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**Evaluation of patient-centred services by community  
pharmacists in New Zealand:  
Focus on cardiovascular disease risk assessment**

**Monica Zolezzi**

A thesis submitted in partial fulfillment of the requirements for the degree of  
Doctor of Philosophy, The University of Auckland, December 10 2013.

## **ABSTRACT**

### **Background:**

Cardiovascular disease (CVD) remains the leading cause of death and hospitalisation in New Zealand (NZ). Pharmacists are ideally positioned to have an influence on cardiovascular risk reduction. However, it is still unknown whether community pharmacists in NZ are well equipped to be involved in CVD preventive strategies that are effective and sustainable under the current healthcare environment.

### **Aim:**

The overall aim of this thesis was to investigate the role of pharmacists in providing CVD risk assessment and management services in NZ community pharmacies; and to evaluate the readiness of the NZ primary healthcare environment for integrating community pharmacists into this role.

### **Methods:**

A mixture of qualitative and quantitative research methods were used; including a postal questionnaire to examine the extent and role of community pharmacists in health screening and medication monitoring services; a systematic review of the literature, a set of qualitative studies to explore the views of general practitioners, community pharmacy consumers and community pharmacists in regard to the role of pharmacists in CVD risk prevention strategies; and a questionnaire to explore undergraduate pharmacy students' perceived education, competency and future roles in CVD risk assessment and management.

### **Results:**

The results of the national postal survey suggested that community pharmacists in NZ are currently involved in CVD prevention strategies, although most are related to screening patients for the presence of risk factors with minimal involvement in CVD absolute risk assessment or management.

The research into the views of key stakeholders, in an effort to understand this poor uptake of pharmacists in CVD prevention strategies, revealed that time, remuneration and perceived lack of adequate training on the part of pharmacists were significant barriers. Despite these barriers, the three key stakeholders indicated that further involvement of community pharmacists in CVD risk reduction strategies would result in increased and wider access to cardiovascular primary health care services. The assessment of the current undergraduate pharmacy curriculum in NZ and the survey of pharmacy undergraduate students identified several weaknesses in preparing future pharmacists for delivering patient-centred care.

**Conclusions:**

Most community pharmacies in NZ continue to offer predominantly product-oriented services, following a business model, and have been generally unable to run an integrated or a parallel self-sustainable patient-centred service. CVD assessment and management by pharmacists is an example of a service which could deliver substantial population health benefits, but this will require clear leadership and commitment by the profession.

## **DEDICATION**

This thesis is dedicated to all those individuals burdened with cardiovascular disease; and to all those pharmacists who strive in their daily practice to make a difference in the care of these people and their families.

I also dedicate this thesis to the memory of my father, Humberto Zolezzi and the supervisor of my Master of Science degree, Dr. Michael Wolowyk.

## ACKNOWLEDGEMENTS

This research has been a really long journey and would have not been completed without the generosity, inspiration and support of my supervisor Professor John Shaw who guided me throughout. Special thanks also goes to Dr. Ross Tsuyuki, co-supervisor of this PhD, for his wise, insightful and timely advice.

Many other people have helped me to complete this PhD smoothly. Thanks to my many wonderful colleagues and students who worked with me in the various projects which are presented in this thesis and whose names have been mentioned separately under each of the relevant chapters. Without them, this PhD research would not have been possible.

Thanks also go to all the pharmacists, general practitioners, pharmacy consumers and students at the University of Auckland who graciously agreed to participate in the research projects that comprised this PhD study. I am grateful for their time and effort to share their views and experience with my research team.

On a personal front, I am grateful also for having had the strong encouragement and love of my husband Enrique and the patience of my daughters Daniela and Sabrina. I am thankful for their understanding and unshakable faith in me.

Thanks also to the many friends that have provided me with support, advice and encouragement throughout the challenges in this phase of my life.

# Table of Contents

ABSTRACT.....	ii
DEDICATION .....	iv
ACKNOWLEDGEMENTS .....	v
TABLE OF CONTENTS .....	vi
LIST OF TABLES.....	x
LIST OF FIGURES.....	xi
LIST OF APPENDICES.....	xii
LIST OF ABBREVIATIONS.....	xiii

## **CHAPTER 1: BACKGROUND**

1.1 Cardiovascular disease - a global challenge.....	1
1.2 Gaps in CVD risk assessment and management in NZ .....	2
1.3 The role of pharmacists in CVD prevention and CV risk reduction.....	4
1.4 A strategy to reduce the gaps in CVD risk assessment and management.....	5
1.5 This thesis .....	6
1.6 References .....	8

## **CHAPTER 2: COMMUNITY PHARMACY AND THE NEW ZEALAND PRIMARY HEALTH CARE SYSTEM**

2.1 Introduction.....	11
2.2 Historical context of New Zealand's health care system.....	12
2.3 How New Zealand's national health care system works .....	13
2.4 Historical context of community pharmacy practice in New Zealand.....	15
2.5 Health care reforms and community pharmacy .....	17
2.5.1 Community pharmacy strategies.....	19
2.5.2 National chronic disease management initiatives.....	20
2.5.3 National quality improvement initiatives in primary health care.....	22
2.6 Future direction for community pharmacy practice in NZ's primary health care.....	24
2.7 References .....	26

## **CHAPTER 3: PROVISION OF HEALTH/DISEASE SCREENING AND MEDICATION MONITORING/MANAGEMENT SERVICES IN NEW ZEALAND COMMUNITY PHARMACIES**

3.1 Introduction.....	29
3.2 Community pharmacy-based health/disease screening services.....	32

3.3 Community pharmacy-based medication monitoring/management services.....	33
3.4 The contribution of community pharmacy to improving the public's health .....	34
3.5 A national survey on the provision of HDS and MM services in NZ community pharmacies.....	37
3.5.1 Methods.....	38
3.5.1.1 <i>Survey instrument</i> .....	38
3.5.1.2 <i>Survey process</i> .....	40
3.5.1.3 <i>Data analysis</i> .....	40
3.5.2 Results.....	42
3.5.2.1 <i>HDS and MM provided in NZ community pharmacies</i> .....	47
3.5.2.2 <i>Respondent pharmacists' opinions related to the provision of HDS and MM services in NZ community pharmacies</i> .....	53
3.5.2.3 <i>Predictors for the provision of HDS and/or MM services in NZ community pharmacies</i> .....	56
3.5.3 Discussion .....	59
3.5.3.1 <i>HDS and MM services in NZ community pharmacies</i> .....	60
3.5.3.2 <i>Reimbursement for HDS and/or MM services in NZ community pharmacies</i> .....	62
3.5.3.3 <i>Predictor characteristics for the provision of HDS and/or MM services in NZ community pharmacies</i> .....	64
3.5.3.3.1 <i>Characteristics of respondent pharmacies</i> .....	64
3.5.3.3.2 <i>Characteristics of respondent pharmacists</i> .....	67
3.5.3.4 <i>Perceived barriers and facilitators for the provision of HDS and/or MM services in NZ community pharmacies</i> .....	69
3.5.4 Limitations.....	72
3.5.4.1 <i>Response rate</i> .....	72
3.5.4.2 <i>Response bias</i> .....	73
3.5.5 Conclusions derived from this survey.....	75
3.5.6 Recommendations.....	77
3.6 References.....	79
3.7 Appendices.....	85
3.8 Acknowledgements for Chapter 3.....	92

## **CHAPTER 4: PHARMACIST INVOLVEMENT IN CARDIOVASCULAR RISK ASSESSMENT AND RISK FACTOR MANAGEMENT**

4.1 Introduction.....	93
4.2 Step-wise approach to the assessment and management of CVD.....	94
4.2.1 Identification of individuals at risk of CVD (Steps 1 and 2).....	96
4.2.2 Assessment of cardiovascular risk (Step 3).....	97
4.2.3 Establishment of a management plan (Steps 4-6).....	102
4.3 Pharmacists and dyslipidaemia management: A systematic review.....	104
4.3.1 Methods.....	104
4.3.1.1 <i>Literature search</i> .....	104
4.3.1.2 <i>Article screening and selection</i> .....	105
4.3.1.3 <i>Data extraction</i> .....	106
4.3.1.4 <i>Risk of bias assessment</i> .....	107
4.3.1.5 <i>Data analysis</i> .....	107
4.3.2 Results.....	107
4.3.3 Discussion.....	116

4.4 Conclusions.....	119
4.5 References .....	120
4.6 Appendices .....	126
4.7 Acknowledgements for Chapter 4 .....	130

**CHAPTER 5: BARRIERS AND OPPORTUNITIES FOR NEW ZEALAND PHARMACISTS' INVOLVEMENT IN CARDIOVASCULAR RISK ASSESSMENT AND MANAGEMENT: A QUALITATIVE ASSESSMENT OF CONSUMERS', GENERAL PRACTITIONERS' AND PHARMACISTS' VIEWS**

5.1 Introduction .....	131
5.2 Pharmacy consumers' views on the provision of cardiovascular risk assessment and management in New Zealand community pharmacies.....	136
5.2.1 Research objective.....	136
5.2.2 Methods.....	136
5.2.2.1 <i>Interview instrument</i> .....	136
5.2.2.2 <i>Participant recruitment</i> .....	137
5.2.2.3 <i>Data collection and analysis</i> .....	137
5.2.3 Results of pharmacy consumers' interviews.....	138
5.2.3.1 <i>Sample characteristics</i> .....	138
5.2.3.2 <i>Enabling themes</i> .....	140
5.2.3.3 <i>Oppositional themes</i> .....	141
5.2.4 Discussion.....	142
5.3 General practitioners' views on the provision of cardiovascular risk assessment and management in New Zealand community pharmacies.....	145
5.3.1 Research objective.....	145
5.3.2 Methods.....	145
5.3.2.1 <i>Interview instrument</i> .....	145
5.3.2.2 <i>Participant recruitment</i> .....	146
5.3.2.3 <i>Data collection and analysis</i> .....	146
5.3.3 Results of general practitioners' interviews.....	147
5.3.3.1 <i>Sample characteristics</i> .....	147
5.3.3.2 <i>Enabling themes</i> .....	149
5.3.3.3 <i>Oppositional themes</i> .....	151
5.3.3.4 <i>Additional findings from the GP interviews</i> .....	156
5.3.4 Discussion.....	157
5.4 Pharmacists' views on the provision of cardiovascular risk assessment and management in New Zealand community pharmacies.....	163
5.4.1 Research objective.....	163
5.4.2 Research strategy.....	164
5.4.3 Face-to-face interviews and community pharmacies observation - pilot study.....	164
5.4.3.1 <i>Methods</i> .....	164
5.4.3.2 <i>Results</i> .....	166
5.4.3.3 <i>Discussion</i> .....	169
5.4.4 New Zealand-wide pharmacists' semi-structured telephone interviews.....	171
5.4.4.1 <i>Methods</i> .....	171
5.4.4.2 <i>Results</i> .....	172
5.4.4.3 <i>Discussion</i> .....	181

5.5 Overall discussion .....	186
5.6 Conclusions .....	193
5.7 References .....	197
5.8 Appendices .....	202
5.9 Acknowledgements for Chapter 5 .....	206

## **CHAPTER 6: PHARMACIST TRAINING IN CARDIOVASCULAR RISK ASSESSMENT AND MANAGEMENT**

6.1 Introduction .....	207
6.2 Assessment of undergraduate pharmacy education in NZ .....	211
6.2.1 Undergraduate pharmacy education in NZ.....	211
6.2.2 CVD risk assessment and management in the pharmacy curriculum at the University of Auckland .....	218
6.3 Students' perceptions on the CVD risk assessment and management curriculum at the University of Auckland School of Pharmacy.....	220
6.3.1 Methods.....	220
6.3.1.1 <i>Survey instrument</i> .....	220
6.3.1.2 <i>Participant recruitment</i> .....	221
6.3.1.3 <i>Data analysis</i> .....	222
6.3.2 Results.....	223
6.4 Discussion.....	228
6.4.1 Analysis of the undergraduate pharmacy curriculum at the University of Auckland.....	228
6.4.1.1 <i>Curriculum weaknesses</i> .....	230
6.4.1.2 <i>Curriculum strengths</i> .....	233
6.4.2 Undergraduate education in CVD risk assessment and management.....	236
6.5 Conclusions .....	244
6.6 References .....	248
6.7 Appendices .....	252
6.8 Acknowledgements for Chapter 6 .....	256

## **CHAPTER 7: CONCLUSIONS AND RECOMMENDATIONS**

7.1 What is already known about cardiovascular disease risk assessment and management.....	257
7.2 What this research adds .....	259
7.2.1 Literature review.....	259
7.2.2 Health/disease screening and medication monitoring/management services in New Zealand community pharmacies.....	261
7.2.3 Consumers', GPs' and pharmacists' views on the role of the pharmacist in CVD risk assessment and management.....	263
7.2.4 Pharmacist education in CVD risk assessment and management.....	265
7.3 Conclusions and Recommendations .....	266
7.3.1 Fostering collaborative practice to improve access to primary cardiovascular health care services.....	266
7.3.2 Advocating practice change through the implementation of patient-centred cardiovascular risk assessment services.....	268

7.3.3 Re-aligning the undergraduate pharmacy education with the future expected roles for pharmacists.....	270
7.3.4 Funding knowledge translation research that improves patient access to cardiovascular preventative care services in community pharmacies.....	272
7.4 Final remarks .....	273
7.5 References .....	275

## LIST OF TABLES

### Chapter 2:

<i>Table 2.1: NZ Practising Pharmacists – by area of employment (as of 30 June 2012).....</i>	17
<i>Table 2.2: The NZPHCS– Population Health Objectives .....</i>	18
<i>Table 2.3: Funded PHO Performance Indicators as of January, 2011 .....</i>	23

### Chapter 3:

<i>Table 3.1: Characteristics of practice sites of respondent pharmacists.....</i>	45
<i>Table 3.2: Characteristics of pharmacists responding to the survey .....</i>	46
<i>Table 3.3: HDS and MM services provided in NZ community pharmacies by geographical location.....</i>	49
<i>Table 3.4: Payment for HDS and MM services in NZ community pharmacies.....</i>	50
<i>Table 3.5: Characteristics of HDS and/or MM services provided in New Zealand community pharmacies .....</i>	52
<i>Table 3.6: Differences in pharmacists’ agreement with the provision of HDS and/or MM services in community pharmacies.....</i>	54
<i>Table 3.7: Respondent pharmacists’ agreement with beneficial statements regarding the provision of HDS and/or MM services.....</i>	55
<i>Table 3.8: Respondent pharmacists’ perceived barriers to the provision of HDS and/or MM services in New Zealand community pharmacies.....</i>	56
<i>Table 3.9: Predictor pharmacy characteristics for the provision of HDS and/or MM services in New Zealand community pharmacies.....</i>	57
<i>Table 3.10: Comparison in the number of employees at NZ community pharmacies offering versus not offering HDS and/or MM services.....</i>	58
<i>Table 3.11: Characteristics of respondent pharmacists and the provision of HDS and/or MM services in NZ community pharmacies.....</i>	59

### Chapter 4:

<i>Table 4.1: Prediction tools for assessing cardiovascular risk .....</i>	99
<i>Table 4.2: Characteristics of included studies.....</i>	109
<i>Table 4.3: Difference in lipid parameter measurements between groups at the end of study follow-up.....</i>	111

### Chapter 5:

<i>Table 5.1: Consumers’ awareness of health screening services provided in community pharmacies.....</i>	139
---	-----

<i>Table 5.2: Characteristics of general practitioner participants and their practice settings</i> .....	148
<i>Table 5.3: Characteristics explored during the pharmacists' interviews</i> .....	166
<i>Table 5.4: Themes identified as “challenges/barriers” in the provision of CVD-related services in community pharmacies</i> .....	168
<i>Table 5.5: Themes identified as “enabling” in the provision of CVD-related services in community pharmacies</i> .....	169
<i>Table 5.6: Characteristics of pharmacists participating in the telephone interviews</i> .....	173

## **Chapter 6:**

<i>Table 6.1: Desired pharmacy practice setting on graduation</i> .....	223
<i>Table 6.2: Pharmacy students' perception of their undergraduate education in CVD risk assessment</i> .....	225
<i>Table 6.3: Pharmacy students' responses to their perceived capabilities in regard to their undergraduate education in CVD risk assessment and management</i> .....	226

## **LIST OF FIGURES**

### **Chapter 3:**

<i>Figure 3.1: Survey response by community pharmacy location within NZ's regions</i> .....	43
<i>Figure 3.2: Respondent pharmacists' positions held in their practice sites</i> .....	47
<i>Figure 3.3: Methods used by community pharmacies to identify patients in need of HDS and/or MM services</i> .....	51
<i>Figure 3.4: Methods used by NZ community pharmacies to follow up on abnormal HDS test results</i> .....	53

### **Chapter 4:**

<i>Figure 4.1: A step-wise approach to the assessment and management of CVD</i> .....	95
<i>Figure 4.2: Flow diagram of the literature search process</i> .....	108
<i>Figure 4.3: Forest plot of LDL cholesterol levels at the end of follow-up</i> .....	113
<i>Figure 4.4: Forest plot of total cholesterol levels at the end of follow-up</i> .....	114
<i>Figure 4.5: Assessment of risk of bias</i> .....	115

### **Chapter 5:**

<i>Figure 5.1: Perceived benefits of offering CVD risk assessment services in community pharmacies</i> .....	187
<i>Figure 5.2: Perceived barriers of offering CVD risk assessment services in community pharmacies</i> .....	189
<i>Figure 5.3: Collaborative working relationship model</i> .....	190

### **Chapter 6:**

<i>Figure 6.1: Selected CVD-related health assessments performed by students during their undergraduate education</i> .....	224
---	-----

<i>Figure 6.2: Pharmacy students' agreement to capability statements in regard to CVD risk assessment.....</i>	<i>227</i>
<i>Figure 6.3: Alignment of the undergraduate pharmacy curriculum at the University of Auckland with core competencies for pharmacy graduates.....</i>	<i>229</i>
<i>Figure 6.4: Alignment of the undergraduate pharmacy curriculum on CVD at the University of Auckland with core competencies for pharmacy graduates.....</i>	<i>237</i>

## **Chapter 7:**

<i>Figure 7.1: The evolution of community pharmacy in NZ: Past, present and future.....</i>	<i>274</i>
---	------------

## **LIST OF APPENDICES**

### **Chapter 3:**

<i>Appendix 3.1: Literature search strategy.....</i>	<i>85</i>
<i>Appendix 3.2: Questionnaire tool.....</i>	<i>86</i>

### **Chapter 4:**

<i>Appendix 4.1: Searched websites for relevant grey literature .....</i>	<i>126</i>
<i>Appendix 4.2: Hand-searched journals for relevant grey literature .....</i>	<i>127</i>
<i>Appendix 4.3: Subject headings and key words based on the MEDLINE® search strategy... </i>	<i>128</i>

### **Chapter 5:**

<i>Appendix 5.1: Pharmacy Consumers - Semi-structured Interview Tool .....</i>	<i>202</i>
<i>Appendix 5.2: General Practitioners - Semi-structured Interview Tool .....</i>	<i>203</i>
<i>Appendix 5.3: Community Pharmacists - Face-to-face Interview Questions .....</i>	<i>204</i>
<i>Appendix 5.4: Community Pharmacists - Semi-structured Telephone Interview Tool .....</i>	<i>205</i>

### **Chapter 6:**

<i>Appendix 6.1: Competence standards for the pharmacist scope of practice .....</i>	<i>252</i>
<i>Appendix 6.2: Survey Instrument .....</i>	<i>253</i>
<i>Attachment 6.3: Participant Information Sheet .....</i>	<i>255</i>

## LIST OF ABBREVIATIONS

BMI:	Body Mass Index
CADE:	Computer Assisted Data Entry
CBD:	Central Business District
CHEs:	Crown Health Enterprises
CMM:	Comprehensive Medicines Management
CPC:	Comprehensive Pharmaceutical Care
CPSA:	Community Pharmacy Services Agreement
CPE:	Continuing Pharmacy Education
CSC:	Community Services Card
CUAP:	Committee on University Academic Programmes
CV:	Cardiovascular
CVD:	Cardiovascular Disease
CWR:	Collaborative Working Relationship
DHBs:	District Health Boards
GPs:	General Practitioners
GMBS:	General Medical Benefits System
HCP:	Health Care Professional
HDL:	High-density Lipoprotein
HDS:	Health/disease Screening
HUHC:	High Use Health Card
IPE:	Inter-disciplinary Professional Education
IPS:	Integrated Pharmacy Studies

LDL:	Low-density Lipoprotein
MM:	Medication Monitoring/management
MNZ:	Medicines New Zealand
MoH:	Ministry of Health
MTA:	Medicines Therapy Assessment
MTM:	Medication Therapy Management
MUR:	Medicines Use Review and Adherence Support
NPSF:	National Pharmacist Services Framework
NZ:	New Zealand
NZD:	New Zealand Dollars
NZHS:	New Zealand Health Strategy
NZPHCS:	New Zealand Primary Health Care Strategy
NZQA:	New Zealand Qualifications Authority
OSCE:	Observed Structured Clinical Evaluation
PCNZ:	Pharmacy Council of New Zealand
PGNZ:	Pharmacy Guild of New Zealand
PHARMAC:	Pharmaceutical Management Agency
PHCS:	Primary Health Care Strategy
PHO:	Primary Care Organisation
PoC:	Point-of-Care testing
PRS:	Pharmaceutical Review Services
RCT:	Randomised Controlled Trial

SRU: Survey Research Unit  
UAHPEC: University of Auckland Human Participants Ethics Committee  
US: United States of America  
UK: United Kingdom  
WHO: World Health Organisation

## CHAPTER 1: BACKGROUND

### 1.1 Cardiovascular disease – a global challenge

Evidence suggests that the majority of individuals who suffer from major cardiovascular (CV) events every year have one or more CV risk factors, such as hypertension, diabetes, smoking, dyslipidaemia, obesity or physical inactivity.<sup>1</sup> Despite considerable knowledge about how these risk factors can be effectively managed, and the availability of evidence-based treatments, cardiovascular disease (CVD) remains the leading cause of death and hospitalisation worldwide.<sup>1</sup> In New Zealand (NZ) CVD is reported to account for 38% of deaths annually.<sup>2</sup>

There is also evidence that CVD is associated with high health care costs, it consumes acute health care services, increases the need for chronic care services - including cardiac rehabilitation, outpatient doctor visits, medication, and laboratory services - and is associated with indirect costs due to productivity losses and premature mortality.<sup>3</sup> In order to address these issues, *The New Zealand Health Strategy* has identified thirteen priority areas for health service delivery that will ensure the highest benefits for the NZ population - six of these are directly related to heart health and diabetes.<sup>4</sup>

An important aspect of decreasing the burden associated with CVD is to shift the focus to primary prevention strategies. Widely recognised epidemiological research, which started over 50 years ago with the Framingham Heart Study and other related studies, has identified modifiable risk factors that predispose individuals to CVD.<sup>5</sup> Hypercholesterolaemia, lack of exercise, hypertension, obesity, and smoking are key risk factors that contribute to the development of CVD. Therefore, attempts to modify CV risk have, until recently, concentrated predominantly on reducing the “relative” risk from individual risk factors, rather than the combined effects from a wider range of risk factors – also referred to as the “absolute” or “global” risk. However, high levels of

single risk factors have been shown to be poorer predictors of CVD risk than moderate levels of these risk factors when combined.<sup>5-7</sup>

Consequently, the World Health Organisation (WHO) has recognised that for CVD prevention and control activities to achieve the greatest impact, a paradigm shift is required from the treatment of risk factors in isolation to comprehensive CV risk management.<sup>8</sup> Accordingly in NZ, for over a decade now, guidelines for the prevention of CVD have recommended that risk management decisions be based primarily on a person's absolute risk of having a CV event.<sup>9</sup> Determination of a person's CV risk requires knowledge of their age, sex, ethnicity, medical and family history, blood pressure, total- and high-density-lipoprotein cholesterol levels, diabetes, and smoking status.

