medicines if someone had an emergency situation.  & 20(9) & 12(5.4) & 36(16.2) & 117(52.7) & 37(16.7) \\
52. If a prescription medicine is being advertised in the media I would consider it safe to lend without a doctor’s approval.  & 88(39.6) & 92(41.4) & 26(11.7) & 15(6.8) & 1(0.5) \\
53. For me, prescription medicine sharing is a way of caring for others during a time of illness.  & 71(32) & 75(33.8) & 51(23) & 22(9.9) & 3(1.4) \\
54. I would consider it safe to lend a prescription medicine if the pharmacist or a doctor had not mentioned the risks of lending it.  & 77(34.7) & 88(39.6) & 32(14.4) & 22(9.9) & 3(1.4)
## Appendix 12: Cross-tabulation

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Base sample N=217</th>
<th>Borrowed medicines</th>
<th>Lent medicines</th>
<th>Have you got leftovers?</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Ever</td>
<td>Past-year</td>
<td>Ever</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non-borrowers</td>
<td>Borrowers</td>
<td>Non-borrowers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(N=98), n (%)</td>
<td>(N=119), n (%)</td>
<td>(N=152), n (%)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>60</td>
<td>33(33.7)</td>
<td>27(22.7)</td>
<td>48(31.6)</td>
</tr>
<tr>
<td>Female</td>
<td>157</td>
<td>65(66.3)</td>
<td>92(77.3)</td>
<td>104(68.4)</td>
</tr>
<tr>
<td><strong>Age in years</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 35</td>
<td>77</td>
<td>36(36.7)</td>
<td>41(34.5)</td>
<td>55(36.2)</td>
</tr>
<tr>
<td>35 to 44</td>
<td>34</td>
<td>11(11.2)</td>
<td>23(19.3)</td>
<td>22(14.5)</td>
</tr>
<tr>
<td>45 to 64</td>
<td>65</td>
<td>30(30.6)</td>
<td>35(29.4)</td>
<td>44(28.9)</td>
</tr>
<tr>
<td>65 or older</td>
<td>41</td>
<td>21(21.4)</td>
<td>20(16.8)</td>
<td>31(20.4)</td>
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<tr>
<td><strong>Education level</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not attend college</td>
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<td>23(23.5)</td>
<td>23(19.3)</td>
<td>35(23.0)</td>
</tr>
<tr>
<td>Attended college</td>
<td>171</td>
<td>75(76.5)</td>
<td>96(80.7)</td>
<td>117(77.0)</td>
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<tr>
<td><strong>Annual household income (NZ$)</strong></td>
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<td></td>
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<tr>
<td>$30,000 or less</td>
<td>50</td>
<td>28(28.6)</td>
<td>22(18.5)</td>
<td>39(25.7)</td>
</tr>
<tr>
<td>$30,001 to $70,000</td>
<td>67</td>
<td>31(31.6)</td>
<td>36(30.3)</td>
<td>48(31.6)</td>
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<tr>
<td>$70,001 to $100,000</td>
<td>40</td>
<td>17(17.3)</td>
<td>23(19.3)</td>
<td>26(17.1)</td>
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<tr>
<td>$100,001 or more</td>
<td>60</td>
<td>22(22.4)</td>
<td>38(31.9)</td>
<td>39(25.7)</td>
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<td><strong>Household size</strong></td>
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<td></td>
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<tr>
<td>1-2 people</td>
<td>103</td>
<td>54(55.1)</td>
<td>49(41.2)</td>
<td>78(51.3)</td>
</tr>
<tr>
<td>3 people</td>
<td>38</td>
<td>11(11.2)</td>
<td>27(22.7)</td>
<td>26(17.1)</td>
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<tr>
<td>4 or more people</td>
<td>76</td>
<td>33(33.7)</td>
<td>43(36.1)</td>
<td>48(31.6)</td>
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<tr>
<td><strong>Are you a health professional?</strong></td>
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264
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<th>Mean(SD)</th>
<th>Mean(SD)</th>
<th>Mean(SD)</th>
<th>Mean(SD)</th>
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<th>Mean(SD)</th>
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<td>3.01(1.00)</td>
<td>2.41(0.94)</td>
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<td>37(61.7)</td>
<td>115(73.2)</td>
<td>23(38.3)</td>
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<td>Have you ever received advice</td>
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<tr>
<td>No</td>
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<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
<td>NA</td>
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<td>NA</td>
<td>NA</td>
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<td>NA</td>
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<td>Mean(SD)</td>
<td>Mean(SD)</td>
<td>Mean(SD)</td>
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<td>Willingness to help those who cannot afford medical care</td>
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NA = Not applicable
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References


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