Intensive lifestyle and pharmaceutical-based treatment is recommended if a person is identified as being at high risk (defined as a 15% or greater probability of having a fatal or non-fatal CV event in the next five years according to the Framingham risk prediction equation).<sup>9</sup> Cardiovascular events could be reduced by up to 50% in high risk individuals who are managed appropriately. Unfortunately, despite this wealth of information about risk factors, screening recommendations, improvements in risk factor identification, and effective treatment strategies, there is also overwhelming evidence that despite modifications of CV risk factors, whether behavioural or pharmacological, many people in NZ are still not reaching treatment targets.<sup>10,11</sup>

Therefore, to reduce the burden associated with the manifestations of CVD, a multi-dimensional approach that spans biology, treatment modalities, societal attitudes, and utilisation of health-care resources is required. It is urgent that these plans are now more vigorously prioritised, adequately resourced, implemented and/or expanded in order to reduce the burden of CVD.

## **1.2 Gaps in CVD risk assessment and management in NZ**

Cardiovascular disease and risk factor management are the most common reasons for New Zealanders to visit their general practitioners (GPs).<sup>12</sup> As a result,

timely assessment of CV risk factors in the general population is now a fundamental approach in primary health care. The NZ Guidelines Group has provided national guidelines for the assessment and management of CV risk, and outlines evidence-based recommendations for selecting people for risk assessment, measuring risk factors, identifying levels of absolute risk, employing appropriate interventions, and ensuring follow-up and monitoring.<sup>9</sup>

The guidelines also recommend that CV risk assessments should be provided by health professionals at the primary care level, who have adequate training and who are supported by appropriate infrastructure and systems for follow-up and quality improvement. These guidelines were distributed nationwide to GP offices and various primary health organisations (PHOs). In addition, risk prediction charts were extracted from the guidelines and incorporated into electronic and computerized decision-support tools which are widely available in primary health organizations and GP offices throughout NZ.<sup>13</sup>

Several limitations to the provision of comprehensive CV care in general practice have been reported.<sup>14-16</sup> Healthy patients generally do not book appointments with doctors, and often GPs must prioritise their time to acute care issues rather than asymptomatic risk factor management. Even when diagnosed and with a treatment plan in place, patient understanding of, and adherence to, treatment guidelines may not be optimal.<sup>16</sup> Despite the availability of the national guidelines, audits of general practice in NZ have indicated low levels of documenting CVD risk factors, even following introduction of electronic screening tools.<sup>11,14,15</sup> Barriers to accessing general practice services may result in low coverage in the most disadvantaged sub-groups of the population, which may lead to an exacerbation of health disparities due to unequal access to CV risk assessment services.<sup>2,17,18</sup> Other audits in NZ have also pointed to sub-optimal implementation of CV interventions.<sup>19,20</sup>

There are also limitations in the frequency of access to health care professionals able not only to appropriately assess risk factors, but also to initiate or alter medication therapy in an attempt to reach treatment targets for CV risk reduction.<sup>11,21</sup> General practitioners are often the first access point to treatment initiation for CV risk factors but

their time constraints pose a limitation to the extent and effectiveness of follow-up required by these patients. Although nurse practitioners and, more recently in some countries, pharmacists are able to prescribe medications, there is very little information in the literature as to the impact of having these alternate advanced care providers being able to introduce or change treatments, or on their ability to decrease the gap that exists when managing therapy of individuals with CV risk factors.

### **1.3 The role of pharmacists in CVD prevention and CV risk reduction**

Multi-disciplinary approaches have been recommended to improve the success of risk factor assessment and modification.<sup>16,22</sup> Several organisations in various countries have suggested that pharmacists, especially those in primary care or community settings, should play a more active role in the assessment and management of CVD risk because of their accessibility, frequent contact with patients, and strong knowledge of pharmacotherapy.<sup>22-26</sup> As medication therapy plays a significant role in the management of CVD, integrating pharmacists into primary care teams has also been researched internationally.<sup>26-30</sup> The *New Zealand Primary Health Care Strategy* (NZPHCS) however, is much more subtle in outlining roles for community pharmacists, simply as a provider of education in addition to medication supply and distribution activities.<sup>31</sup>

Many studies have examined pharmacist interventions aimed at improving CV risk factors, most of which have shown positive results.<sup>32-40</sup> However, pharmacists appear to be largely under-utilised and poorly integrated into NZ's primary care teams.<sup>41,42</sup> The slow introduction of pharmacists into these positions may be a result of several factors. First, pharmacists themselves may not be ready to take on an expanded role. Similarly, other healthcare professionals may be uncertain as to pharmacists' roles in primary care. The majority of studies of pharmacist-led interventions to improve CV risk factor management require close collaborations with GPs and/or frequent and intensive patient follow-up.<sup>27,30-32</sup> Although there has been a recent increase in the number of pharmacists working directly within medical practices and primary health organisations, the majority of registered pharmacists in NZ still work in chain or independent

community pharmacy settings which are largely not conducive to collaborative practice. In addition, health system barriers such as lack of remuneration for clinical pharmacy services may also be a hindrance.<sup>43</sup>

In community pharmacy settings, remuneration is primarily based on dispensing prescriptions; thus any activities related to non-dispensing activities, though worthwhile, are often not given priority. The current pharmacist shortage is also a factor, as many pharmacists simply do not have the time necessary for professional development or implementation of programmes which require time-intensive operating procedures. As such, collaborations with GPs are generally limited to brief communications regarding technical issues related to prescription writing or minor alterations/adaptations of medication dosages. In the same manner, interactions with patients rarely go beyond basic counselling at prescription dispensing. In NZ, the extent to which pharmacists engage patients for the purpose of health screening and monitoring their therapy is also limited and largely undocumented or unpublished.

The NZPHCS calls for the delivery of high quality care through improved access and equity. This is expected to be facilitated by integration between service providers and development of culturally competent multi-disciplinary primary health care teams.<sup>31,42</sup> However, the NZPHCS does not provide detail of how community pharmacists could be involved in CVD risk assessment in order to increase access to this primary care service and contribute to improving CV health outcomes, particularly in those populations at highest risk.

#### **1.4 A strategy to reduce the gaps in CVD risk assessment and management**

As reviewed above, a gap exists with respect to the optimal management of CV risk factors in NZ. However, there also exists a great opportunity for pharmacists to facilitate CV risk reduction activities if the barriers to their integration into primary care are better understood and overcome. The contribution of community pharmacists to public health is becoming increasingly recognised worldwide.<sup>23,43,44</sup> The high profile and unique accessibility of pharmacists in the community, coupled with their frequent contact with a wide range of people, well and sick, means that community pharmacists

are well-positioned to provide preventive health advice, health promotion interventions, refer people for adequate, evidence-based treatments, collaboratively monitor and assess therapy with other health care providers, and positively influence treatment outcomes.

NZ's specific CVD risk assessment and management clinical practice guidelines could facilitate the success of pharmacists in achieving these goals. However, wide dissemination of guidelines alone will not significantly reduce the treatment gap, prevent CV disease and its progression or promote the achievement of treatment targets among patients. Therefore, further research is needed to identify practical ways in which pharmacists can successfully employ CV reduction strategies that are feasible and sustainable in the current health care system and practice environments to reduce the evidence-to-practice gap in CV risk assessment and management in NZ.

## **1.5 This thesis**

My overall research question was as follows:

*What strategic interventions can NZ community pharmacists adopt to facilitate the provision of CV risk assessment and management services within the constraints of the current health care system and their practice environment?*

The specific objectives of the research outlined in this thesis were to:

- 1) understand the unique context of the NZ health care setting within which community pharmacists would function as an integral part of the multi-disciplinary primary care team and determine the setting's readiness to support their involvement;
- 2) systematically review the literature to identify and evaluate published interventions by community pharmacists for the purpose of CVD risk reduction and/or management;
- 3) document the views of important stakeholders (GPs, consumers and pharmacists themselves) on the acceptability of community pharmacists as

integral participants in the multi-disciplinary primary care team in CV risk assessment.

- 4) provide strategic recommendations that pharmacists in primary care settings can use to facilitate CV risk reduction services within the constraints of the current health care system and their practice environment in a sustainable manner.

Because the vision of pharmacists working in patient-oriented health care environments represents a transformational change in the evolution of the profession, it is important to understand the current practice environment of community pharmacists in which this transformation will take place. Chapter 2 is thus devoted to describing the NZ primary health care setting and strategies that are likely to influence community pharmacy practice change, and to gauge the setting's readiness for integrating pharmacists into primary care teams, particularly for a future role in CV risk assessment and management.

This thesis is composed of five separate but related studies. Each study addresses a specific research objective in an attempt to answer the overall research question. The first study (described in Chapter 3) examines the role of community pharmacy in NZ's primary health care, exploring its involvement in health screening and medication monitoring services. In Chapter 4, the literature is systematically reviewed to gain a deeper understanding of the published interventions involving community pharmacists aimed at CV risk factor assessment and management, and the related outcomes particularly with regard to reaching treatment targets. Chapter 5 describes the barriers and opportunities for NZ pharmacists' involvement in CV risk assessment as perceived by GPs, consumers and pharmacists themselves. In Chapter 6, advanced training of CV risk assessment and management available to NZ pharmacy undergraduates are assessed in an effort to provide recommendations for sustainable future implementation of CV risk assessment services in community pharmacies.

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## CHAPTER 2:

# COMMUNITY PHARMACY AND THE NEW ZEALAND PRIMARY HEALTH CARE SECTOR

### 2.1 Introduction

Historically, community pharmacy practice has focused on ‘product-oriented’ types of activities such as dispensing medications and giving prescription-related advice. In addition to these, community pharmacists are starting to provide more ‘patient-oriented’ services and have become active advocates in a number of public health initiatives.<sup>1-4</sup> Increasingly, the pharmacist’s task is to ensure that a patient’s medications are appropriately indicated, the most effective available, the safest possible and most convenient and economical for the patient. This new approach is enabling pharmacists to take more direct responsibility for the individual patient’s medicine-related needs, optimising medicine-related health outcomes, and contributing to the quality of life of their patients.

As a result of this increased involvement, there is growing international pressure not only to ensure that pharmacy professional bodies advocate system change to enable pharmacists to contribute to primary health care, but also to demonstrate that community pharmacists are effective members of the primary health care team.<sup>4-9</sup> In NZ, although community pharmacy has been considered as an integral part of primary health care<sup>10</sup>, there has been very little regard for system change to integrate pharmacists into primary care teams to enable them to contribute to improved outcomes for patients in a sustainable manner.

As explained in Chapter 1, research indicates that treatment gaps for CVD in primary care settings are still prevalent in NZ despite the wide availability of evidence-based guidelines.<sup>11,12</sup> Because pharmacists are considered as one of the most accessible health care professionals<sup>13</sup>, CV risk assessment can be regarded as a service in the primary care sector in need of community pharmacy involvement.

Screening programmes evaluated in various countries have demonstrated that community pharmacists are in an ideal position to assess individuals' CV risk, manage CV risk factors, and refer high-risk individuals.<sup>14,15</sup> Collaborative practices between community pharmacists and other primary care providers in CV risk assessment and management may decrease the treatment and access gaps previously identified, and may have a positive effect on CV health outcomes in the population.<sup>16-18</sup>

Major health care reforms have been implemented in NZ that impact on community pharmacy practice and that may have implications for how community pharmacists' roles could be expanded to offer CV risk assessment services in a collaborative and sustainable manner. This chapter provides an environmental scan of NZ general practice, and national systems and policies, to understand the unique context of the NZ health care setting within which community pharmacists would function as an integral part of the multidisciplinary primary care team, and to determine the setting's readiness to support their involvement in CV risk reduction strategies. The chapter starts by describing the NZ health care system, the evolution of Primary Care Organisations (PHOs), the current policy environment, and the possible future integrated roles of community pharmacists in the population health initiatives in NZ.

## **2.2 Historical context of New Zealand's health care system**

NZ was one of the first countries in the world to provide universal health care. Under the Social Security Act of 1938, a Labour government began funding hospitals, although medical and pharmaceutical benefits were not fully effective until 1941 with the introduction of the General Medical Benefits System (GMBS).<sup>19</sup> The GMBS allowed a reasonable income for GPs and patients received low- to no-cost medical services through the 1950s and 1960s.

In 1983, the Area Health Board Act restructured the country's 27 hospital boards into 14 area health boards using a population-based funding formula.<sup>20</sup> The restructuring was intended to introduce greater local accountability and administrative efficiency, in the face of escalating health care costs. The 1983 Act successfully held health expenditures steady from 1980-1990, following a sharp rise during the 1970s.<sup>19,21</sup>

In response to accelerating healthcare costs, from the early 1990s the NZ health system underwent ten years of significant changes. In 1991 under a National (conservative) government, area health boards were replaced by four regional health authorities headed by government-appointed commissioners. The GMBS was also changed in 1992 with a government subsidy targeted at low income families and those with high health needs.<sup>19,21</sup>

Hospitals became Crown Health Enterprises (CHEs) with appointed boards of directors, and much health care was funded through market-driven competitive contracting.<sup>18</sup> It was a radical departure from a system of community involvement in health care which had largely been accepted by both political parties since the establishment of universal health care in the 1930s. As a result, in 1996, the four regional purchasing authorities were amalgamated into the Health Funding Authority. The CHEs were renamed as *Hospitals and Health Services* shifting the emphasis from competitive contracting to collaboration, fostering teamwork and co-ordination of health care delivery that had suffered as a result of the business-oriented health model.<sup>22</sup>

In 1999, *Hospitals and Health Services* became 21 District Health Boards (DHBs) and a population-based funding formula was introduced. Each DHB became responsible for both primary and secondary services, as well as public health services for defined geographic areas.<sup>20,23</sup> Key to this strategy was the establishment of not-for-profit PHOs funded by the DHBs, some of which were able to provide free or very low charge GP visits. In 2003, increased subsidies were introduced for children and adolescents (aged 6-17 years) and in 2004 for older people (aged 65 years and over).<sup>24</sup> By 2007, 82 PHOs had enrolled 95% of the NZ population.<sup>25</sup>

### **2.3 How New Zealand's national health care system works**

Each year the government of NZ decides how much public money will be spent on health care. These funds are then allocated to the DHBs. The government provides broad guidelines on what services the DHBs must provide. Some DHBs then purchase these services from a range of providers including public hospitals, non-profit health

agencies, Māori groups or private organisations. DHBs run public hospitals, preventive services, and health promotion activities and services.

The first point of contact the patient has with the health service is usually through a primary health care provider, such as a GP, accident and medical centre, midwife, independent nurse practitioner, family planning clinic, optometrist, dentist or complementary therapist. Specialists can only be seen after referral from a GP or midwife. Patients are personally responsible for the GP's fee, ranging between \$35-65 NZ dollars (NZD). However specialty care, which is generally delivered through the public hospital outpatient department, is fully covered by the DHB.<sup>20,24, 26</sup>

People with low incomes are eligible for a Community Services Card (CSC). The government subsidises GP visits for patients with a CSC. A CSC also entitles patients to receive additional subsidies on prescription drugs. Adults and children aged six and over with a CSC pay \$5 NZD per prescription. Children aged under six with a CSC do not pay.<sup>27</sup> There is also a High Use Health Card (HUSC) which allows for additional subsidies for GP visits and prescriptions. To be eligible for a HUSC an individual needs to have visited the doctor more than 12 times in one year.<sup>20,24</sup>

The Pharmaceutical Management Agency (PHARMAC) was also established in the 1990s.<sup>28</sup> This government agency decides which prescription drugs will be on the Pharmaceutical Schedule to receive full or partial governmental subsidy. PHARMAC has been a pioneer internationally for its ability to hold down prescription costs.<sup>29</sup> Before drugs are put on the schedule, there is a strong burden on drug companies to demonstrate not only that their products are effective, but also more cost-effective than similar products.

After negotiating with drug companies for the lowest possible price, PHARMAC typically sets a dollar amount for the subsidy of all medicines in what they call "therapeutic sub-groups". Usually this amount is set at the manufacturer's price for the least expensive drug in a given category. If a brand name drug priced higher than the subsidy is prescribed for a patient, he or she is required to pay the difference. Several changes have been implemented in PHARMAC since 2009. For example the \$3 co-

payment for prescription charges was extended to prescriptions written by DHB prescribers for people moving from secondary health care services back into the community.<sup>28</sup>

## **2.4 Historical context of community pharmacy practice in New Zealand**

Pharmacy practice has been described as evolving in three distinct stages:

(1) The traditional or drug distribution stage; before the 1960s; generally, pharmacists were known as chemists, their function was to procure, prepare, and compound medicinal products. However, this role was gradually taken over by the pharmaceutical industry.

(2) The transitional or clinical pharmacy stage; initiated in the mid-1960s, where pharmacy practice placed much less emphasis on compounding and considerably more emphasis on clinical service delivery; and

(3) The patient-focused or pharmaceutical care stage which began in the early 1990's and continues to the present time.<sup>30</sup>

In line with the latter stage of pharmacy practice, the Pharmacy Council of NZ (PCNZ), the regulatory body for pharmacists, has proposed a new scope of practice for pharmacists.<sup>31</sup> This new scope will allow suitably trained and qualified clinical pharmacists working in a collaborative health team environment to prescribe *Prescription Medicines* and *Controlled Drugs* to patients under their care. If approved, it will provide community pharmacists with additional tools to move their clinical role forward.

Initially, the growth of clinical pharmacy in hospitals led to the misconception that clinical pharmacy activities were limited to pharmacists working in hospital settings. Although the shift to patient-focused practice in NZ community pharmacies started almost simultaneously, the transition has been slower and more difficult in community pharmacy settings mainly because of the business-like nature of community pharmacy, and also because of the distance from the clinical environment and the difficulties accessing pertinent patient health information.<sup>32</sup>

Internationally, the move toward pharmaceutical care practice has represented a period of relatively rapid expansion in the core functions of community pharmacists and of continued professional development on their part. Increasingly, the pharmacist's task is to ensure that a patient's medications are appropriately indicated, the most effective available, the safest possible and most convenient for the patient. This new approach has enabled pharmacists to take more direct responsibility for the individual patient's medication-related healthcare needs, and pharmacists are making a unique contribution towards optimising health outcomes and the quality of life of their patients.

Present efforts in NZ parallel the work of pharmacy organisations and professional groups internationally. These initiatives involve pharmacists seeking to respond and adapt to a rapidly changing health care environment and to the health care needs of the public. However, there is very little formal investigation into the nature of those changes and the contribution community pharmacy makes to the efficiency and quality of the primary health care service. This underscores the need for sound evidence-based material to better inform local decision making on how to optimise health and budgetary outcomes through community pharmacy. In addition, overall, negotiations on community pharmacy services with the government and similar funding agencies have historically primarily focused on the price for dispensing and related activities rather than for clinically-oriented/patient-centred functions.

Practice change within the pharmacy profession is necessary to support the future role of pharmacists in NZ. According to PCNZ, a total of 3304 pharmacists were on the practising register by 30 June 2012.<sup>33</sup> Table 2.1 provides an estimate of the number of pharmacists in the different areas of pharmacy employment throughout NZ. The information was retrieved from the pharmacists who completed the 'type of work' section on their Annual Practising Certificate (APC) renewal form. The data collected relates to the previous APC year.

Considering that the vast majority of pharmacists in NZ practise in community pharmacies, the drive for practice change will most likely come from role models working in this sector. It is imperative that pharmacists begin to understand that those who merely dispense are no longer fulfilling a societal need, and in this era of greater

accountability in health care, can no longer be justified.<sup>34,35</sup> Pharmacists themselves may have to make attitudinal changes in order to take on new roles and integrate within the primary care team. A growing literature on change management and pharmacy practice exists, which highlights that practice change is crucial to support moving the profession forward.<sup>36,37</sup> As it pertains to CV risk assessment and management, this practice change on the part of community pharmacists is also essential.

***Table 2.1: NZ Practising Pharmacists by area of employment as of 30 June 2012 (n = 3304)<sup>33</sup>***

Type of pharmacy work	Number of practising pharmacists (%)*
Community pharmacy	2262 (68%)
Hospital	421 (13%)
Pharmaceutical industry	54 (2%)
Teaching/research	96 (3%)
IPA, PHO, DHB	68 (2%)
Other (pharmacy related)	115 (3%)
Other, general	144 (4%)

**Legend:** \*Some pharmacists did not report employment setting and some indicated being employed in more than one setting. IPA=Independent Practitioner Association, PHO=Primary Health Organisation, DHB=District Health Board

## 2.5 Health care reforms and community pharmacy

Clearly identifying the structural, legislative, policy, programme and funding requirements to support transitioning of the pharmacy profession in NZ is important. Several major health care reforms have been introduced to support not only the general changes in the NZ health care system, but also those which have impacted on community pharmacy practice, particularly the 2000 New Zealand Health Strategy (NZHS),<sup>10</sup> the 2001 NZPHCS<sup>25</sup> and the Medicines New Zealand (MNZ) strategy.<sup>9</sup> The overarching aims of the NZHS were to improve the health of New Zealanders by focusing on areas that would ensure the greatest benefits and reduce health inequalities. Thirteen population health objectives were identified as outlined in Table 2.2.

**Table 2.2: The New Zealand Primary Health Care Strategy Population Health Objectives<sup>25</sup>**

1. reduce smoking
2. improve nutrition
3. reduce obesity
4. increase the level of physical activity
5. reduce the rate of suicides and suicide attempts
6. minimise harm caused by alcohol and illicit and other drug use to both individuals and the community
7. reduce the incidence and impact of cancer
8. reduce the incidence and impact of cardiovascular disease
9. reduce the incidence and impact of diabetes
10. improve oral health
11. reduce violence in interpersonal relationships, families, schools and communities
12. improve the health status of people with severe mental illness
13. ensure access to appropriate child health care services including well child and family health care and immunisation.

The PHCS calls for the delivery of high quality care through improved access and equity. Although it only outlines subtle roles for community pharmacists (simply as a provider of education in addition to medication supply and distribution activities), community pharmacists already contribute to a number of the NZPHCS population health objectives through a variety of services, which need to be further facilitated by integration between service providers and the development of culturally competent multi-disciplinary primary health care teams.

In contrast to the PHCS, which does not provide details of what community pharmacy needs to deliver in order to improve health outcomes, the MNZ is a strategy which provides more direction and increased roles for pharmacy, citing three objectives:

1. To ensure the quality, safety and efficacy of available medicines.
2. To improve access to medicines that New Zealanders need regardless of an individual's ability to pay.

### 3. To optimise the quality use of medicines.

This strategy highlights the central position of community pharmacy in assisting patients to understand their medicines better, to use their medicines appropriately, to monitor side effects and adverse reactions and to optimise therapeutic outcomes through appropriate medicines use and adherence. The MNZ strategy is supported by an action plan called '*Actioning Medicines NZ*' which also outlines the process by which PHARMAC and DHBs develop a proposed budget for community pharmaceuticals based not only on the relative costs, but also on the benefits of a variety of health interventions.<sup>38</sup>

#### **2.5.1. Community pharmacy strategies**

As briefly outlined under 2.4, funding negotiations on community pharmacy services have historically focused on the price for dispensing and related activities. Discussions on price have included debate on whether or not the dispensing fee includes provision of advice, and the extent thereof, to patients when they pick up their medications from a pharmacy. Despite the fact that both the NZ Pharmaceutical Society document '*Ten Year Vision for Pharmacists in New Zealand*'<sup>39</sup> and the Pharmacy Guild of NZ document '*Blueprint for the Future of Community Pharmacy*'<sup>40</sup> promote pharmacists as valued contributors to quality and safe primary care services, there has been very little regard for system change to enable improved outcomes for patients.

The DHBs have also developed a NZ National Pharmacist Services Framework (NPSF).<sup>41</sup> This document provides a range of defined services that pharmacists could provide within a variety of settings. The NPSF is based on current international direction and development of community pharmacy practice and therefore provides a valuable basis on which to develop services. The framework consists of existing dispensing services and five newly developed services. The new services are divided into two main themes:

- a. Information services, comprised of:
  - Health Education to patients
  - Medicines and clinical information support to practitioners (this includes Clinical Advisory Pharmacist and Pharmacist Facilitation roles)
- b. Medicines review services, comprised of:
  - *Medicines Use Review and Adherence Support* (MUR), a four part review assessing the patient's use, understanding and adherence to their medication regimen. This service has been aligned with the PCNZ competency standards and titles.
  - *Medicines Therapy Assessment* (MTA), a comprehensive clinical review of an individual patient's medication as part of a multidisciplinary team.
  - *Comprehensive Medicines Management* (CMM), case based active management of changes and (future) pharmacist prescribing activities, as part of a multidisciplinary team.

In addition, PCNZ also approved the Pharmacist Prescriber Scope of Practice in November of 2011.<sup>42</sup> To register as a Pharmacist Prescriber, the pharmacist must hold an Annual Practising Certificate in the Pharmacist Scope of Practice, declare competency in all standards relevant to the NPSF services outlined above, have at least three years of post-registration experience working in a collaborative health team environment, have completed an accredited course of education and training, and provide evidence that their prescribing practice will be in a collaborative health team environment.

### **2.5.2. National chronic disease management initiatives**

Two national chronic disease management programmes (*Get Checked Diabetes Aotearoa* and *Care Plus*) were implemented to foster team-based service delivery in primary care.<sup>43,44</sup> The *Get Checked* programme was set up in June 2000 by the Health Funding Authority to help people who have been diagnosed with diabetes better manage their condition and lower the risks of complications. DHBs are responsible for the programme and ensuring that it is delivered in their districts. The programme

entitles people who have been diagnosed with type 1 or type 2 diabetes to have a free annual health check from either their GP or an appropriately trained registered primary healthcare nurse (diabetes nurse), who are usually members of primary health organisations (PHOs). The purpose of the check is to ensure that key tests (which assist in identifying diabetes complications early) have been completed for the year and to allow people to plan treatment for the year ahead. The programme is part of the strategic direction for diabetes care set by the Ministry of Health in 1997. The programme's objectives are to:

- systematically screen for the risk factors and complications of diabetes to promote early detection and intervention;
- agree on an updated treatment plan for each person with diabetes;
- prescribe treatment and refer people for specialist or other care if appropriate;
- update the information in the diabetes register, which is used as a basis of clinical audit and for planning diabetes services in the area;
- improve the planning and co-ordination of services delivered by all healthcare providers; and
- decrease the barriers to accessing high quality care for Māori and Pacific Island peoples.

*Care Plus* was introduced in July 2004 as part of the PHCS.<sup>25</sup> It was targeted to patients who are high-health users (holding a HUSC) or have chronic conditions, acute medical or mental health needs, or terminal illness requiring intensive medical management. A *Care Plus* patient could expect to receive a funded extended initial appointment with a nurse or doctor and together develop an individualised care plan.<sup>43</sup> Many practices where the GP was initially the sole provider of chronic disease care adopted a team-based approach, primarily in collaboration with nurses.

Although these two new funding streams facilitated chronic disease management in general practice, they did not explicitly engage community pharmacists.<sup>36</sup> Consequently, there was limited interest on the part of community pharmacists to take on these opportunities to expand their role and develop new skills. However, these primary care strategies have been able to highlight a large skill gap on the part of

various health care professionals (HCPs) and the need for the provision of postgraduate training in chronic disease management, and further qualifications and prescribing rights for various HCPs.

The potential of an infrastructure of close to 1,000 community pharmacies<sup>45</sup> and over two thousand community pharmacists in NZ<sup>33</sup> with regard to chronic disease management, in particular CV risk assessment and management, should not be ignored. An important advantage of pharmacists over other HCPs is their accessibility in the community; they are often the first point-of-contact for patients with health enquiries. It has been reported that community pharmacists often see patients more frequently than doctors.<sup>46</sup>

### **2.5.3. National quality improvement initiatives in primary health care**

Over the last fifteen years, there has been substantial growth in clinical governance and quality improvement-related activities in the NZ primary care sector. The PHCS has provided further momentum with requirements to measure the performance of health care delivery to achieve national, regional and local community goals.<sup>25</sup> A pay-for-performance programme, the *PHO Performance Management Programme*, was introduced in 2006 to strengthen the role of PHOs and sharpen their focus on the population health and inequality priorities. This programme is one part of an overall quality framework and was designed by primary health care representatives, DHBs and the MOH to reinforce the combined health sector efforts to improve the health of enrolled populations and reduce inequalities in health outcomes through supporting clinical governance and rewarding quality improvement within PHOs in NZ.<sup>47</sup>

A number of priority health areas have been identified and performance indicators created which can be measured against ideal targets. Incentives, in the form of financial payments to the PHO, encourage performance. For most of the indicators, the closer the PHO is to achieving the target, the greater the proportion of the payment is made. Performance indicators may change from year to year and some indicators are provided for information only and do not qualify for a payment. *Table 2.3* lists the indicators that are currently funded.<sup>48</sup>

**Table 2.3: Funded PHO Performance Indicators as of January, 2011**<sup>48</sup>

Breast cancer screening
Cervical cancer screening
Ischaemic cardiovascular disease detection
Cardiovascular disease risk assessment
Diabetes detection
Diabetes follow-up after detection
Smoking status
Infectious disease: Influenza vaccine in people aged over 65 years
Age appropriate vaccinations for children aged two years
Financial: GP referred laboratory expenditure
GP referred pharmaceutical expenditure

Many of these indicators emphasise prevention and treatment of chronic diseases where pharmacists can make significant contributions, particularly in those related to diabetes and CVD detection and prevention programmes.<sup>46</sup> Therefore, if pharmacists are to be active participants in achieving these goals, collaboration with the wider primary health care team, such as GPs and nurses, is needed.<sup>44</sup> Pharmacists will need to demonstrate that they are medicines experts who can effectively communicate not only with their patients, but also with other health professionals and representatives from health funding and planning organisations. As with general practice, demonstrated evidence of the delivery of quality primary health care by community pharmacy will be necessary.<sup>36</sup>

## **2.6 Future direction for community pharmacy practice in New Zealand's primary health care**

National health strategies and general practice funded programmes are facilitating a unified population health direction as well as targeting inequities of those with chronic disease. However, considerable barriers to population based services in NZ still remain. Currently, general practice is still coming to terms with population health and how to implement the PHCS, while still being primarily fee-for-service small businesses. There will be significant value for general practice, DHBs and PHOs when community pharmacy is more integrated with primary care and starts delivering enhanced pharmaceutical services to a wider segment of the population.<sup>36</sup>

Integrating pharmaceutical care services within general practice will have patients who are better informed about their medications, more likely to be adherent and who are more likely to achieve the health targets expected by the DHBs. By engaging with community pharmacy, PHOs will be seen not only to contribute to population health outcomes, but also to the development of a robust multi-disciplinary workforce and primary care infrastructure which is an expectation of primary care policy.<sup>47</sup>

From all of the national health strategies and pharmacy-related vision/strategic direction documents previously described, there are common themes that can be articulated in regards to the future direction for community pharmacy practice in NZ. Services need to be provided in a manner that:

- are patient-centred;
- have targeted health outcomes;
- assure patient safety;
- assure quality;
- are sustainable;
- are collaborative and integrated within healthcare teams;
- support the continuing professional development of pharmacists and;
- facilitate pharmacists practice to their full scope;

These will bring a greater expectation that community pharmacies contribute to both patient and population health outcomes as a result of increased multi-disciplinary teamwork and integration at both practitioner and organisational levels. As stated in section 2.4 of this chapter, PCNZ is proposing a new scope of practice for pharmacists as designated prescribers. The PCNZ believes that by enabling these pharmacists to become designated prescribers, as defined in the Medicines Act<sup>31</sup> considerable benefits will accrue to the public, the government and health care professionals.

This initiative brings opportunities for pharmacists to get not only more involved in CV risk assessment, but also in expanding their role in managing medication therapy in collaboration with other health care professionals. However, for pharmacists to conduct systematic, equitable disease prevention and management programmes, such as the CV risk assessment programme that is the focus of this thesis, there will need to be a more sustainable primary care clinical workforce and increased capacity and skills to meet the demand.

Therefore, there is a need to assess how community pharmacists' roles should evolve to meet these demands, not only as those established by pharmacy regulatory bodies, but also those from the wider health care community; and how further integration of community pharmacy services should be undertaken to ensure that pharmacy contributes to health outcomes through coordinated and sustainable approaches with other primary health care providers.

There is very little NZ evaluative research about the feasibility of pharmacist-led CV risk assessment initiatives. It is essential to determine the level of acceptability of public health interventions by pharmacists in order to inform the likelihood of success of such services. This PhD research will therefore complement the scant NZ research available on this topic to date and facilitate future knowledge translation of pharmacists in public health initiatives, particularly in CV risk assessment and management.

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## CHAPTER 3:

# PROVISION OF HEALTH/DISEASE SCREENING AND MEDICATION MONITORING/MANAGEMENT SERVICES IN NEW ZEALAND COMMUNITY PHARMACIES

### 3.1 Introduction

The World Health Organisation (WHO) defined primary health care as the principal method of delivering health care to patients at first contact and at the most local level of the health system.<sup>1</sup> Central to this definition is that primary health care should be accessible for all individuals, regardless of ethnic, cultural, or socioeconomic differences.<sup>1,2</sup> However, increasing costs and fragmentation of the health care system pose a challenge to the adequate delivery of public health.<sup>3,4</sup> As a consequence, people often face difficulties obtaining needed health care in a timely fashion.

For primary care to be successful, the full involvement of both health care providers and their patients is essential.<sup>1,2</sup> Community pharmacists have an important role to play in reducing some of these health disparities and improving access to quality health care, particularly in the primary care sector.<sup>5,6</sup> With the existing number of pharmacies, their presence in communities of almost any size and location, their extended hours, and the walk-in character of the community pharmacy, the pharmacist is the most accessible of health care professionals.<sup>7-9</sup>

As reviewed in Chapter 2, the pharmacists' role is expanding beyond the traditional product-oriented functions of dispensing and distributing medicines to more patient-oriented and public health functions. Pharmacists are able to use medication-related encounters with patients to provide information and either resolve these or make a referral to other health care professionals or for other health care needs. The benefits to patients include valuable access to information on drug therapies and treatment of minor ailments, prevention and resolution of medication-related problems, improved outcomes and increased patient satisfaction.<sup>5,6-9</sup> Worldwide, pharmacists have proven

not only to be an accessible resource for health and medication information, but also for other essential components of population health programmes, such as health/disease screening (HDS) and medication monitoring/management (MM).<sup>10</sup>

In New Zealand (NZ), access to HDS and MM services has traditionally been through general practice. Various potential barriers to optimal public health care by general practitioners (GPs) have been reported – both in NZ and internationally - such as constraints on GP time, accessibility, and priority placed on provision of acute care rather than preventive initiatives.<sup>11-14</sup> In view of increased public need, particularly for those individuals not seeing their GPs regularly, first practice nurses and then pharmacists, have been slowly sharing these responsibilities with GPs, mostly in a collaborative manner.<sup>15,16</sup> Disease screening and monitoring are supported by the New Zealand Health Strategy (NZHS) which emphasises a population health approach, requiring an increased involvement in health promotion and preventative care by a range of health professionals.<sup>17</sup> Accessibility and broad medical and pharmacotherapy training has prepared pharmacists for extended roles that fit those outlined by the NZHS.

A relatively recent document released by the Pharmaceutical Society of NZ, *Focus on the Future: Ten-Year Vision for Pharmacists in New Zealand: 2004–2014*, reflects twelve key areas of pharmacy practice that will help to achieve the vision of providing patient-centred services in primary care by the year 2014.<sup>18</sup> This document highlights the need for collaboration between pharmacists, doctors and nurses when making prescribing decisions, and the role of community pharmacists performing medicines management, health screening and monitoring services. Therefore, it is expected that pharmacists - as part of multidisciplinary primary care teams - will become increasingly involved in delivering wellness programmes, particularly HDS and MM services, which will help to reduce the demand on general practice which is suffering from a shortage of GPs, and more directly contribute to improving access to quality health care.

Because community pharmacy practice has changed from a mainly dispensing function to include a wide range of other services involving medicines and health, it has become important to research the nature of community pharmacy practice and the

factors that influence community pharmacies in the provision of more clinically-oriented services.<sup>19,20</sup> This shift has resulted in a vast body of research to determine the effects of extending the pharmacists' roles into medication review services, medication compliance interventions and medication counselling.<sup>21-26</sup> Largely positive results have been demonstrated for medication compliance and medication counselling interventions by pharmacists, with mixed results for medication review services.

The contribution of community pharmacists to public health is another area of pharmacist's role expansion that is becoming increasingly recognised. Internationally, a large number of studies have examined the prevalence and utility of community pharmacist-led HDS and MM services.<sup>10,27,28</sup> In NZ however, there appears to be a paucity of studies that have addressed these services, their outcomes and/or the related challenges and opportunities for their provision.<sup>29-31</sup>

The aim of this chapter is to contribute to the knowledge base related to NZ community pharmacy practice in primary care service provision, in particular that related to HDS and MM services. In the context of the overall objectives of this research, the available literature on pharmacist-led cardiovascular disease (CVD) risk assessment and management will be examined. First, a comprehensive national and international literature on these topics will be reviewed and summarised, followed by a presentation of the results of a NZ-wide survey in community pharmacies which describes the pharmacy- and pharmacist-related characteristics of those offering services beyond that of traditional dispensing, medicines information and advice. In keeping with the focus of this research, the survey also investigated the degree of involvement of NZ community pharmacies in CVD risk assessment services.

The literature search was conducted covering the period of January 1 1990 to June 30 2011 available through the University of Auckland, including *Medline*®, *Embase*® and *International Pharmaceutical Abstracts*, as well as internet-based searches using PubMed®. Bibliographies located in the original database searches were used to identify additional articles. For the search strategies, a combination of subject headings and key words were developed for each electronic resource based on the Ovid MEDLINE search strategy (*Appendix 3.1*).

### 3.2 Community pharmacy-based health/disease screening services

Screening is performed to identify the presence of a disease, or a risk factor for a disease among those who do not already manifest symptoms. When screening is performed by a health care provider, it has often been referred to as ‘health assessment’ or ‘health evaluation’.<sup>32</sup> Screening involves the periodic or targeted assessment of an individual’s overall health and the presence of risk factors for disease. This results in the delivery of clinical preventive services that are tailored to a patient’s age, sex, risk factors and laboratory parameters.<sup>32</sup> By promoting prevention and enhancing the patient-provider relationship, screening services may improve the public’s health. Screening in community pharmacies is not intended to replace the role of the GP, but to enhance it.<sup>33</sup> Screening in community pharmacies is also designed to provide access to screening services to members of the public who may not access or source this intervention through their GP.<sup>33-35</sup>

A number of international studies have assessed the usefulness of HDS services in community pharmacies. The range of medical conditions being screened for has been broad with most of the published research in this area focusing on pharmacist-led screening for CVD risk factors (such as hypertension, dyslipidaemia, and smoking), diabetes and osteoporosis.<sup>10,35-39</sup> Limited research has assessed screening for breast and cervical cancer risk<sup>40,41</sup>, chlamydia infection<sup>42</sup>, airways disease<sup>43,44</sup>, depression and insomnia.<sup>45-48</sup> There is only one published study in NZ reporting the extended services provided by community pharmacists based on a 2000 national survey.<sup>29</sup> In this study, only 16% of the participating community pharmacies reported to be involved in “diagnostic and monitoring” activities. However, the extent and specificities of such services was not reported.

Despite these reports, there is still insufficient evidence to determine whether or not screening activities are an effective use of community pharmacy resources.<sup>10</sup> In addition, for certain conditions, there is also insufficient data supporting a reduction of complications after early diagnosis, and the fear exists that positively screened patients would not result in adequate follow-up testing or more thorough consultations with GPs or specialists; or that the potential exists that community screenings would not target

appropriate patients.<sup>49</sup> There may also be unnecessary patient anxiety from false positive test results. For these reasons, it has been advocated that pharmacy-based CVD screening programmes should be specifically targeted at those individuals likely to be at elevated risk and those who could benefit the most from the pharmacist intervention (often referred to as “*targeted screening*” or “*case finding*”) and should incorporate a close liaison with GPs (such as collaborative care).<sup>33,50</sup>

Appropriate training and demonstrated competence by pharmacists to perform HDS tests must also be considered and has not been significantly researched or available in the published literature. The design of many community pharmacies has also been identified as a concern for implementation of community pharmacy based screening services.<sup>31,51</sup> From the community pharmacist perspective, HDS services are time consuming and most offer no financial recompense; thus, they are mainly provided on the customer’s/patient’s request and usually paid by the customers/patients themselves.<sup>20,30,35</sup>

### **3.3 Community pharmacy-based medication monitoring/management services**

In addition to HDS, community pharmacists also provide ongoing services to monitor the health and progress of patients to ensure the safe and effective use of medications. These non-dispensing services have been termed cognitive services, pharmaceutical care services, medication monitoring, and – more recently in the United States (US) - medication therapy management (MTM) services.<sup>52</sup> In NZ, these have often been referred to as *Medicines Management* that includes patient-centred services aimed at improving medicines-related health outcomes: such as Medicines Use Review (MUR) previously referred to as Pharmaceutical Review Services (PRS), Medicines Therapy Assessment (MTA) and Comprehensive Medicines Management (CMM), both of which were previously referred to as Comprehensive Pharmaceutical Care (CPC).<sup>53,54</sup> Regardless of the terminology used, these services in community pharmacy are designed to improve care, enhance communication among patients and pharmacists, improve communication and collaboration among providers, and optimise medication use that leads to improved patient outcomes. Ideally, patients or caregivers

will receive MTM services at the pharmacy where they have filled their prescriptions and from a pharmacist with whom they have an ongoing relationship.<sup>52</sup>

International studies, such as the *National Pharmacist Workforce Survey* in the US<sup>19</sup> and the *National Pharmacy Database Project* in Australia<sup>20</sup> have identified four main MM services offered in community pharmacies: immunisations, smoking cessation, diabetes care management, and medication reviews. The only published study in NZ which researched patient-centred services offered in community pharmacies reported that CPC, PRS and medication monitoring were provided by the minority of surveyed pharmacies compared to dispensing-related services.<sup>29</sup>

However, as for HDS services, most of the MM services offered in community pharmacies worldwide can still be considered to be in an early adoption phase. The complexity and resources required for these strategies when undertaken in real world settings, limits their application and sustainability.<sup>55,56</sup> Studies on the perceived barriers to community pharmacists increasing their involvement in MM have revealed that environmental issues such as time, space, privacy, adequacy of trained staff, and lack of reimbursement have been reported as the main barriers.<sup>30,31,35,50</sup> Community pharmacy-based MM services are generally not reimbursed or are paid for by the pharmacy customer/patient. Community pharmacy-based MTM services in the US, Australia, and in some provinces in Canada are now eligible for reimbursement from Medicare and similar health insurance programmes.<sup>57-59</sup> These reimbursement schemes have provided pharmacists in the US, Australia and Canada with a greater opportunity to perform MM services and receive compensation for their time and expertise. In NZ, pharmacists have been reimbursed by the District Health Boards (DHBs) primarily for MUR services if provided with the consent of the patient and his/her GP.<sup>29,53</sup> Similar funding schemes for community pharmacy-based MM services have also been reported in other countries.<sup>35,59,60</sup>

### **3.4 The contribution of community pharmacy to improving the public's health**

Governments in numerous countries are increasingly recognising the potential of a fuller integration of pharmacists as a means of improving access to primary health care

and reducing medication-related morbidity and mortality.<sup>9,18,27,61,62</sup> The growing recognition of pharmacy's responsibility for the public's use of medicines is also reflected in pharmacists' evolving role as prescribers – worldwide<sup>63</sup> and in NZ.<sup>64</sup> There are hundreds of individual pharmacist-impact studies examining specific populations, specific diseases and various outcomes (clinical, quality of life and economic), most of which have been assessed in systematic reviews of the international literature.<sup>10,21-26,28,65-69</sup> Given the variability in patient populations, disease states, and pharmacists' interventions included in these studies – and the varied positive, neutral, and negative findings - it is difficult to reach an overall conclusion about the impact of pharmacists' health care provision on patient outcomes.<sup>70</sup>

Anderson *et. al.* presented a summary of findings from a review of evidence published in peer-reviewed journals between 1990 and 2007 on the contribution of community pharmacy to improving the public's health.<sup>10</sup> The authors reviewed a total of 196 papers which focused on evidence of effectiveness, quality, and costs of studies related to:

- promoting health and wellbeing (eg nutrition, physical activity);
- preventing illness (eg smoking cessation, immunisation, travel health);
- identifying ill health (eg screening and case finding);
- the maintenance of health for those with chronic or potentially long-term conditions (e.g. diabetes, asthma, hypertension).

In their report, evidence was strongest for pharmacy-based smoking cessation, diabetes, contraception, influenza immunisation and drug misuse.

In a similar, more recent literature review, Brown *et. al.* reported on the outcomes of a total of 377 published studies between 1990 and August 2011 on the impact of health promotion activities delivered by community pharmacists.<sup>28</sup> The authors reported that over time, there was a marked increase in frequency of publications reflecting a growing pharmacy interest in the public healthcare agenda. Over a third (35 %) of the papers appeared in the last three-year study period. The authors also found that the majority of this research was based in the United Kingdom (UK) (51.5 %), followed by the US (20.4 %), Australia/New Zealand (9.8 %), Europe (7.7 %) and Canada (7.2 %).

Good evidence supporting pharmacist-led interventions for smoking cessation, CVD prevention, hypertension and diabetes care was found in their review. Some good evidence was reported for interventions on asthma and heart failure. However, the evidence supporting weight management, sexual health, osteoporosis detection, substance abuse and chronic obstructive pulmonary disease, was reported to be weak.

A fairly recent systematic review of the literature by Santschi *et. al.*<sup>71</sup> to determine the impact of pharmacist care on the management of CVD risk factors identified 30 randomised controlled trials (RCTs) that assessed a total of 11,765 outpatients. As for the findings of Anderson *et. al.*<sup>16</sup> and Brown *et. al.*<sup>28</sup>, and several earlier reviews (which included smaller population cohorts and non-RCTs)<sup>72,73</sup> the authors found greater benefit in blood pressure and lipid profiles when managed by pharmacists - as well as in reducing the risk of smoking – when compared to usual care.

As most of the studies included in the Santschi *et. al.* systematic review were US-based, the authors indicated that further studies are needed to define and evaluate which pharmacist interventions are the most effective for the management of CVD risk factors in different health care system organisations or jurisdictions.<sup>71</sup> The peer-reviewed evidence also indicates that training is an important prerequisite of effectiveness of community pharmacy staff in CVD risk assessment and management programmes.<sup>72,73</sup>

1. Some conclusions may be drawn from these reviews in the literature, including: Many studies in key topic areas were conducted in settings that vary from those in NZ and therefore further research is required to test the transferability of their findings to a NZ context.
2. A more systematic approach needs to be taken to the development of the public health contribution of community pharmacy if the full potential of this role is to be realised. The evidence shows that making training available to all pharmacy staff, particularly in identifying individuals ‘at risk’ and for behavioural support techniques, is key if effective interventions are to be delivered.

3. Two key challenges confront researchers seeking to clarify the impact of pharmacist efforts in primary care.<sup>70</sup> The first is methodological – and relates to the requirement that research studies identify, measure and evaluate the range and complexity of pharmacists' work in the provision of pharmaceutical care. The second relates to the differing levels of status and power of the two key players in the field of medicines-related health care – the doctor and the pharmacist – a relationship whose contribution to 'negative' or 'positive impact' studies needs to be carefully examined.
4. The relative influence of medication and non-medication approaches on patient outcomes (especially health inequalities), data recording and links to the wider health infrastructure should be included as part of the evaluation of future studies, so that a greater understanding of the unique characteristics of pharmacy-based public health interventions is acquired.

No NZ studies have investigated the effectiveness of public health services provided by community pharmacists on population health outcomes. Before we can start investigating this issue however, the following research questions need to be answered:

- 1. What is the extent and quality of NZ community pharmacists' involvement in public health care services?*
- 2. What barriers and opportunities are identified by the pharmacists to expand their clinical role in NZ's primary health care services?*
- 3. In keeping with the overall context of this thesis, what is the extent of CVD risk assessment and management services being provided in NZ community pharmacies?*

### **3.5 A national survey on the provision of HDS and MM services in NZ community pharmacies**

The extent of pharmacist involvement in screening and monitoring services in NZ has not been fully investigated. Accurately identifying the extent of these services, the

areas of deficiency, and the factors influencing the degree of pharmacist involvement, is necessary before enhanced primary care pharmacy services are further developed, implemented and evaluated for population outcomes. Such information will enable the government and leaders within the pharmacy profession to establish improved models of patient care in line with the NZ Primary Health Care Strategy (NZPCS).

This survey research was conducted with the aim of answering the two research questions stated above, by capturing the extent and characteristics of health screening and monitoring services provided by NZ community pharmacists. The objectives were to identify whether community pharmacies offered health screening and medication monitoring services and to describe the specifics of the services provided; as well as to identify the pharmacists' perspectives on the challenges and opportunities associated with offering these services.

### **3.5.1 Methods**

#### ***3.5.1.1 Survey Instrument***

A questionnaire was designed following recommended guidelines for questionnaire development.<sup>74</sup> The majority of the questions were taken or adapted from surveys in similar studies as identified in the literature search.<sup>19,20,29,75</sup> Due attention was given to the inclusion of questions relating to NZ's primary health care priorities and quality use of medicines. The survey instrument was constructed in consultation with a wide range of pharmacists and academicians at the School of Pharmacy, the University of Auckland. The questions were also screened by the University of Auckland Survey Research Unit (SRU) to assess for clarity and intended purpose. Ten practising pharmacists were invited to participate in "piloting" the questionnaire, of which six responded to the pilot survey. Based on their feedback and comments various changes were made to the wording of the questions.

The final questionnaire consisted of 40 questions presented in 10 pages, it was designed to take approximately 15 minutes to complete. It generally consisted of closed questions, but it also allowed respondents the option of providing additional comments.

There were several open-ended questions at the end to allow respondents to provide further information on aspects of their experiences not covered by the survey. The questionnaire also included a list of definitions for the terms used to describe the various community pharmacy services. The questionnaire was divided into four parts (Appendix 3.2):

*Part 1 - Screening and Monitoring Services*, investigated the types of services pharmacies offer. Service was assessed by having respondents check each service offered in their pharmacy practices from a list of 10 HDS services and 15 MM services. The list of screening and monitoring services was developed on the basis of previously published studies of pharmacy services, as well as discussions with pharmacy practitioners. These services were believed to represent progressive service areas being pursued by NZ community pharmacies.

*Part 2 - Opportunities and Barriers*, explored the opinions of respondent pharmacists with regard to providing HDS and MM services in community pharmacies, regardless of whether or not they offered these services. Respondents were also asked to provide their opinions of a series of potential barriers using a 5-point *Likert* scale ranging from “not a barrier” to “major barrier”.

*Part 3 – Pharmacy Information*, explored the characteristics of the community pharmacy offering the screening and monitoring services, such as geographical area (term used to describe locality by population density) including city centre – area within the central business district (CBD), suburban (area around or in close proximity to the CBD), and rural (all non-urban areas); locality of the pharmacy within the geographical area (within a shopping strip, inside a mall, part of a supermarket, or within a medical clinic/centre); business type such as being an independent versus non-independent (franchise or being part of a buying group); daily prescription volume and number of employees.

*Part 4 – Pharmacist Information* investigated the profile of the pharmacist responding to the survey such as education, year of graduation, post-graduate qualifications and involvement in continuing professional development.

Ethical approval for this study and the survey instrument was received from the University of Auckland Human Participants Ethics Committee on April 13, 2006. Ethics approval/reference number 2006/Q/10.

### **3.5.1.2 Survey Process**

The Pharmacy Guild of New Zealand (PGNZ) provided the contact information for all community pharmacies in the country, as of April 2006. The questionnaire, together with a letter informing the purpose of the survey, an invitation to participate and a postage-paid envelope, were mailed to all 879 pharmacies on the list provided by PGNZ. The letter was addressed to the pharmacy manager or in-charge pharmacist. Response to the questionnaire was considered as informed consent to participate. The questionnaire was distributed in November of 2006. Two reminder mail outs were delivered to all non-respondents in January and March of 2007. Completed surveys were accepted until April 30, 2007. Questionnaires were coded by a private mailing-out service which was used to maintain anonymity of respondents. Participant contact information was unavailable to researchers.

Questionnaires that were completed and returned by respondent pharmacists, were sent to the SRU where data were entered into a computer assisted data entry (CADE) system by trained clerks. The data entered into the CADE system was validated using double entry verification. Data entry error levels were found to be within acceptable levels (<0.5%). The effects of non-differential information bias would therefore be minimal.

### **3.5.1.3 Data Analysis**

Data were extracted from the CADE system and exported into SPSS software (version 19., SPSS Corporation, Chicago, IL) for analysis. Initially, frequency distributions were obtained to summarise demographic data and responses to the survey questions. Frequencies and percentages of responses were calculated for each question and for each of the pharmacy HDS and MM services provided. If responses

were continuous and numerical, descriptive statistics were generated (i.e. mean, standard deviation, median, minimum and maximum scores).

An overall binary service variable was created (e.g. “*Provides Services*” vs. “*Does not provide Services*”). If responses to “*characteristic*” questions were categorical (i.e. geographical area, pharmacy location, pharmacy business type, prescription volume) subsections were combined to create new pharmacy characteristic variables.<sup>76</sup>

Characteristic questions were combined on the basis of literature review, previous study results and knowledge of pharmacy characteristic trends within NZ. Cross tabulations and correlations were used to compare characteristics of the respondent pharmacies and the provision of HDS and/or MM services.

Logistic regression analyses were used to test relationships between individual pharmacy characteristics and provision of HDS and/or MM services. The determination of which pharmacy characteristics to include in the regression model as predictor variables for offering or not offering HDS and/or MM services was based on literature review of similar international surveys.<sup>20,29,75</sup> The following community pharmacy demographic variables were used in the regression analysis (independent variables):

- general geographical area of pharmacy (city centre, suburban or rural);
- three pharmacy locations (shopping strip, within a shopping centre/mall, and part of a medical centre);
- two business types of pharmacies (non-independent/franchise/group buyer and independent);
- prescription volume (<100, 100-300, 301-400, >400 per day).

Perceived benefits of offering HDS and/or MM services in community pharmacies were analysed by percent of agreement with a set of benefit statements. A 5-point *Likert* scale was used to measure respondent pharmacists’ opinions towards their perceived barriers for the provision of HDS and/or MM services in community pharmacies, the scale ranged from “*not a barrier*” to “*major barrier*”. Frequency distribution tables were used to convey information related to perceived benefits and

barriers. To have a sense of potentially significant barriers, “*quite a barrier*” and “*major barrier*” answers were combined into one category.

Pearson’s Chi-square testing was used to establish if significant associations existed in the benefits and barriers perceived by respondent pharmacists working in pharmacies “*providing*” versus “*not providing*” patient-centred services (where expected cases were less than five, Fisher’s exact test was used). If the characteristic variables were continuous (i.e., number of employees) then significance testing was conducted using one-way analysis of variance (ANOVA). To test if significant relationships existed between respondent pharmacists’ characteristics and specific barriers to the provision of HDS/MM services, Pearson’s Chi-square tests were conducted (where expected cases were less than five, Fisher’s exact test was used).

### **3.5.2 Results**

Survey packages were mailed to a total of 879 community pharmacies throughout NZ. After two mail-outs, 458 questionnaires were returned, yielding a response rate of 52%. Based on the current distribution of NZ pharmacies, as listed in the National Directory of NZ pharmacies updated and published yearly by the PGNZ,<sup>77</sup> when the respondent pharmacies were divided into the four NZ regions, response rates were similar to those of the overall survey response rate (53% from the Central Region, 55% from the Midland Region and 52% from the Southern Region) with the exception of the Northern Region, which showed the lowest response rate (41%) when compared to the overall response rate of 52%. This is illustrated in [\*Figure 3.1\*](#). This figure also shows the NZ DHBs which are located within each region. The region for 17 of the respondent surveys was not identifiable. The responses to these 17 surveys were included in the overall response rate and examined with the remainder of the results.

**Figure 3.1: Survey response by community pharmacy location within New Zealand's regions**

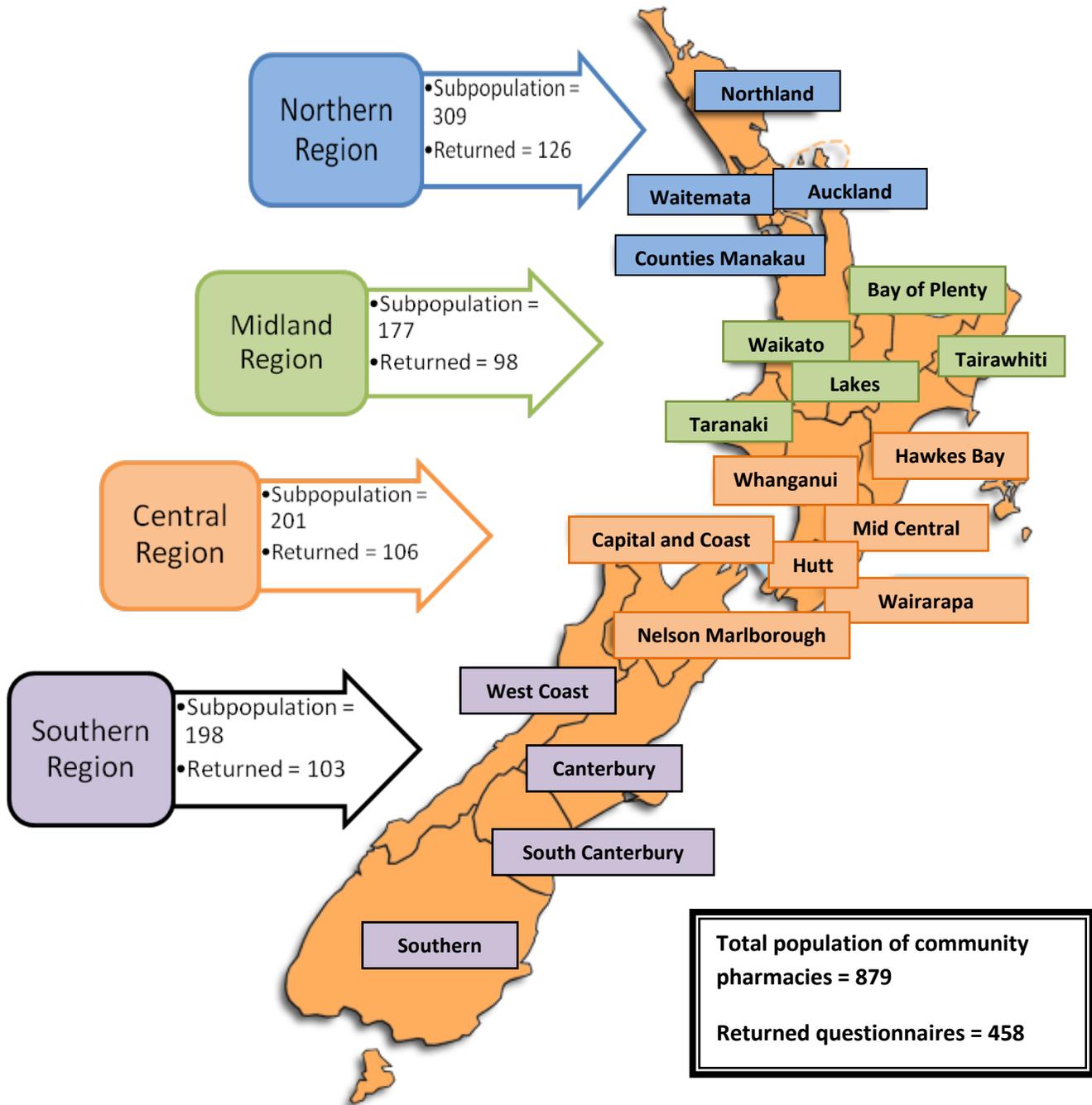


Table 3.1 provides a summary of the characteristics of the pharmacies where respondents were practising. The majority of responses to the survey were obtained from respondents working in suburban pharmacies (n=268, 59%), followed by rural (n=119, 26%) and city centre (n=70, 15%) community pharmacies (one respondent did not identify the pharmacy location). The majority of pharmacies were reported to be located in shopping strips (n=297, 65%), dispensing between 100-300 prescriptions per day (n=304, 66%) and reported to be independent-type pharmacies (n=305, 67%).

The pharmacies reported employing an average of 10 people (mean=9.5, SD=6.9), with the majority (60%) employing at least five people in a full-time or a part-time capacity. Most of the pharmacies (90%) did not report having a collaborative practice agreement with a general practice setting or individual GPs for the provision of patient-centred services. Some pharmacies employed nurses (n=11, 2.4%), podiatrists (n=23, 5%) and nutritionists (n=9, 2%) to assist them in the provision of these services. Other types of health care practitioners (HCPs) employed by some pharmacies included naturopath/herbalist, massage/physiotherapist, homeopath specialist, bone mineral density technical assistant, and audiologist were amongst those reported. However, the majority of pharmacies (68%) reported not employing any additional HCP for the provision of patient-centred services.

**Table 3.1: Characteristics of practice sites of respondent pharmacists**

Pharmacy Characteristics	Frequency n (%)*
<b>Geographical area of community pharmacy</b>	
<i>Suburban</i>	268 (59%)
<i>Rural</i>	119 (26%)
<i>City centre</i>	70 (15%)
<b>Location of pharmacy within geographical area</b>	
<i>In a shopping strip</i>	297 (65%)
<i>Part of a medical centre</i>	86 (19%)
<i>Inside a shopping mall</i>	52 (11%)
<i>Other</i>	21 (5%)
<b>Business type of pharmacy</b>	
<i>Independent</i>	305 (67%)
<i>Non-independent (franchise/other)</i>	150 (33%)
<b>Prescription volume</b>	
<i>&lt;100 prescriptions/day</i>	59 (13%)
<i>100 – 300 prescriptions/day</i>	304 (66%)
<i>300 – 400 prescriptions/day</i>	59 (13%)
<i>&gt;400 prescriptions/day</i>	32 (7%)
<b>Special arrangements for the provision of extended pharmacy services</b>	
<i>Collaborative Practice Agreement with a GP</i>	40 (9%)
<i>Employs nurse</i>	11 (2%)
<i>Employs other</i>	40 (9%)

**Legend:** n=Number of pharmacies participating in the survey, %=Percent of valid responses

\*For each category, there were some missing responses

Table 3.2 provides the overall characteristics of the pharmacists who participated in the survey. The majority of respondent pharmacists were male (n=265, 59%), in the age group of 41-50 years (n=144, 32%) and of NZ/European (n=348, 76%) ethnic descent. When asked what best described their positions at the pharmacies where they practised, most (n=192, 42%) indicated that they were the “*sole proprietors*” of the pharmacy. Some pharmacists responded to holding more than one position in their practice sites. These responses are shown in Figure 3.2.

The majority of respondents (n=144, 32%) indicated that they had between 21-30 years of experience, reported to have obtained their first pharmacy qualification in NZ (n=407, 89%) and indicated not having a post-graduate qualification (n=422, 92%). When asked about the hours they spent in continuing pharmacy education (CPE) activities, the majority (n=397, 88%) reported spending less than 10 hours per month (mean number of CPE hours reported was 7.4 per month).

**Table 3.2: Characteristics of pharmacists responding to the survey**

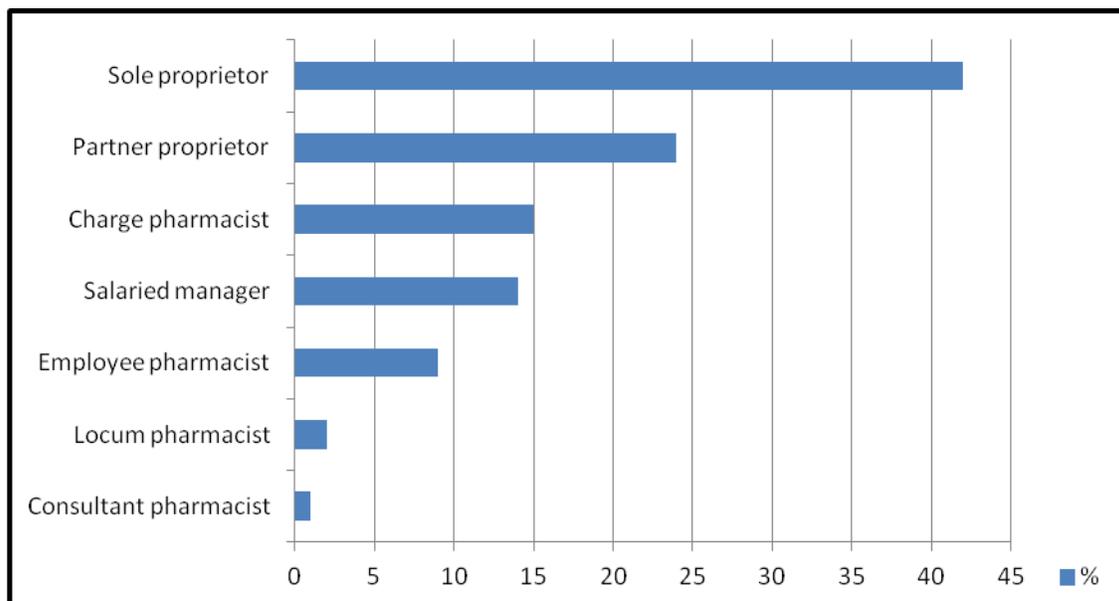
Respondent pharmacist profile	Frequency n (%)*
<b>Gender:</b>	
Male	265 (59%)
Female	186 (41%)
<b>Age:</b>	
21-30 years of age	62 (14%)
31-40 years of age	81 (18%)
41-50 years of age	144 (32%)
51-60 years of age	109 (24%)
61 or more years of age	59 (13%)
<b>Qualifications:</b>	
Bachelor/diploma in pharmacy	422 (92%)
Additional post-graduate (PG) qualification**	36 (8%)
<b>Years of Experience:</b>	
Less than 10 years	109 (24%)
11-20 years	87 (19%)
21-30 years	144 (32%)
31-40 years	81 (18%)
41 years or more	33 (7%)
<b>Hours spent in continuing education:</b>	
< 10 hours per month	397 (88%)
11-20 hours per month	39 (9%)
> 20 hours per month	13 (3%)

**Legend:** n=Number of respondent pharmacists, %=Percent of valid responses

\*For each category, there were some missing responses

\*\* Including MSc, PhD, PG Diploma, or PG Certificate

**Figure 3.2: Respondent pharmacists' positions held in their practice sites (n=457\*)**



**Legend:** %=Percent of valid responses

\* Some pharmacists reported to hold more than one position at their practice sites.

### 3.5.2.1 HDS and MM services provided in NZ community pharmacies

Fifty-nine percent (n=271) of all the respondents reported currently providing some form of HDS and/or MM services with body mass index, blood pressure, and blood glucose measurements being the most common HDS services provided; and adverse drug reaction, weight management and clozapine therapy monitoring the most common MM services offered. Amongst those who responded to this question, the majority of pharmacies providing some form of HDS and/or MM services did so for “less than half” of their customers (98.9% for HDS and 93.1% for MM services). However, there were a high number of non-responders to this question (40%).

The frequencies of the specific services provided by community pharmacies (divided into the three different geographical areas surveyed) are shown in [Table 3.3](#). The median number of services offered by community pharmacies was 4 when the combination of both HDS and MM services were analyzed. Eighty-three percent of the 271 pharmacies indicating that they offered patient-centred services provided at least one HDS service, and 93% offered at least one MM service. Those services offered by

a small number of pharmacies (i.e.  $n < 10$ ) were grouped under “*Other*”. HDS services offered by a small number of pharmacies included urea breath test for *H Pylori*-related dyspepsia. MM services offered by a small number of pharmacies included immunizations, dyslipidaemia and dyspepsia management.

HDS and MM services for which pharmacists indicated the pharmacy received payment for their provision are listed in [Table 3.4](#). Overall, 78% of enhanced pharmacy services were paid for. When both types of services were analysed separately, the findings show that payment was received for the majority (57%) of the HDS services offered. HDS services which pharmacies were less likely to receive payment for included weight/body mass index measurement and pulmonary function testing. Pharmacists also indicated that payment was received for the majority (55%) of MM services. MM services for which pharmacies were less likely to receive payment included adverse drug reaction monitoring and reporting, diabetes and anticoagulation management.

Nearly all the HDS services provided were paid for by pharmacy customers. Numerous other payers were reported to reimburse community pharmacies for their MM services, including the DHB or a PHO, as well as pharmacy customers. The MM services reported to be primarily reimbursed by a DHB included clozapine therapy monitoring, medicines review, home visits, and smoking cessation. No pharmacist indicated their practice site was reimbursed by health insurance companies for these services. Around one-third (36%) of those who reported providing HDS and/or MM services indicated that they did so “*free of charge*”.

Among the pharmacies that provided HDS and/or MM services, the majority (51%) tried to identify individuals at risk of adverse medication-related outcomes by “*utilising their own medication dispensing records*” (85%) and/or by “*interviewing customers*” (63%). Other quoted methods utilised to identify high risk groups included the “*use of customer’s medical records*” (46%), “*knowledge of the customer’s family history*” (33%), and “*referral from other professionals*” (36%). These results are presented in [Figure 3.3](#).

**Table 3.3: HDS and MM services provided in NZ community pharmacies by geographical location**

	Community Pharmacy Location by Geographical Area			
	All Respondents (458) n (%)	City Centre Pharmacies (70) n (%)	Sub-Urban Pharmacies (268) n (%)	Rural Pharmacies (119) n (%)
<b>Provides HDS/MM Services</b>	<b>271 (59)</b>	<b>51 (73)</b>	<b>158 (59)</b>	<b>62 (52)</b>
<b>HDS Services</b>				
Weight and body mass index	167 (36)	37 (53)	100 (37)	30 (25)
Blood pressure measurement	164 (36)	35 (50)	95 (35)	34 (29)
Blood glucose testing	118 (26)	21 (30)	64 (24)	33 (28)
Bone mineral density testing	45 (10)	11 (16)	23 (9)	11 (9)
Blood cholesterol testing	36 (9)	7 (10)	21 (8)	8 (7)
CVD risk assessment	21 (5)	6 (9)	12 (4)	3 (3)
Pulmonary function testing	20 (4)	5 (7)	9 (3)	6 (5)
Pregnancy testing	14 (3)	4 (6)	7 (3)	3 (3)
Other	17 (4)	5 (7)	9 (3)	3 (3)
<b>MM Services</b>				
ADR monitoring & reporting	192 (42)	33 (47)	117 (43)	42 (35)
Weight management	115 (25)	25 (36)	70 (26)	20 (17)
Clozapine therapy monitoring	82 (18)	6 (9)	55 (21)	21 (18)
Smoking cessation	64 (14)	10 (14)	38 (14)	16 (13)
Medicines review	45 (10)	4 (6)	23 (9)	18 (15)
Diabetes management	43 (9)	6 (9)	18 (7)	19 (16)
Home visits (DMR)	40 (9)	3 (4)	25 (9)	12 (10)
Hypertension management	29 (6)	6 (9)	15 (6)	8 (7)
Asthma management	15 (3)	1 (2)	7 (3)	7 (6)
Anticoagulation management	10 (2)	0 (0)	5 (2)	5 (4)
Osteoporosis management	10 (2)	2 (3)	7 (3)	1 (1)
Other	23 (5)	6 (9)	11 (4)	6 (5)

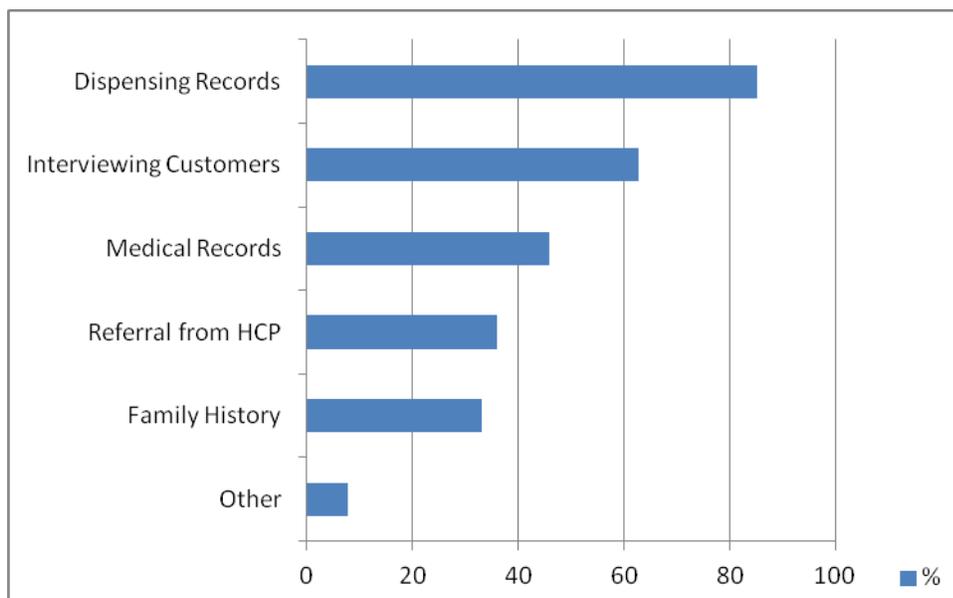
**Legend:** n=number of pharmacies offering the services, %=percent within the geographical area, HDS=Health/disease screening, MM=Medication monitoring/management, CVD=Cardiovascular Disease, ADR=Adverse Drug Reaction, DMR=Domiciliary Medicines Review.

**Table 3.4: Payment for HDS and MM services in NZ community pharmacies**

<b>HDS Services:</b>	<b>Payment for Service (n,%*)</b>
<i>Bone Mineral Density testing</i>	45 (100.0)
<i>Cholesterol testing</i>	35 (97.2)
<i>Pregnancy testing</i>	13 (92.9%)
<i>Blood glucose testing</i>	77 (65.3)
<i>Blood pressure measurement</i>	102 (62.6)
<i>CVD risk assessment</i>	12 (57.1)
<i>Weight and body mass index</i>	65 (40.1)
<i>Pulmonary function testing</i>	6 (30.0)
<i>Other</i>	9 (64.3)
<b>MM Services:</b>	<b>Payment for Service (n,%*)</b>
<i>Osteoporosis management</i>	8 (88.9)
<i>Home visits (DMR)</i>	27 (69.2)
<i>Hypertension management</i>	20 (69.0)
<i>Clozapine therapy monitoring</i>	55 (67.1)
<i>Medicines review</i>	28 (66.7)
<i>Smoking cessation</i>	38 (61.3)
<i>Hyperlipidaemia management</i>	3 (60.0)
<i>Weight management</i>	58 (51.3)
<i>Diabetes management</i>	13 (30.2)
<i>Anticoagulation management</i>	1 (10.0)
<i>ADR monitoring &amp; reporting</i>	5 (2.6)
<i>Others</i>	7 (58.3)

**Legend:** n=Frequency of community pharmacy receiving payment for the individual services provided, HDS=Health/disease screening, MM=Medication monitoring/management, CVD=Cardiovascular disease, DMR=Domiciliary Medicines Review, ADR=Adverse Drug Reaction. \* Percent corrected for missing values

**Figure 3.3: Methods used by community pharmacies to identify patients in need of HDS and/or MM services (n=142\*)**



**Legend:** %=Percent of valid responses and responding “yes” to the question

\*Some pharmacies reported utilising more than one method to identify patients at need of HDS/MM services

HCP = Health care professional/practitioner

The majority of pharmacies (76%) providing HDS and/or MM services reported promotion of these patient-centred services. Several methods were used by pharmacies to promote their services. These included “*verbal invite by staff*” (26%), “*in-store promotions*” (25%), and through various external advertisements such as circulars (11%), local paper (10%), and radio/television (3%). Other reported methods used to promote services included referrals from other health professionals. Some pharmacists reported using more than one method to promote HDS and/or MM services to pharmacy customers.

Other characteristics of community pharmacies which offered HDS and/or MM services are presented in [Table 3.5](#). The majority of pharmacies had trained personnel for service provision (83%), standard operating procedures for performing screening tests (68%), a separate consulting room (62%) for the provision of these services, and kept records of the tests or services provided (51%). The majority (69%) of respondent pharmacists believed that their customers were “*very satisfied*” with the HDS and/or MM services they provided.

***Table 3.5: Characteristics of HDS and/or MM services provided in NZ community pharmacies***

<b>Characteristics Surveyed</b>	<b><i>n</i></b>	<b><i>%*</i></b>
<i>Have trained personnel for service provision</i>	211	83.4
<i>Have standard operating procedures for screening tests</i>	168	68.6
<i>Provide services in separate/private consultation room</i>	159	62.0
<i>Follow up with customers on their screening results</i>	141	88.6
<i>Keep records of screening results</i>	121	51.5
<i>Provide services free of charge</i>	92	36.3

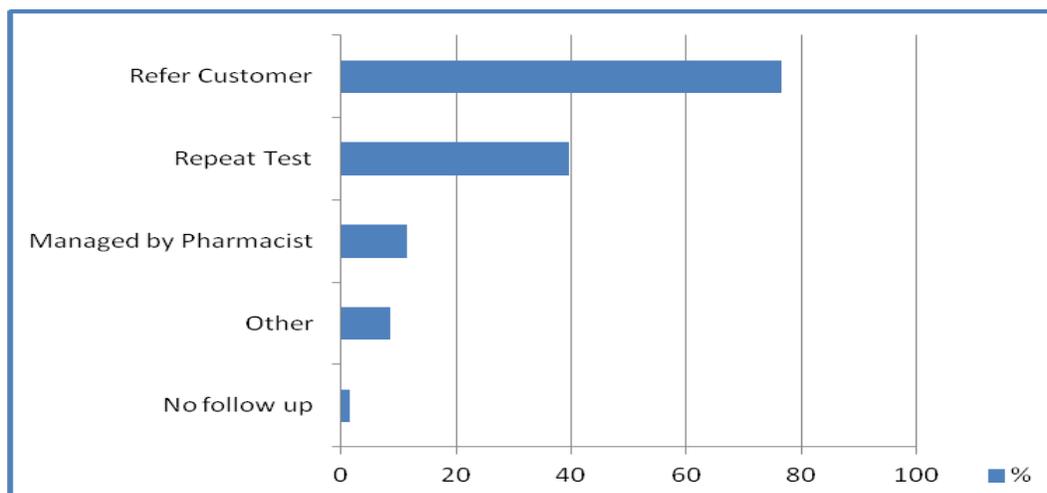
**Legend:** *n*=Number of pharmacies offering screening/monitoring service and responding “yes” to the question,

*%*=Percent of valid responses

\*Some respondents did not answer or had invalid responses to these questions

The majority of pharmacies (89%) follow up abnormal test results from HDS services provided. The most frequent method of follow-up was referring customers to other HCPs. Other methods that were reported to be used for follow-up of abnormal test results are shown in [Figure 3.4](#). Some pharmacists reported using more than one method to follow up abnormal results. If a referral was deemed necessary, various ways of referring customers to other HCPs were reported, including “advising the customer to see their doctor” (50%), “writing a referral letter” (15%), and “phoning the customer’s doctor” (18%). Some pharmacies reported that they used more than one method to refer a customer.

**Figure 3.4: Methods used by NZ community pharmacies to follow up on abnormal HDS test results (n=271\*)**



**Legend:** %=Percent of valid responses answering “yes” to the question,

\* Some pharmacists reported to utilize more than one method to follow up on abnormal test results

### **3.5.2.2 Respondent pharmacists’ opinions related to the provision of HDS and MM services in NZ community pharmacies**

The majority of the survey respondents believed that community pharmacies should provide HDS (77%) and/or MM (80%) services, these percentages increased to 98.5% if the provision of these services were to be fully reimbursed. Cross tabulation of participants’ agreement with this statement between those working at pharmacies offering HDS and/or MM services versus those not offering the services is provided in [Table 3.6](#). As shown in this table, the majority of respondents from pharmacies that provide HDS and/or MM services, as well as from those which do not offer these services believe that community pharmacies should provide HDS as well as MM services; however, those who offered the services showed higher levels of agreement for both of these services. There were significant differences in this opinion between pharmacists working in pharmacies offering versus those not offering patient-centred services ( $p<0.001$ ). The majority of respondents (63%) also indicated that other health professionals are “*sometimes*” supportive of community pharmacists performing HDS services.

**Table 3.6: Differences in pharmacists' agreement with the provision of HDS and/or MM services in community pharmacies**

Agreement Statements:		Respondents' pharmacies	
		Provide HDS/MM Sx n (%)*	Do not provide HDS/MM Sx n (%)*
<b>Community pharmacies should provide HDS Sx</b>	<b>Agree</b>	228 (86.7)	117 (62.9)
	<b>Disagree</b>	35 (13.3)	69 (37.1)
<b>Community pharmacies should provide MM Sx</b>	<b>Agree</b>	235 (88.7)	126 (67.7)
	<b>Disagree</b>	30 (11.3)	60 (32.2)

**Legend:** HDS=Health/disease screening, MM=Medication monitoring/management, Sx=Services, n=Number of pharmacies offering screening/monitoring service and responding "yes" to the question, %=Percent of valid responses  
\* Invalid/unknown responses are not shown.

Beneficial statements regarding the provision of HDS and/or MM services in community pharmacies were further divided into three categories: 1) optimising the quality of primary health care delivery, 2) facilitating pharmacist professional growth, and 3) improving community pharmacy business. Overall, respondents supported the beneficial statements listed under these three categories. "Improving health outcomes" was the beneficial statement most frequently agreed on by the respondents as optimising the quality of primary health care delivery.

The respondents also perceived that offering these services could bring professional and business benefits, "improving customer satisfaction" being the most frequently reported perceived benefit for both, the pharmacist and the pharmacy. The percentages of participants' agreement with other supportive statements surveyed are presented in Table 3.7. Statistical analysis indicated that respondents working in pharmacies offering HDS/MM services were more likely to be in agreement with statements indicating that patient-centred services optimise the quality of primary health care delivery compared to those respondents who work in pharmacies that do not offer these services. Other significant differences regarding beneficial statements of offering patient-centred services are also shown in Table 3.7.

**Table 3.7: Respondent pharmacists' agreement with beneficial statements regarding the provision of HDS and/or MM services**

Beneficial statements	n (% Agree)			
	All Respondents	Offering Sx	Not offering Sx	P value
<b>Optimizes quality of primary health care delivery by:</b>				
<i>Improving health outcomes*</i>	400 (88)	248 (92)	152 (82)	0.002
<i>Increasing the public's health awareness</i>	321 (70)	198 (73)	123 (66)	0.111
<i>Reducing adverse drug events*</i>	218 (48)	140 (52)	78 (42)	0.041
<i>Preventing chronic diseases*</i>	211 (46)	140 (52)	71 (38)	0.004
<b>Facilitates pharmacist professional growth by:</b>				
<i>Improving customers' satisfaction*</i>	401 (88)	253 (93)	148 (80)	<0.001
<i>Raising the status of the pharmacy profession</i>	343 (75)	204 (75)	139 (75)	0.895
<i>Improving pharmacist satisfaction*</i>	247 (54)	157 (58)	90 (48)	0.044
<i>Providing financial gain</i>	182 (40)	109 (40)	73 (40)	0.834
<b>Improves community pharmacy business by:</b>				
<i>Improving customers' satisfaction*</i>	399 (87)	245 (90)	154 (83)	0.016
<i>Raising the professional status of the staff</i>	314 (69)	195 (72)	119 (64)	0.071
<i>Providing financial gain</i>	242 (53)	138 (53)	104 (56)	0.313
<i>Improving staff satisfaction</i>	239 (52)	152 (56)	87 (47)	0.050

**Legend:** n=Total number of respondent pharmacists in agreement with beneficial statement, %=Percent of valid responses  
 Rxs=Number of pharmacists in agreement with the beneficial statement, Sx=Services,  
 \* Statistically significant associations between respondents working in pharmacies offering versus not offering HDS/MM services (p<0.05)

Table 3.8 presents the frequency of the perceived barriers to the provision of HDS and/or MM services in NZ community pharmacies. The top three most commonly reported barriers perceived as “quite a barrier” or as a “major barrier” included “lack of compensation, remuneration or financial resources available”, “lack of time to offer these services” and “limited access to medical histories or laboratory data necessary for their adequate provision”, which were reported by over 50% of respondents.

Statistical analysis indicated that there were no significant differences in the perceived barriers of “lack of compensation, remuneration or financial resources available” (p=0.58), or “lack of support from other health care professionals” (p=0.28) amongst pharmacists working in pharmacies providing versus those not providing HDS

and/or MM services. Overall, the mean scores for all barriers were greater for those respondents at pharmacies not providing enhanced services.

**Table 3.8: Respondent pharmacists' perceived barriers to the provision of HDS and/or MM services in NZ community pharmacies**

Perceived barriers:	Mean score in 5-point Likert scale (SD)	n (%)
<i>Lack of compensation / remuneration / financial resources</i>	4.4 (0.9)	388 (86)
<i>Lack of time to offer services</i>	3.8 (1.2)	319 (70)
<i>Limited access to medical history or laboratory data</i>	3.8 (1.1)	308 (68)
<i>Increased need for quality assurance policies &amp; procedures</i>	3.2 (1.2)	197 (44)
<i>Lack of support from other health care professionals</i>	3.2 (1.1)	180 (40)
<i>Lack of confidence/training or skills for offering services</i>	3.0 (1.2)	171 (38)
<i>Lack of suitable space in the pharmacy</i>	2.9 (1.5)	191 (43)
<i>Fear of litigation</i>	2.9 (1.2)	142 (32)
<i>Lack of customer demand</i>	2.9 (1.1)	119 (26)
<i>Inadequate computer programs/ limited drug information resources</i>	2.8 (1.2)	135 (30)
<i>Inappropriate pharmacy management support</i>	2.8 (1.2)	109 (25)
<i>Lack of motivation/ fear of changing practice</i>	2.5 (1.2)	106 (24)
<i>Lack of evidence for their value</i>	2.6 (1.2)	84 (18)
<i>No beneficial health outcomes to customers</i>	2.2 (1.1)	49 (11)

**Legend:** SD=Standard deviation, n=Number of respondent pharmacists who identified the statement as "Quite a barrier" or "Major barrier" %=Percent of valid responses.

### 3.5.2.3 Predictors for the provision of HDS and/or MM services in NZ community pharmacies

Table 3.9 shows the results of the logistic regression analysis expressed in odds ratios. There is possible evidence that the geographical area where the pharmacy was located was associated with the likelihood of providing HDS/MM services ( $p=0.11$ ) with both suburban and rural pharmacies having lower odds of provision of service than city centre pharmacies, although this difference could only be shown to be significant for rural pharmacies. Non-independent type pharmacies (e.g., franchises/chain/buying group) had an odds almost four times greater (odds ratio = 3.6) of providing HDS/MM services when compared to independent-type pharmacies, this difference was

statistically significant ( $p < 0.001$ ). Location of the pharmacies within the geographical area and the pharmacies' prescription volume did not show significant associations with the provision of patient-centred services.

**Table 3.9: Predictor pharmacy characteristics for the provision of HDS and/or MM services in NZ community pharmacies**

Pharmacy Characteristics	Odds ratio (95% CI)	P value
<b>Geographical area of community pharmacy</b>		0.114
<i>City centre</i> *	1	
<i>Rural</i>	0.48 (0.24 – 0.96)	
<i>Suburban</i>	0.58 (0.31 – 1.10)	
<b>Location of pharmacy within geographical area</b>		0.401
<i>Other</i> *	1	
<i>In a shopping strip</i>	0.53 (0.19 – 1.48)	
<i>Inside a shopping mall</i>	0.73 (0.22 – 2.42)	
<i>Part of a medical centre</i>	0.44 (0.15 – 1.32)	
<b>Business type of pharmacy</b>		< 0.001
<i>Independent</i> *	1	
<i>Non-independent (franchise/other)</i>	3.58 (2.19 – 5.84)	
<b>Prescription volume</b>		0.267
<i>&gt; 400 prescriptions/day</i> *	1	
<i>&lt;100 prescriptions/day</i>	0.46 (0.17 – 1.28)	
<i>100 – 300 prescriptions/day</i>	0.46 (0.19 – 1.10)	
<i>300 – 400 prescriptions/day</i>	0.43 (0.24 – 1.85)	

**Legend:** \*Comparison group, n/a=not applicable (refers to the comparison group).

Statistical analysis showed that pharmacies having collaborative agreements with GPs were significantly more associated with the provision of HDS/MM services ( $p=0.013$ ). The number of employees working at pharmacies offering versus not offering HDS and/or MM services is compared in [Table 3.10](#) which shows a trend towards a higher number of employees working in pharmacies which offered patient-centred services. Correlation analysis showed a significant positive relationship ( $p=0.008$ ) between the total number of employees and a higher number of patient-

centred services provided. However, when the two type of services were analysed separately, there was a significant positive correlation only for those offering HDS services ( $p < 0.001$ ) but not for those offering MM services ( $p = 0.358$ ).

**Table 3.10: Comparison in the number of employees at NZ community pharmacies offering versus not offering HDS and/or MM services**

	Responding Pharmacies	
	Providing Sx NE (Mean, SD)*	Not providing Sx NE (Mean, SD)*
<b>Part time (PT)</b>	4.0 (5.2)	3.3 (2.9)
<b>Full time (FT)</b>	6.5 (5.4)	4.8 (4.3)
<b>PT + FT</b>	10.5 (7.7)	8.1 (5.4)

**Legend:** NE=Number of employees working in the pharmacies where respondent pharmacists were employed, Sx=HDS/MM Services, SD=Standard deviation, \* corrected for missing values

Table 3.11 shows the results of the chi-square testing which was used to identify any differences between pharmacies providing HDS/MM services and responding pharmacists' characteristics. The results showed that there were no significant differences in the provision of HDS/MM services by pharmacist gender ( $p = 0.084$ ). However, age of the responding pharmacist showed a significant association with the provision of services ( $p = 0.043$ ), older pharmacists (in both age groups 41-50, and 51-60 years of age) were more likely to provide HDS/MM services. None of the other variables tested, such as qualifications, years of experience, or hours spent in continuing pharmacy education (CPE) showed any significant relationship with the provision of HDS/MM services.

**Table 3.11: Characteristics of respondent pharmacists and the provision of HDS and/or MM services in NZ community pharmacies**

Respondent pharmacist profile	Pharmacy offers services* (n=271) n (%)	Pharmacy does not offer services* (n=187) n (%)	p value
<b>Gender:</b>			
Male	148 (56%)	117 (44%)	p=0.084
Female	119 (64%)	67 (36%)	
<b>Age:</b>			
21 - 30 years of age	37 (60%)	25 (40%)	p=0.043
31 - 40 years of age	39 (48%)	42 (52%)	
41 - 50 years of age	90 (63%)	54 (38%)	
51 - 60 years of age	74 (68%)	35 (32%)	
61 or more years of age	30 (51%)	29 (49%)	
<b>Qualifications:</b>			
Bachelor/diploma in pharmacy	249 (59%)	173 (41%)	p=0.805
Post-graduate (PG) qualification	22 (61%)	14 (39%)	
<b>Years of Experience:</b>			
Less than 10 years	64 (59%)	45 (41%)	p=0.106
11 - 20 years	44 (51%)	43 (49%)	
21 - 30 years	96 (67%)	48 (33%)	
31 - 40 years	49 (61%)	32 (40%)	
41 years or more	16 (49%)	17 (52%)	
<b>Hours spent per month in continuing education:</b>			
< 10 hours per month	236 (59%)	161 (41%)	p=0.987
11- 20 hours per month	23 (59%)	16 (41%)	
> 20 hours per month	8 (61%)	5 (39%)	

**LEGEND:** \* Refers to HDS and/or MM services, \*\* MSc, PhD, post-graduate (PG) Diploma, or PG Certificate

### 3.5.3. Discussion

This survey represents the most thorough investigation of the type of HDS/MM services that are provided in NZ community pharmacies in the published literature to date. The profession of pharmacy in NZ is currently attempting to move toward the goals outlined in the *Focus on the Future: Ten-Year Vision for Pharmacists in New Zealand: 2004–2014* document<sup>18</sup> and to implement its recommendations on the twelve

key areas of pharmacy practice that will help to achieve the vision of greater involvement in primary health care by the year 2014 through the provision of patient-centred services. Therefore, it is timely and valuable to have collected information, not only regarding to the extent of HDS/MM services provided in community pharmacists, but also the opinions of pharmacists from across the country regarding the challenges and opportunities related to this endeavour. Several international surveys and other similar, but less extensive, NZ surveys have been reviewed to assist in the interpretation of the findings of this survey and are discussed in the following subsections.

### **3.5.3.1 HDS and MM services in NZ community pharmacies**

Close to 60% of community pharmacies that participated in the survey reported offering some form of HDS and/or MM services. Overall, pharmacists reported offering a diversity of patient-centred services at their practice sites, and seemed to offer more MM than HDS services, the median number being four services per pharmacy. A few other services were provided which were not included in the questionnaire (such as zinc testing, orthotic fittings, gluten intolerance and *Chlamydia* screening among HDS services; and mental health, arthritis and medication adherence management among MM services), but these were very infrequent. The majority of pharmacies providing HDS/MM services reported having trained personnel (83%), following standard operating procedures (68%), and having a private consultation room for service provision (62%). These high percentages reported by pharmacies offering patient-centred services were encouraging and consistent with research findings elsewhere which also reported that having separate consultation rooms and trained staff were viewed by respondents as facilitators for the provision of patient-centred services in community pharmacies.<sup>20,31,78,79</sup>

The most frequently offered HDS-type services provided in NZ community pharmacies reported in this survey were related to CVD risk factors, such as measurement of body mass index, blood pressure, and blood glucose. Although these findings were encouraging, screening for other CVD risk factors such as dyslipidaemia

or absolute CVD risk assessment (as recommended in the *NZ Cardiovascular Risk Assessment and Management* guidelines<sup>80</sup>), were reported by less than 10% of those offering HDS services. Similar results have been reported in other international surveys, where blood pressure screening was reported as a frequent HDS service provided by community pharmacies, while cholesterol screening was provided infrequently.<sup>19,20,28,81</sup>

The fact that most pharmacists reported their pharmacies having to cover for the costs associated with this service provision, makes it possible that provision of cholesterol screening may not be financially viable for most community pharmacies. Because CVD risk assessment requires not only blood pressure measurements, but also a lipid panel for the estimation of an individual's CVD risk, the lack of provision of cholesterol screening correlates well with the lack of provision of CVD risk assessment. Evidence from randomised controlled trials strongly supports the value of pharmacist care in CVD risk factor management.<sup>71,82</sup> If pharmacists are to fulfill one of NZ's public health care priorities by targeting the risk factors associated with CVD, they will need to address this disparity in service provision and poor adoption of evidence-based practices on their part.

The vast majority of MM services provided in NZ community pharmacies were not directed at disease management. Rather, the most frequent MM services provided included adverse drug reaction monitoring and reporting, weight management and clozapine therapy monitoring. All MM-type services related to chronic disease management (such as diabetes, hypertension, asthma, anticoagulation and osteoporosis) were reported to be provided in less than 10% of the practice sites of respondent pharmacists. Also, with the exception of weight management, the most frequent MM services were not consistent with the most frequent types of HDS services provided (such as blood pressure and glucose testing). These findings suggest that pharmacists may be more comfortable providing more targeted, one-time type of HDS services - which are often opportunistic in nature - rather than with services that require more time or ongoing involvement for performing assessments and follow up of patients' medical histories. Similar results have been found in other studies in Europe, Australia,

the US and Canada.<sup>19,20,83</sup> These studies also reported pharmacists to be routinely engaged in general activities such as patient risk factor screening, but infrequently involved in the implementation of treatment, medication monitoring, or documenting care plans which would be functions required in the provision of disease management services.

Other types of patient-centred services such as MUR and *Home Visits* were also infrequently reported in this survey (in less than 10% of those offering MM services). The results of the 2000 survey - which also examined the extended roles of pharmacists in NZ pharmacies - found similar low rates for the provision of CPC and PRS.<sup>29</sup> Despite having been taken four years apart, the very similar results reported in the provision of these two MM services in community pharmacies in these NZ surveys are indicative that by 2007 (when this survey was completed), most MM services offered in community pharmacies in NZ had remained in an early adoption phase.

Interestingly in 2007, as part of the National Pharmacist Services Framework, *Medicines Use Review and Adherence Support* services were introduced in NZ.<sup>53</sup> MURs are provided by trained pharmacists who must be accredited by PCNZ to provide this service. MURs are not nationally funded and local schemes must be negotiated with the corresponding DHB. Despite this funded opportunity for MM services, a 2008 NZ survey indicated that MUR services by pharmacists remained low. MUR services were provided in 5/21 (24%) DHBs and by 3.7% of pharmacists practising in 897 surveyed pharmacies.<sup>84</sup> Authors indicated that limited experience with the service, and the need for local contract negotiations at the time of their investigation, may have contributed to the low reported rates. These results remain relatively consistent with our earlier findings. Similar international studies have shown that MUR services are provided by about 9.8% of pharmacies in the (UK)<sup>85</sup>, and by 13.8% of pharmacies in Australia.<sup>86</sup>

### **3.5.3.2 Reimbursement for HDS and/or MM services in NZ community pharmacies**

This survey also demonstrated that patient-centred services in NZ community pharmacies are largely provided on a “*fee-for-service*” type of reimbursement model, in which the customer/patient is the primary payer, particularly for HDS services. This

reimbursement scheme for HDS services is in line with other reports in the literature that have indicated HDS services offer limited financial reward to the pharmacy; therefore, they are mainly provided in response to a customer's request.<sup>30,32,35,87</sup>

Provision of some MM services in NZ community pharmacies was reported to have additional reimbursement models (other than “*fee-for-service*”) as well as various other payers for services (other than the customer). Government-based funding (administered by the DHBs) for the provision of clozapine therapy monitoring, medicines review, home visits, and smoking cessation are known to be available in NZ, Australia and the UK.<sup>53,59,60</sup> These systems usually require doctors' involvement at some point in the process.

The increased frequency of provision of these MM services reported by the respondent pharmacies in this survey may reflect that NZ community pharmacies are inclined to provide such MM services rather than MM services that would require a “*fee-for-service*” reimbursement model, as it is the case for all the MM services related to chronic disease management. Other countries have introduced reimbursement models for MM services related to chronic disease management.<sup>57-60</sup> These reimbursement schemes have provided pharmacists in these countries with a greater opportunity to perform MM services and receive compensation for their time and expertise.

A similar reimbursement model has recently been approved for implementation, the new Community Pharmacy Service Agreement (CPSA) will be implemented throughout NZ over the next three years.<sup>88</sup> Under the new CPSA, community pharmacies' involvement in chronic disease MM services may increase. A review of the pharmaceutical care practices in community pharmacies in Canada described a “*Suggested Fee Guide for Pharmacy Services*” to serve as a tool for pharmacists interested in reimbursement for cognitive services.<sup>87</sup> A similar guide on the reported patient-centred services provided by NZ community pharmacies as a result of this survey would be useful, containing a comprehensive list of the HDS and MM services, a detailed description of each, and a suggested fee for the service provision.

A review of pharmacy reimbursement models for pharmacy cognitive services found that pharmacist participation was usually high in the initial stages of service provision, but declined over time.<sup>89</sup> This lack of financial support for pharmacists' extended clinical services has been commonly reported as a barrier to practice change in the pharmacy literature. It has been suggested that many of the proposed expanded roles for pharmacists could not be widely implemented without changes to pharmacist reimbursement models.<sup>78</sup> This issue was also assessed through our survey, and it is discussed in the section under *Perceived Barriers and Facilitators for Patient-centred Services*. Despite the publication of numerous studies which address remuneration of pharmacy services, there remains a lack of controlled studies on the effects of remuneration, not only on service provision, but also on the quality of such services. Such studies are also currently needed in NZ, and may be necessary as the new CSPA rolls out throughout NZ over the next three years.<sup>89</sup>

### ***3.5.3.3 Predictor characteristics for the provision of HDS and/or MM services in NZ community pharmacies***

#### ***3.5.3.3.1 Characteristics of respondent pharmacies***

Almost three-quarters of responses to the survey were obtained from pharmacists practising in urban pharmacies (either located in suburbs of major urban cities or in the city centre), and one-quarter practised in pharmacies located in rural communities. Mid-volume pharmacies dispensing between 100-300 prescriptions per day and located in shopping strips accounted for the majority of practice sites for the respondent pharmacists.

Similar studies in other countries have noted that community pharmacies seem to concentrate in urban areas zoned for commercial activity.<sup>90</sup> A national survey in the year 2000 which investigated the NZ retail pharmacy sector reported similar overall findings with regard to size, noting that NZ has somewhat small-to-medium size pharmacies dispensing less than 50,000 prescriptions per year.<sup>91</sup> This study did not thoroughly report or comment on the distribution of community pharmacies according to the various geographical areas, but indicated that increasingly NZ pharmacies were

being located within medical centres. However, only about one-fifth of respondent pharmacists indicated that they practised in pharmacies located within medical centres. In addition, our survey showed no significant associations between the location of the pharmacy and the provision of patient-centred services, although there was a positive trend.

Interestingly, in the 2000 NZ survey - which reported a 97% response rate – the authors presented similar results. The similarity of these results are indicative that being adjacent to a medical practice does not necessarily appear to be an influential factor for the provision of patient-centred services.<sup>29</sup> An Australian analysis of primary prevention services for CVD in community pharmacies also found that pharmacies in medical centres were less likely to provide these services.<sup>81</sup> These consistent findings are not surprising, medical centres often offer HDS and MM services within GP offices, or have other HCPs offering screening and disease management services within the medical centre. It is possible that community pharmacies located within medical centres consider the offering of patient-centred services within their premises to be a duplication of effort and not commercially viable; in particular, for HDS services which most often require payment by customers.

Lower percentages of HDS and/or MM services were consistently reported by community pharmacies located in rural areas. When compared to urban pharmacies, and particularly those located in city centres, rural pharmacies reported decreasing odds of offering HDS and/or MM services. Geographic access has been shown to influence use of many primary health care services.<sup>92</sup> A NZ study found that patients living in rural locations and those farther from a pharmacy were less likely to use their services.<sup>93</sup> Considering that the pharmacy profession is exploring means of improving access to primary care services, our findings highlight that rural populations may be at increased need of pharmacist involvement in HDS and/or MM services. Recruitment of rural pharmacists and pharmacist locums is often difficult and rural pharmacies are decreasing in numbers. Similar findings were obtained in an Australian survey, where a significantly higher proportion of urban retail pharmacies offered patient-centred services compared to pharmacies located in other geographical areas.<sup>20</sup>

Although the majority of respondent pharmacists practised in independent-type pharmacies, non-independent type pharmacies were shown to be more likely to offer patient-centred services. Regression analysis confirmed this positive association. The 2000 NZ survey of the retail pharmacy sector showed relatively similar findings, with around 39% of NZ pharmacies belonging to buying or marketing groups, such as AMCAL and Unichem.<sup>91</sup> In a different report of the same survey, the author also reported that pharmacies who were members of marketing groups were more likely to provide diagnostic and monitoring services.<sup>29</sup> Similar findings were obtained in the Australian survey.<sup>20</sup> These overall results are indicative that pharmacy marketing groups may provide more support, such as training programmes - and possibly financial resources - for pharmacists to expand their clinical roles. It has also been suggested that corporate chains tend to attract a greater proportion of commissioning income from government-funded programmes.<sup>85</sup>

Our results also showed a higher number of employees in non-independent type pharmacies compared to independent pharmacies, which appears to influence the provision of patient-centred services. This finding was confirmed through statistical analysis, which indicated a significant positive correlation, particularly for HDS services. Because lack of time has been reported as a significant barrier to the provision of patient-centred services, having an increased number of employees, particularly those who could provide support in the technical aspects of the pharmacists' workload, would be able to free-up pharmacists to undertake the training required and engage in the provision of HDS/MM services.

Although there is an increased emphasis on a team approach to primary care services in NZ, an overwhelming majority of respondent pharmacists (91%) indicated that their practice sites did not have a collaborative practice agreement with a GP, or other primary care settings, for the provision of patient-centred services. However, those that did, were significantly more likely to offer HDS and/or MM services. These results may contribute to the above findings regarding the association between pharmacy location and provision of enhanced clinical services. International and NZ literature has also indicated that building rapport with local physicians is important to the

success of community pharmacies' patient-centred services.<sup>94,95</sup> Although being adjacent to medical practices is not necessarily associated with community pharmacy service provision, closer and more formal relationships with medical professionals may translate into more involvement by pharmacists in non-dispensary type of activities.

The authors of the 2000 NZ survey also suggested that pharmacies adjacent to medical centres may focus more on providing traditional dispensing services rather than on other activities.<sup>29</sup> Studies in the US have shown that community pharmacist-provided MTM services are enhanced when an effective collaborative working relationship exists between pharmacists and GPs.<sup>95</sup> However, community pharmacists appear to struggle establishing relationships with GPs, this issue is consistently reported in pharmacists' surveys which explore barriers to the implementation of patient-centred services in community pharmacies, not only in NZ but internationally.<sup>30,75,96</sup>

A 2007 NZ survey to pharmacists and GPs reported significant barriers for increasing the clinical services provided in community pharmacies, both from the community pharmacists themselves and from the GPs.<sup>30</sup> McDonough and Doucette proposed a conceptual model for the development of pharmacist-physician collaborative working relationships (CWRs).<sup>97</sup> This framework illustrates that CWRs move along a collaboration continuum, from a stage of professional awareness to a stage of commitment. The results of the current study are suggestive that in NZ, the relationship between community pharmacy and general practice may be in the earlier phases of this CWR model, and deserves further exploration. At this stage, it may be necessary for NZ pharmacists to act as relationship initiators, building awareness and ensuring communication during the early phases, and later on strengthening this relationship by emphasising high-quality pharmacist contributions.

#### **3.5.3.3.2 Characteristics of respondent pharmacists**

The vast majority of the respondents described their positions in the pharmacies as either "sole" or "partner" proprietors. It is important to note that this survey was addressed to "pharmacists-in-charge" of NZ's community pharmacies, which often

includes owners, partners, and managers; that is, those pharmacists who most likely determine and implement the pharmacy services to be provided. Therefore, their views and opinions regarding the barriers and opportunities for the implementation of patient-centred services are of particular importance.

There appeared to be variability in the service provision dependent on the type of pharmacy ownership. These variations may have multiple explanations, including willingness and ability to provide them, as well as their appropriateness for a given location. Although owners tend to take the leadership role, implementation of patient-centred services is often facilitated by engaging the entire pharmacy team and allowing the development of common goals towards which all members of the team are working. It has been suggested that pharmacy owners should be cognisant of the need to include their entire staff in the implementation process, even for a service that is ostensibly delivered only by the pharmacist, and should include all staff members in the processes of planning and goal setting.<sup>94</sup> These issues were not sufficiently explored in this survey and may need further investigation.

According to the latest annual report of practising pharmacists released by PCNZ, of the 3304 pharmacists that were on the practising register as of June 30 2012, the majority were females (62%) and half (50%) were in the age range between 26-45 years.<sup>54</sup> Almost half of our respondent pharmacists (49%) also belonged to a similar age group as obtained by combining the age groups between 31-40 and 41-50 years. However, the majority of pharmacists responding to our survey were males, a finding that is similar to an earlier NZ survey.<sup>31</sup> Later surveys have shown an increased number of female respondents<sup>30</sup>, which may be consistent with the profession's trend towards becoming predominantly female.<sup>19,54</sup>

The age of the respondent pharmacists appeared to influence the provision of patient-centred services at the practice site. Middle-aged pharmacists (between 41 and 60 years of age) were more likely to work in pharmacies that provided HDS/MM services when compared to younger pharmacists (between 21-40 years of age) or older pharmacists (those older than 60). This was an interesting finding considering the emphasis on clinical pharmacy education in undergraduate programmes since the early

2000s. It was anticipated that younger respondent pharmacists would be more involved in patient-centred services. Findings of an earlier NZ survey reported a lack of relationship between pharmacists' age and involvement in extended roles.<sup>29</sup> Another survey found younger pharmacists significantly more likely to participate in CVD risk factor screening, the authors indicated that it was possibly due to a broader educational and training than older pharmacists who were trained as "chemists".<sup>98</sup> This relationship should be explored further in future research.

When questioned about their years of experience as pharmacists and their qualifications, the majority of respondents indicated that they had between 21-30 years of experience, did not have a post-graduate qualification, and spent less than 10 hours per month in continuing pharmacy education (CPE). No significant associations between years of experience, advanced qualifications or hours spent in CPE and provision of patient-centred services were found from the results of our survey. There is lack of information in earlier NZ surveys in this regard, so we could not compare our results with other national studies. Similar results were found in an Australian survey, where the majority of pharmacists surveyed also indicated that they engaged in less than 10 hours per month of CPE activities.<sup>20</sup>

#### ***3.5.3.4 Perceived barriers and facilitators for the provision of HDS and/or MM services in NZ community pharmacies***

Overall, pharmacists responding to this survey agreed with the majority of beneficial statements regarding the provision of HDS and/or MM services in community pharmacies. A similar survey performed by Dunlop and Shaw in 2002 exploring NZ pharmacists' attitudes towards the provision of pharmaceutical care services also showed a positive disposition on the part of pharmacists towards the implementation of services beyond the dispensing of medications.<sup>31</sup> Our study showed that over three-quarters of the pharmacists surveyed were in agreement that community pharmacies should provide HDS and/or MM services. Those already providing these services showed greater agreement with this statement than those who were not (84% versus 63%, respectively). These results suggest that pharmacists offering the services may

have a more positive attitude towards expanding their clinical roles than those who do not offer patient-centred services. However, despite this high level of agreement on the part of pharmacists on the benefits of providing patient-centred care, the results of this survey also indicated that only close to 60% of pharmacies offered clinical services. A relatively recent Canadian study which investigated attitudes of pharmacists to practice change reported similar findings. Pharmacists felt prepared to undertake new roles, primarily because they felt that these new roles would result in improved patient health outcomes.<sup>75</sup>

There seems to be a consistent discrepancy amongst pharmacists in what they believe is the future of pharmacy practice, and what they actually do to move their practice forward. Practice change has been extensively discussed in the pharmacy literature.<sup>78,94,99-101</sup> It has been suggested that pharmacists' perceptions and attitudes are central to driving behaviour, and this affects the uptake and implementation of patient-centred services.<sup>100</sup> It has also been suggested that if the professional culture and the approach to change do not align, practice change will remain elusive.<sup>101</sup> A NZ study aimed at determining the awareness and perceived barriers of pharmacists to the implementation of the *Focus on the Future: Ten-Year Vision for Pharmacists in New Zealand: 2004–2014* document<sup>18</sup> reported pharmacists' apathy, narrow and inward focus, negativity of the current health care environment, silo thinking, and taking a subservient approach.<sup>99</sup>

Historically, efforts to better understand the lack of advancement in pharmacy practice have generally focused on barriers to practice change. Several barriers to the provision of enhanced pharmaceutical care services in community pharmacies have been reported by pharmacists in various international studies, including store layout, lack of privacy, and overall lack of space.<sup>52,96,102-105</sup> Excessive workload, lack of time, and lack of personnel have also been commonly cited as barriers to provision of cognitive services.<sup>94,98,102-106</sup> Lastly, lack of financial compensation<sup>94,98,99,102,103,106</sup> and legal liability<sup>102</sup> have been perceived to inhibit provision of such services. The most frequently cited barriers in the 2002 NZ pharmacists' survey by Dunlop and Shaw

included lack of time and absence of a recognised reimbursement system<sup>31</sup> - barriers that have remained unchanged in this study.

It has been reported that efforts to remove these barriers have not necessarily resulted in sustained practice change.<sup>63,84,100</sup> Interestingly, in this survey, a higher number of respondent pharmacists currently offering HDS and/or MM services in their practice sites compared to those not offering the services perceived that lack of reimbursement was a major barrier (49% versus 35%, respectively). Their experience in offering extended services which overall continue to be financed mostly by their customers or the pharmacies themselves, may have negatively influenced the opinions of these pharmacists who may find dispensing more lucrative under the current dispensing-focused remuneration system, compared with a system focused on clinical services that often requires implementation - and increased time and training - for a questionable financial rate of return.

Other important barriers identified in this survey, such as lack of time and lack of access to patient information, were also reported in other NZ and international surveys.<sup>20,31,81,94,99</sup> Similarly, a recent study in the US reported that lack of time was the single greatest barrier to pharmacists provision of MTM services.<sup>96</sup> Lack of support staff in NZ community pharmacies has been previously suggested as another explanation for the decreased available time for pharmacists to provide HDS/MM services.<sup>29,31</sup>

In this study, pharmacies reporting the provision of HDS/MM services had a higher number of employees than pharmacies not providing the services. These findings may suggest that re-arrangement of pharmacist duties within the pharmacy and increasing the technical personnel, may be a mechanism to free up pharmacists for the provision of HDS/MM services. However, it may be argued that offering HDS/MM services demands additional time on the part of pharmacists. If no reimbursement is provided, the additional time required to offer these services in an effective manner; that is, one that is translated into positive health outcomes for the public, it is likely to demand additional time which in the current system remains unfunded. Therefore, it seems that both lack of reimbursement and lack of time continue to be intimately related and

continue to be reported as the most common perceived barriers for implementing HDS/MM services in NZ community pharmacies.

Overall, the results of this study in regard to barriers and facilitators for the provision of patient-centred services in community pharmacies are similar to those found worldwide and largely remain unchanged over time. Rather than focusing our research on the identification of these influencing factors, research to better understand pharmacy culture and pharmacist personality traits may offer some explanation into why pharmacy practice change is taking so long.<sup>99,100</sup> By improving our understanding of pharmacy culture from the point of view of pharmacists, it may be possible to develop culturally specific strategies which can then be used to advance the practice of the profession.

### **3.5.4 Limitations**

#### **3.5.4.1 Response rate**

A response rate of just over 50% may be the major limitation of this study. However, limitations on the potential representativeness of respondents and veracity of the survey instrument to measure true values of variables occur in any survey research. Nevertheless, the results derived from this survey must be viewed with caution in view of the response rate obtained, and one must arrive at conclusive remarks in regards to the characteristics of NZ community pharmacies and pharmacists offering patient-centred services with caution. These results should be considered reflective rather than definitive; a similar follow up survey will be required to confirm or discard the conclusions arrived at through this study. The small under-representation of respondent pharmacies from the Northern Region in NZ (which also has the highest number of community pharmacies) may also pose some bias to these results.

Although the survey distribution was done following literature recommendations to maximise response rates (such as providing a self-addressed stamped envelope, and sending reminders during the survey period thanking the respondents who had completed the survey, while reminding others about the deadline for their participation)

the survey yielded a response rate of just over 50%. Although this rate is often quoted as “adequate” for mail surveys<sup>107</sup> and it is within the average reported for various nationwide pharmacy international surveys<sup>75,83,108</sup> it was lower than those obtained in other NZ pharmacists’ surveys<sup>29,30,31</sup>, as well as than others reported in similar studies in Australia, the US and Canada.<sup>19,20,78</sup>

Possible reasons for this lower response rate include the time of the year when the survey was distributed (November, in close proximity to holidays and believed to be a time of increased workload for pharmacies) and the fact that there were no incentives offered. Because of the anonymity of this survey, it was not possible to contact non-respondents to carry out a non-respondent analysis. Lack of time, lack of personnel or not providing patient-centred services have been reported in other surveys as reasons for not returning the questionnaire.<sup>83</sup> Some of these reasons may also explain non response to the present survey.

Response rate was lower in the Northern Region (41%). The other regions showed a relatively similar response rate to that obtained for the whole sample. This finding was disappointing, primarily because the majority of community pharmacies in NZ (approximately 35%) are located in the Northern region which is in close proximity to Auckland, reaching about one-quarter of NZ’s population. It would have been very useful to have information on the patient-centred services that these pharmacies provide, so that our findings could be more generalisable. Unfortunately, the previous surveys in NZ pharmacies that were found in the literature review (which had higher response rates) did not divide their findings according to region or DHBs, this makes comparison with similar NZ survey data difficult.

#### **3.5.4.2 Response bias**

Response bias is a type of cognitive bias which can affect the results of a statistical survey if respondents answer questions in the way they think the questioner wants them to, rather than according to their true beliefs.<sup>109</sup> Response bias often occurs in situations of voluntary response, as it is the case of this survey. That is, those who responded are likely to be more interested in the topic of the survey and do not necessarily reflect a

statistically representative sample of the actual population. Questionnaire design can also introduce response bias from respondents. This occurs most often in the wording of the questions. Response bias is present when a question contains a leading opinion or if the respondent wishes to “please” the questioner by answering what appears to be the “right” answer.

Interpretation of survey results is also limited by the nature of self-reported data and whether this accurately reflects respondent understanding of the survey questions. In our survey, respondents may have been unclear as to what it was meant by “providing” the service. It may have meant that they did it “once” as opposed to “regular or ongoing” provision of services. Some of the pharmacy characteristics (e.g., having a separate consultation room) were only asked to be responded to by those who self-reported as “providing” the services, so these characteristics were not able to be analyzed amongst those who self-reported “not offering” the services.

Although the survey instrument used was pilot-tested for clarity and face validity, its criterion validity is unknown. Also, because the first question was for the respondent to state if the pharmacy provided either HDS and/or MM services, it is possible that there was a respondent bias for selecting “providing services”, which may have overestimated the overall service provision in NZ community pharmacies. This question may reflect a social desire/ability bias.

One last important limitation was in the design of the *Likert* scale that was used to assess the respondent pharmacists’ perceived barriers to the provision of HDS and/or MM services in community pharmacies. When analysing the data, the “*quite a barrier*” and the “*major barrier*” scales were aggregated, while the other three scales provided more distinctive features and thus remained as separate data points. Arguments exist for including and not including a neutral point; in this particular section of our survey, asking for perceived barriers, it is uncertain what the effect of adding a neutral point has had on the responses received. Is it possible that elimination of a neutral point may provide a better measure of the intensity of participants’ attitudes or opinions? It may be worth addressing this in future research.

Every attempt was made to minimise the introduction of potential biases which often characterise survey research, such as replicating questions from previously tested questionnaires used in international surveys which address similar research questions, piloting the instrument, and providing key definitions to the respondents as part of the questionnaire. Considering that other international surveys have shown similar proportions of patient-centred services as those reported in this study, this bias in our survey may be small.

### **3.5.5 Conclusions derived from this survey**

This survey is the first extensive study which has examined the extent of the various types of primary care services provided in NZ's community pharmacies. It adds to our current knowledge and understanding of the characteristics of pharmacists and pharmacies that may influence the provision of patient-centred services, particularly those which involve an expanded role for community pharmacists in meeting the needs of NZ's national health strategies. The information derived from this national survey has allowed us to answer the research questions that were posed at the beginning of this chapter:

1. The majority of NZ community pharmacies are providing some form of HDS/MM centred services to the public - services over and above those related to the traditional medication dispensing and medicines information and/or counseling - although they appear to be mostly in an early adoption phase. However, many of these patient-centred services are not consistently, sufficiently or efficiently addressing NZ's priority health disorders. The results indicate that pharmacists will need to make attitudinal changes in order to take on new roles to be able to integrate within the primary care team. As a profession, community pharmacy has to become indispensable, deliver value, and attempt to improve relationships with stakeholders to assist in securing a funding model which enables the provision of patient-centred services to be sustainable. There is a need to decrease the reliance on selling pharmaceutical products to fund pharmacist involvement in the provision of primary care services.

2. Practice change in NZ community pharmacies continues to face resistance and there are limited efforts on the part of pharmacists to shift their practices from dispensing and technical duties to a focus on clinical services that improve patient outcomes. Barriers to moving the profession forward continue to be identified by pharmacists; however, there is also limited evidence for facilitators known to promote practice change. Although pharmacists believe that offering enhanced pharmaceutical care services in the community are beneficial not only for the public, but also for the profession of pharmacy, most pharmacists continue to find more challenges than opportunities in expanding their role to more clinically oriented services without a solid financial reimbursement scheme. Given the uncertain revenue streams for pharmacist-delivered care and medication management-type services, our survey suggests that community pharmacy administrators have decided the time has not yet come to incur the costs for the resources needed to support these enhanced pharmaceutical care services.
3. The extent of CVD risk assessment and management services being provided in NZ community pharmacies is extremely limited, mostly consisting of individual CVD risk factor screening. Individual risk factor assessment on the part of pharmacists appears to be superficial, and is infrequently provided. In addition, individual CVD risk factor assessment, as has been reported in this survey, does not follow the *NZ Cardiovascular Risk Assessment and Management* guidelines which recommend that CVD risk assessment should not be targeted to screening for individual risk factors, but rather obtaining global or absolute risk scores (using charts or validated calculators such as the Framingham Risk Score). This is the risk of an individual experiencing a CV event over a predefined period of time (e.g. 5 years in NZ). This approach encourages a shift to considering all risk factors together, rather than individually. These scores are useful for combining individual risk factor measurements into a single quantitative estimate of risk that can be used to target preventive interventions. Based on the results of this survey, it is clear that community pharmacists in NZ

are not embracing this recommended public health approach in the services they offer to the public.

### **3.5.6 Recommendations**

Undergraduate academic programmes in NZ need to become more proactive in assisting pharmacists-to-be to understand why practice change is the way of the future, and provide comprehensive training and support to assure they receive the education required for a successful transition from a product-oriented professional to a patient-centred practitioner. Previous education and training models emphasizing technical skills over the application of knowledge should no longer be applied to pharmacy education. Rather, pharmacy education should place priority in addressing the mismatches between the provision of services continuously reported by community pharmacies and the priority health disorders in NZ.

New services will require different models of practice and the strengthening of relationships amongst other primary health care providers. To develop this widely, pharmacy professional bodies and related stakeholders need to work together to systematically develop a plan to improve implementation of patient-centred services by addressing the perceived barriers and providing the support pharmacists need to facilitate change. This support will need to be in the form of training not only for pharmacists but also for support staff, designing suitable environments and private space, and strengthening documentation systems which assure quality and accountability.

The *NZ Cardiovascular Risk Assessment and Management* guidelines provide evidence-based recommendations for selecting people for risk assessment, measuring risk factors, identifying level of absolute risk, employing appropriate interventions, and ensuring follow-up and monitoring. The guidelines also recommend that CV risk assessments should be provided at the primary care level by health care professionals who have adequate training, and who are supported by appropriate infrastructure and systems for follow-up and quality improvement. Further research is needed to

understand the knowledge of pharmacists on these guidelines and their understanding of how to apply this knowledge in their practices.

An important concern to move practice forward is establishment of collaborative practices with GPs. Pharmacists continue to be skeptical that doctors would be willing to accept pharmacists taking on new roles. Considering the large collaborative role that doctors will play in the future vision for pharmacy, it will be important to determine if this perceived barrier to change is real or not. Considering that the NZPHCS emphasises involvement in health promotion and preventative care by a range of health professionals, medical and pharmacy organisations, as well as undergraduate pharmacy and medical academic programmes, need to increase their attention to implement strategies to assist practitioners establish and foster these collaborative practices in primary care throughout the continuum of their formal and professional education.

Future research will allow the assessment of how changes in pharmacists' work environments affect outcomes. In particular, we can determine how increased capacity for more specific patient care services - increased staff, equipment, and technology resources - affects pharmacists' productivity, the quality of care they provide, and their job satisfaction. The identified facilitators should also be used in a multilevel strategy to integrate professional services into the community pharmacy business, and to engage pharmacists and their staff, policy makers, educators, and researchers. Further research is required to determine additional factors impacting the capacity of community pharmacies to implement change.

Further studies are needed to find out the reasons why introduction of services declines with time. This data could then be used in the development of implementation models for patient-centred services that ensure sustainability. There were also major differences in the provision of patient-centred services in the different geographical areas studied. While these disparities may result from differences in geography and population distribution, the level of access to community pharmacies in NZ deserves further investigation, particularly in rural populations which as indicated in our study, may be of increased need for pharmacist involvement in HDS and/or MM services.

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### 3.7 Appendices

#### ***Appendix 3.1: Subject headings and key words based on the MEDLINE® search strategy***

MEDLINE 1946 to Present with Daily Update  
Results limited to English: 5694 De-duped: 5249  
limit 01 Jan 1990 to 30 Jun 2011: 3589

1. Pharmacists/
2. Pharmacy/
3. Pharmacies/
4. Community Pharmacy Services/
5. Ambulatory Care/ and (pharmacy or pharmacies or pharmacist? or "pharmaceutical service?").mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier]
6. Pharmaceutical Services/
7. (community adj3 (pharmacist? or pharmacy or pharmacies or druggist?)).ti,ab.
8. (ambulatory adj3 (pharmacist? or pharmacy or pharmacies or druggist?)).ti,ab.
9. ((pharmacist? or pharmacy) adj3 (initiat\$ or manage\$ or run or staff\$ or supervi\$ or led or based or assisted or provided or service\$ or monitor\$)).ti,ab.
10. or/1-9
11. Mass Screening/
12. Preventive Health Services/
13. Health Education/
14. Primary Health Care/
15. Patient Care/
16. Health Promotion/ or Healthy People Programs/
17. Professional Role/ or Professional Practice/ or "Referral and Consultation"/ or "Delivery of Health Care"/
18. Primary Prevention/
19. Risk Assessment/ or Risk Factors/
20. "Outcome Assessment (Health Care)"/
21. Organizational Innovation/ or Practice Management/
22. (prevention or preventive or preventative).ti.
23. screening.ti,ab.
24. Chronic Disease/pc [Prevention & Control]
25. Medication Therapy Management/
26. (medication adj2 (manag\$ or review\$)).tw.
27. drug monitoring.tw.
28. (health adj2 promotion).ab.
29. (innovat\$ or educat\$ or counsel\$).ti,ab.
30. or/11-28
31. and/10,30
32. limit 31 to english language
33. remove duplicates from 32
34. limit 33 to ed="19900101 - 20110630"
35. limit 33 to ed="20110701 - 20131129"

## Appendix 3.2: Questionnaire Tool

### Part 1: Screening and Monitoring Services

- 1 Do you provide **screening services** and/or **monitoring services** in your pharmacy? (*tick one*)
- No   
Yes

If **Yes**, please read below. If **No**, move on to Part 2 (Page 4).

If a service listed under **Screening Services** or **Monitoring Services** applies to your pharmacy, tick in the box next to the service. Tick as many services provided by your pharmacy. If you provide a service not listed here, please specify this in the 'other' row.

**Payment** – Circle "Yes" or "No" if payment is received when the service is provided. If payment is received, then please specify who pays, for example:

- Customer
- PHO
- Insurance company
- DHB
- Employer
- Other - *please specify who*

Screening Services:	Tick	Payment (circle)	Who pays?
Blood pressure measurement	<input type="checkbox"/>	Yes No	
Blood glucose testing	<input type="checkbox"/>	Yes No	
Bone Mineral Density (BMD) testing	<input type="checkbox"/>	Yes No	
Urea Breath Test	<input type="checkbox"/>	Yes No	
Cardiovascular risk assessment	<input type="checkbox"/>	Yes No	
Cholesterol testing	<input type="checkbox"/>	Yes No	
Obesity (weight and body mass index)	<input type="checkbox"/>	Yes No	
Peak Expiratory Flow Rate measurement	<input type="checkbox"/>	Yes No	
Pregnancy testing	<input type="checkbox"/>	Yes No	
Other – <i>Specify:</i>	<input type="checkbox"/>	Yes No	

Monitoring Services:	Tick	Payment (circle)	Who pays?
Adverse Drug Reaction Reporting	<input type="checkbox"/>	Yes No	
Anticoagulation ( <i>INR</i> ) management	<input type="checkbox"/>	Yes No	
Asthma management	<input type="checkbox"/>	Yes No	
Clozapine therapy monitoring	<input type="checkbox"/>	Yes No	
Diabetes management	<input type="checkbox"/>	Yes No	
Hyperlipidaemia management	<input type="checkbox"/>	Yes No	
Hypertension management	<input type="checkbox"/>	Yes No	
<i>H. Pylori</i> and dyspepsia management	<input type="checkbox"/>	Yes No	
Osteoporosis management	<input type="checkbox"/>	Yes No	
Smoking cessation ( <i>NRT</i> )	<input type="checkbox"/>	Yes No	
Weight management	<input type="checkbox"/>	Yes No	
Immunisation services	<input type="checkbox"/>	Yes No	
Medicines management ( <i>CPC/PRS</i> )	<input type="checkbox"/>	Yes No	
Home visits (Domiciliary Medicines Review)	<input type="checkbox"/>	Yes No	
Other – <i>Specify:</i>	<input type="checkbox"/>	Yes No	

- 2 Do you try to **identify** high risk groups? (*tick one*)
- No   
Yes

If yes, **how?**  
(*tick as many that apply*)

Dispensing records	<input type="checkbox"/>
Patient medical records	<input type="checkbox"/>
Interviewing patients	<input type="checkbox"/>
Family history	<input type="checkbox"/>
Referral from other professionals	<input type="checkbox"/>
Other – <i>Specify:</i>	<input type="checkbox"/>
.....	

3	What proportion of your customer base do you provide <b>screening</b> services to? ( <i>tick one</i> )	<table border="0" style="width: 100%;"> <tr><td>None (or almost none)</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Less than half</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>More than half</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Almost all</td><td style="text-align: right;"><input type="checkbox"/></td></tr> </table>	None (or almost none)	<input type="checkbox"/>	Less than half	<input type="checkbox"/>	More than half	<input type="checkbox"/>	Almost all	<input type="checkbox"/>										
None (or almost none)	<input type="checkbox"/>																			
Less than half	<input type="checkbox"/>																			
More than half	<input type="checkbox"/>																			
Almost all	<input type="checkbox"/>																			
4	What proportion of your customer base do you provide <b>monitoring</b> services to? ( <i>tick one</i> )	<table border="0" style="width: 100%;"> <tr><td>None (or almost none)</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>A few (but less than half)</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>About half</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>More than half</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Almost all</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>None (or almost none)</td><td style="text-align: right;"><input type="checkbox"/></td></tr> </table>	None (or almost none)	<input type="checkbox"/>	A few (but less than half)	<input type="checkbox"/>	About half	<input type="checkbox"/>	More than half	<input type="checkbox"/>	Almost all	<input type="checkbox"/>	None (or almost none)	<input type="checkbox"/>						
None (or almost none)	<input type="checkbox"/>																			
A few (but less than half)	<input type="checkbox"/>																			
About half	<input type="checkbox"/>																			
More than half	<input type="checkbox"/>																			
Almost all	<input type="checkbox"/>																			
None (or almost none)	<input type="checkbox"/>																			
5	How do you <b>promote</b> screening and monitoring services to customers? ( <i>tick as many that apply</i> )	<table border="0" style="width: 100%;"> <tr><td>Services are NOT promoted</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>In-store promotion</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Verbal invite by staff</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Advertisements (newspapers/magazines)</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Referrals from other health professionals</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Television/Radio</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Circulars/pamphlet distribution</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Other – <i>Specify:</i></td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>.....</td><td></td></tr> </table>	Services are NOT promoted	<input type="checkbox"/>	In-store promotion	<input type="checkbox"/>	Verbal invite by staff	<input type="checkbox"/>	Advertisements (newspapers/magazines)	<input type="checkbox"/>	Referrals from other health professionals	<input type="checkbox"/>	Television/Radio	<input type="checkbox"/>	Circulars/pamphlet distribution	<input type="checkbox"/>	Other – <i>Specify:</i>	<input type="checkbox"/>	.....	
Services are NOT promoted	<input type="checkbox"/>																			
In-store promotion	<input type="checkbox"/>																			
Verbal invite by staff	<input type="checkbox"/>																			
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Television/Radio	<input type="checkbox"/>																			
Circulars/pamphlet distribution	<input type="checkbox"/>																			
Other – <i>Specify:</i>	<input type="checkbox"/>																			
.....																				
6	<b>Who pays</b> for the majority of customers to whom screening and / or monitoring services are provided? ( <i>tick one</i> )	<table border="0" style="width: 100%;"> <tr><td>Customer</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Insurance Company</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Employers</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>DHB / PHO</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Free service</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Other – <i>Specify:</i></td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>.....</td><td></td></tr> </table>	Customer	<input type="checkbox"/>	Insurance Company	<input type="checkbox"/>	Employers	<input type="checkbox"/>	DHB / PHO	<input type="checkbox"/>	Free service	<input type="checkbox"/>	Other – <i>Specify:</i>	<input type="checkbox"/>	.....					
Customer	<input type="checkbox"/>																			
Insurance Company	<input type="checkbox"/>																			
Employers	<input type="checkbox"/>																			
DHB / PHO	<input type="checkbox"/>																			
Free service	<input type="checkbox"/>																			
Other – <i>Specify:</i>	<input type="checkbox"/>																			
.....																				
7	Is the person who performs the screening service <b>trained</b> to do so? ( <i>tick one</i> )	<table border="0" style="width: 100%;"> <tr><td>No</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Yes – <i>Specify how:</i>.....</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>N/A</td><td style="text-align: right;"><input type="checkbox"/></td></tr> </table>	No	<input type="checkbox"/>	Yes – <i>Specify how:</i> .....	<input type="checkbox"/>	N/A	<input type="checkbox"/>												
No	<input type="checkbox"/>																			
Yes – <i>Specify how:</i> .....	<input type="checkbox"/>																			
N/A	<input type="checkbox"/>																			
8	<b>Where</b> do you usually perform screening and monitoring services? ( <i>tick one</i> )	<table border="0" style="width: 100%;"> <tr><td>Separate consultation room</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Corner of the pharmacy</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Over the counter</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>No specific place</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Other – <i>Specify:</i></td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>.....</td><td></td></tr> </table>	Separate consultation room	<input type="checkbox"/>	Corner of the pharmacy	<input type="checkbox"/>	Over the counter	<input type="checkbox"/>	No specific place	<input type="checkbox"/>	Other – <i>Specify:</i>	<input type="checkbox"/>	.....							
Separate consultation room	<input type="checkbox"/>																			
Corner of the pharmacy	<input type="checkbox"/>																			
Over the counter	<input type="checkbox"/>																			
No specific place	<input type="checkbox"/>																			
Other – <i>Specify:</i>	<input type="checkbox"/>																			
.....																				
9	Do you have SOPs for providing screening tests at your pharmacy? ( <i>tick one</i> )	<table border="0" style="width: 100%;"> <tr><td>No</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Yes</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>N/A</td><td style="text-align: right;"><input type="checkbox"/></td></tr> </table>	No	<input type="checkbox"/>	Yes	<input type="checkbox"/>	N/A	<input type="checkbox"/>												
No	<input type="checkbox"/>																			
Yes	<input type="checkbox"/>																			
N/A	<input type="checkbox"/>																			
10	How would you <b>follow up</b> abnormal results? ( <i>tick as many that apply</i> )	<table border="0" style="width: 100%;"> <tr><td>Repeat test</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Refer customer</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Manage yourself</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>No follow up</td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>Other – <i>Specify:</i></td><td style="text-align: right;"><input type="checkbox"/></td></tr> <tr><td>.....</td><td></td></tr> </table>	Repeat test	<input type="checkbox"/>	Refer customer	<input type="checkbox"/>	Manage yourself	<input type="checkbox"/>	No follow up	<input type="checkbox"/>	Other – <i>Specify:</i>	<input type="checkbox"/>	.....							
Repeat test	<input type="checkbox"/>																			
Refer customer	<input type="checkbox"/>																			
Manage yourself	<input type="checkbox"/>																			
No follow up	<input type="checkbox"/>																			
Other – <i>Specify:</i>	<input type="checkbox"/>																			
.....																				

- 11 How would you **refer** a customer?  
(tick as many that apply)
- |                               |                          |
|-------------------------------|--------------------------|
| Advise customer to see doctor | <input type="checkbox"/> |
| Write a referral letter       | <input type="checkbox"/> |
| Phone their doctor            | <input type="checkbox"/> |
| Other – Specify:              | <input type="checkbox"/> |
| .....                         |                          |
- 12 Do you keep **records** of patients screening results? (tick one)
- |                       |                          |
|-----------------------|--------------------------|
| No                    | <input type="checkbox"/> |
| Yes – How long? ..... | <input type="checkbox"/> |
| N/A                   | <input type="checkbox"/> |
- 13 Do you **follow-up** on screened patients at a later date? (tick one)
- |           |                          |
|-----------|--------------------------|
| No        | <input type="checkbox"/> |
| Yes       | <input type="checkbox"/> |
| Sometimes | <input type="checkbox"/> |
| N/A       | <input type="checkbox"/> |
- 14 How **satisfied** are your customers regarding screening and/or monitoring services at your pharmacy? (circle one number)
- 1      2      3      4      5      6      7      8      9      10
- ←-----→
- Not satisfied    Marginally satisfied    Neutral    Very satisfied    Extremely satisfied

**Part 2 : Barriers & Opportunities**

- 15 Do you believe community pharmacies should provide **screening** services? (tick one)
- |     |                          |
|-----|--------------------------|
| No  | <input type="checkbox"/> |
| Yes | <input type="checkbox"/> |
- 16 Do you believe community pharmacies should provide **monitoring** services (tick one)
- |     |                          |
|-----|--------------------------|
| No  | <input type="checkbox"/> |
| Yes | <input type="checkbox"/> |
- 17 If all costs (including staffing) associated with providing a **screening and monitoring** service were fully reimbursed, would more pharmacies offer them? (tick one)
- |     |                          |
|-----|--------------------------|
| No  | <input type="checkbox"/> |
| Yes | <input type="checkbox"/> |
- 18 If training for providing **screening and monitoring** services were fully reimbursed, do you think more pharmacies would offer them? (tick one)
- |     |                          |
|-----|--------------------------|
| No  | <input type="checkbox"/> |
| Yes | <input type="checkbox"/> |
- 19 Do you think that other health professionals are (or would be) **supportive** of you performing **screening** services? (tick one)
- |           |                          |
|-----------|--------------------------|
| No        | <input type="checkbox"/> |
| Yes       | <input type="checkbox"/> |
| Sometimes | <input type="checkbox"/> |
- 20 By offering **screening** and/ or **monitoring** services, do you feel that you can help to:  
(tick as many as apply)
- |                               |                          |
|-------------------------------|--------------------------|
| Improve health outcomes       | <input type="checkbox"/> |
| Increase awareness            | <input type="checkbox"/> |
| Reduce adverse drug reactions | <input type="checkbox"/> |
| Prevent disease               | <input type="checkbox"/> |
| None of the above             | <input type="checkbox"/> |
| Other – Specify:              | <input type="checkbox"/> |
| .....                         |                          |

21 What do you perceive to be the **benefits** to you as a **pharmacist** in providing screening services? *(tick as many that apply)*

Professional status	<input type="checkbox"/>
Financial gain	<input type="checkbox"/>
Customer satisfaction	<input type="checkbox"/>
Staff satisfaction	<input type="checkbox"/>
Other – <i>Specify:</i>	<input type="checkbox"/>
.....	

22 What do you perceive to be the **benefits** for your **business** in providing screening services? *(tick as many that apply)*

Professional status	<input type="checkbox"/>
Financial gain	<input type="checkbox"/>
Customer satisfaction	<input type="checkbox"/>
Staff satisfaction	<input type="checkbox"/>
Other – <i>Specify:</i>	<input type="checkbox"/>
.....	

23 What **you** perceive to be the **barriers to you** as a pharmacist or your business in providing screening services? *(tick as applicable)*

1 = Not a barrier    2 = A slight barrier    3 = Neutral    4 = Quite a barrier    5 = Major barrier

Barriers	1	2	3	4	5
Lack of time	<input type="checkbox"/>				
Lack of space	<input type="checkbox"/>				
Lack of confidence / training / skills to offer services	<input type="checkbox"/>				
Limited access to patient medical history or laboratory data	<input type="checkbox"/>				
Lack of compensation / remuneration / financial resources	<input type="checkbox"/>				
Lack of customer demand	<input type="checkbox"/>				
No perceived beneficial health outcomes to the customer	<input type="checkbox"/>				
Lack of support from other health professionals	<input type="checkbox"/>				
Inappropriate management systems	<input type="checkbox"/>				
Lack of evidence on their value / Lack of documentation	<input type="checkbox"/>				
Inadequate computer programmes/Limited drug information resources	<input type="checkbox"/>				
Increased need for establishing quality assurance policies/procedures	<input type="checkbox"/>				
Fear of litigation	<input type="checkbox"/>				
Lack of motivation to set up such a service / Fear of change	<input type="checkbox"/>				
Other – <i>Specify:</i>	<input type="checkbox"/>				
.....					

**Part 3: Pharmacy Information**

24 Which of the following best describes the pharmacy you are currently working in?

Geographical Area *(tick one)*

Rural	<input type="checkbox"/>
Suburban	<input type="checkbox"/>
City centre (CBD)	<input type="checkbox"/>

Location *(tick one)*

Shopping strip	<input type="checkbox"/>
Mall	<input type="checkbox"/>
Supermarket	<input type="checkbox"/>
Medical centre	<input type="checkbox"/>
Other – <i>Specify:</i>	<input type="checkbox"/>
.....	

Type *(tick one)*

Franchise	<input type="checkbox"/>
Independent	<input type="checkbox"/>
Other – <i>Specify:</i>	<input type="checkbox"/>
.....	

- 25 How many **prescriptions** does your pharmacy dispense **per day** on average? *(tick one)*
- |           |                          |
|-----------|--------------------------|
| < 100     | <input type="checkbox"/> |
| 100-300   | <input type="checkbox"/> |
| 301 - 400 | <input type="checkbox"/> |
| > 400     | <input type="checkbox"/> |
- 26 Do you have a Collaborative Practice Agreement with any other health professionals? *(tick one)*
- |  |                          |
|--|--------------------------|
| No   | <input type="checkbox"/> |
| Yes  | <input type="checkbox"/> |
| <i>If YES, specify if verbal or written.....</i> |                          |
- 27 Does your pharmacy employ any of the following health care practitioners? *(tick all that apply)*
- |                         |                          |
|-------------------------|--------------------------|
| Nurse                   | <input type="checkbox"/> |
| Podiatrist              | <input type="checkbox"/> |
| Nutritionist            | <input type="checkbox"/> |
| None                    | <input type="checkbox"/> |
| Other – <i>Specify:</i> | <input type="checkbox"/> |
| .....                   |                          |
- 28 Please record in the appropriate box the **number of staff** working in this pharmacy as “full time” or “part time” employees.

Pharmacy staff	Full time	Part time
Proprietor	<input type="checkbox"/>	<input type="checkbox"/>
Pharmacist Manager	<input type="checkbox"/>	<input type="checkbox"/>
Non-pharmacist Administrator/Manager	<input type="checkbox"/>	<input type="checkbox"/>
Pharmacist	<input type="checkbox"/>	<input type="checkbox"/>
Pharmacy Technician	<input type="checkbox"/>	<input type="checkbox"/>
Pharmacy Assistant	<input type="checkbox"/>	<input type="checkbox"/>
Pharmacy Intern	<input type="checkbox"/>	<input type="checkbox"/>
Other Non-pharmacy Staff	<input type="checkbox"/>	<input type="checkbox"/>

**Part 4: Information on the pharmacist responding to the survey**

- 29 **Gender** *(tick one)* Male  Female
- 30 **Age** *(tick one)*
- |       |                          |
|-------|--------------------------|
| 21-30 | <input type="checkbox"/> |
| 31-40 | <input type="checkbox"/> |
| 41-50 | <input type="checkbox"/> |
| 51-60 | <input type="checkbox"/> |
| 60+   | <input type="checkbox"/> |
- 31 **Ethnicity** *(tick one)*
- |                         |                          |
|-------------------------|--------------------------|
| New Zealand European    | <input type="checkbox"/> |
| Maori                   | <input type="checkbox"/> |
| Pacifican               | <input type="checkbox"/> |
| Asian                   | <input type="checkbox"/> |
| Other – <i>Specify:</i> | <input type="checkbox"/> |
| .....                   |                          |
- 32 Which of the following best describes your **position** in this pharmacy? *(tick as many that apply)*
- |                       |                          |
|-----------------------|--------------------------|
| Sole proprietor       | <input type="checkbox"/> |
| Partner proprietor    | <input type="checkbox"/> |
| Salaried manager      | <input type="checkbox"/> |
| Charge pharmacist     | <input type="checkbox"/> |
| Locum pharmacist      | <input type="checkbox"/> |
| Consultant pharmacist | <input type="checkbox"/> |
| Employee pharmacist   | <input type="checkbox"/> |
- 33 In which year did you obtain New Zealand **registration** as a pharmacist? *(enter year)*
- 
- 34 What is the **first pharmacy** qualification you obtained? *(tick one)*
- |                         |                          |
|-------------------------|--------------------------|
| Diploma                 | <input type="checkbox"/> |
| BPharm                  | <input type="checkbox"/> |
| Other – <i>Specify:</i> | <input type="checkbox"/> |
| .....                   |                          |

35 In what **country** did you obtain your first pharmacy qualification? (*tick one*)

New Zealand	<input type="checkbox"/>
Australia	<input type="checkbox"/>
United Kingdom	<input type="checkbox"/>
South Africa	<input type="checkbox"/>
Other – <i>Specify:</i>	<input type="checkbox"/>
.....	

36 What was the **graduating university / institution** in which you obtained your first pharmacy qualification? (*tick one*)

Petone	<input type="checkbox"/>
CIT	<input type="checkbox"/>
University of Otago	<input type="checkbox"/>
University of Auckland	<input type="checkbox"/>
Other – <i>Specify:</i>	<input type="checkbox"/>
.....	

37 Do you have **post-graduate** qualifications?  
(*tick as many as apply*)

No	<input type="checkbox"/>
Yes ( <i>please specify below</i> ):	
Membership/Fellowship of NZ College of Pharmacists	<input type="checkbox"/>
MPharm	<input type="checkbox"/>
Dpharm / PharmD	<input type="checkbox"/>
PhD	<input type="checkbox"/>
PG Dip Pharm	<input type="checkbox"/>
Other – <i>Specify:</i>	<input type="checkbox"/>
.....	

38 How many years have you been **practising** as a community pharmacist?  
(*enter number of years*)

39 In what other **areas** of pharmacy practice have you worked?  
(*tick as many that apply*)

Hospital pharmacy	<input type="checkbox"/>
Pharmaceutical industry	<input type="checkbox"/>
Academia	<input type="checkbox"/>
IPA, PHO	<input type="checkbox"/>
Manager of Health Services	<input type="checkbox"/>
Pharmacy Health Service Advisor (MOH, DHB, PSNZ, Pharmacy Guild)	<input type="checkbox"/>
None	<input type="checkbox"/>
Other – <i>Specify:</i>	<input type="checkbox"/>
.....	

40 How many hours on average do you spend on Continuing Pharmacy Education ? (*enter hours per month*)

### 3.8 Acknowledgements for Chapter 3

The research presented in this Chapter is the result of the valuable contributions of the following individuals and funding agencies:

- *This survey research was funded by a grant from the New Zealand Pharmacy Education and Research Foundation.*
- *Lynne Bye, Senior Tutor at the School of Pharmacy, the University of Auckland, who was a co-investigator in this survey research.*
- *Anita Singh, former pharmacy student at the School of Pharmacy, the University of Auckland for her work designing and piloting the questionnaire during the 2006 summer studentship program.*
- *Jeff Harrison, Senior Lecturer at the School of Pharmacy, the University of Auckland, for his assistance in synthesising the survey data in preparation for data analysis.*
- *Joanna Stewart, biostatistician at the Department of Epidemiology and Biostatistics at the School of Population Health, the University of Auckland.*
- *David Odynak, research analyst at the Population Research Laboratory, Department of Sociology, the University of Alberta.*

## CHAPTER 4:

### PHARMACIST INVOLVEMENT IN CARDIOVASCULAR RISK ASSESSMENT AND RISK FACTOR MANAGEMENT

#### 4.1 Introduction

The prevalence of cardiovascular disease (CVD) in New Zealand (NZ) was thoroughly reviewed in Chapter 1 of the thesis, where it was also highlighted to be the leading cause of death in NZ, accounting for 38% of deaths annually.<sup>1</sup> Widely recognised epidemiological research, started over 50 years ago with the Framingham Study - a long term cohort study undertaken in the 1960s to 1980s in approximately 5,000 mainly European-Americans - has identified modifiable predisposing risk factors for both coronary heart disease and stroke.<sup>2,3</sup> Therefore, the early identification of these modifiable risk factors that can predispose an individual to develop CVD should be an essential component of any CVD management program. Randomised studies have demonstrated the efficacy of lowering blood pressure and cholesterol levels or smoking cessation to reduce CVD morbidity and mortality.<sup>4</sup> However, results from international studies show that control of these modifiable CVD risk factors remains far from optimal in the population.<sup>5</sup> Interventions to improve the management of CVD risk factors are therefore needed.

The *New Zealand Health Strategy*<sup>6</sup> and the *New Zealand Primary Health Care Strategy*<sup>7</sup> advocate for a multidisciplinary approach to target the modifiable CVD risk factors, and a greater use of community-based models of care that are focused on activities that prevent the development of CVD. Among these models is the greater integration of the pharmacist as a provider of health services and members of the health care team. These strategies were extensively reviewed in Chapter 2 of this thesis.

Basing practice on evidence has been claimed to be a feature of modern health care – but this claim is by no means the norm in everyday practice, particularly in community pharmacy. Many pharmacists continue to base their practice on what they

learned in pharmacy schools (which remains to be mostly product-focused); or trial-and-error in practice; or on reading single study reports in a small number of settings. None of these practices however are appropriate in an age of rapidly changing knowledge. Systematic reviews and meta-analyses of randomised controlled trial (RCT) evidence are now emerging in pharmacy practice and are contributing to the evidence of clear clinical benefits derived from pharmacist interventions for the individual modifiable CVD risk factors including hypertension, smoking cessation, and hyperlipidaemia.<sup>8</sup>

This chapter will summarise the evidence generated in research studies regarding the contribution of community pharmacists in CVD prevention and management programs. This chapter will also present the research undertaken as part of this PhD study to support this evidence - a systematic review of the published literature on the effects of pharmacists care in dyslipidaemia management derived from RCTs.

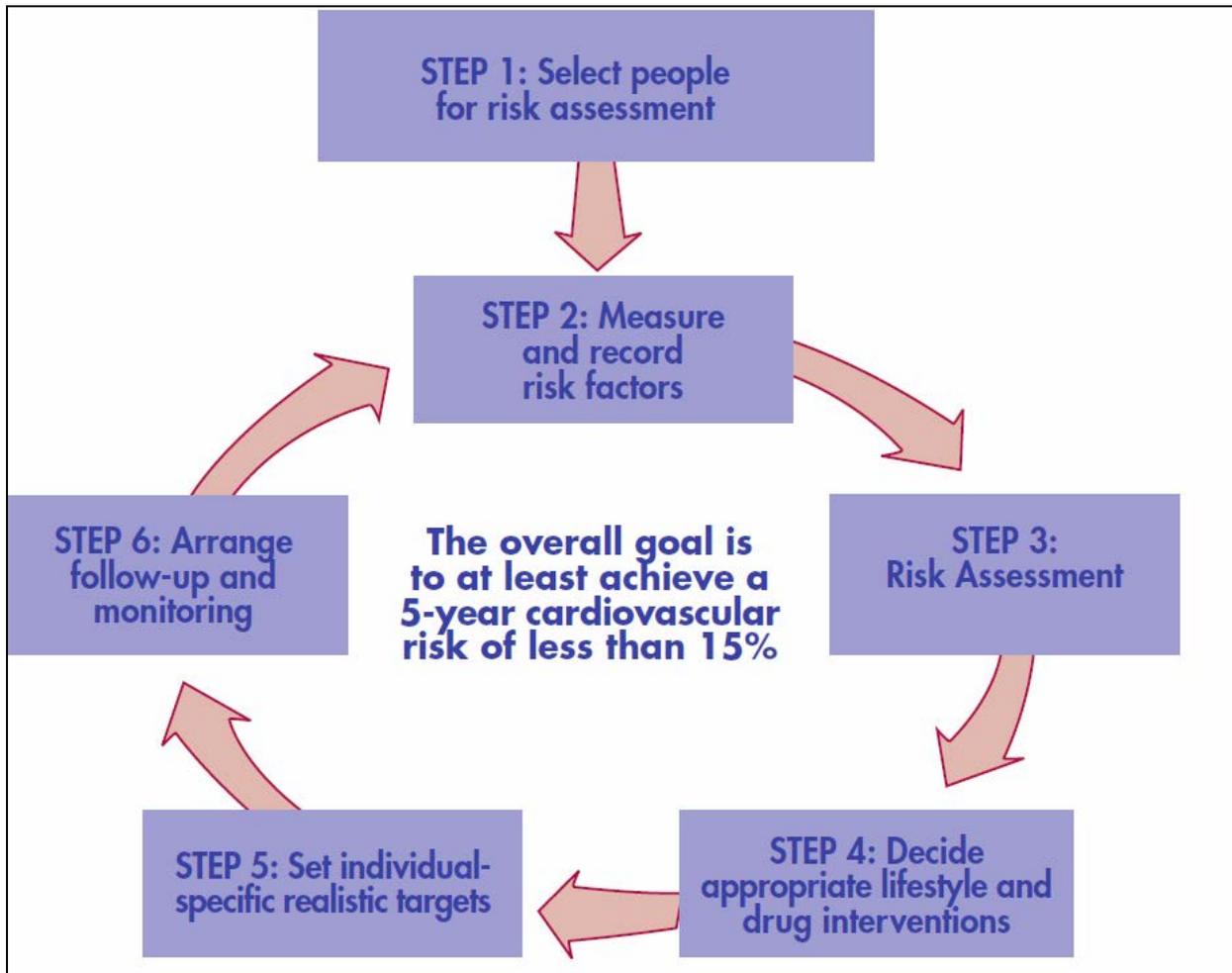
## **4.2 Step-wise approach to the assessment and management of CVD**

CVD management has changed over the years. The approach in the past was to assess and manage each cardiovascular (CV) condition - or modifiable risk factor - in isolation from each other and to treat each separately. The World Health Organisation recommended that a shift in focus, from treating risk factors in isolation, to a comprehensive CV risk management process, is necessary.<sup>9</sup> The *New Zealand Guideline for the Assessment and Management of Cardiovascular Risk*<sup>10</sup>, developed under the auspices of the NZ Guidelines Group (NZGG) in partnership with the National Heart Foundation, the Stroke Foundation of NZ and the Ministry of Health, pioneered this fundamental principle - that is, risk assessment and management based on considering all relevant risk factors and expressing risk in absolute terms.

The guideline was also intended to address the gap between evidence and practice that is known to exist in NZ, especially in the Maori population but also in Pacific peoples and those with ethnic origin in the Indian Subcontinent.<sup>1,11</sup> This multi-factorial approach involves all aspects of lifestyle modification such as increased exercise, cardio-protective diet, weight loss and smoking cessation. These lifestyle changes then

complement the prescribed pharmacotherapy. The guideline recommends a step-wise approach to the management of the CVD individual, as illustrated in *Figure 4.1*.

**Figure 4.1:** A step-wise approach to the assessment and management of CVD<sup>10</sup>



International evidence on the role of community pharmacists appears to be particularly strong in activities surrounding the identification of individuals at risk of CVD. Thus, evidence supports the pharmacist role in Steps 1-3 of the process described above; that is, selecting individuals for risk assessment, identifying and recording their CVD risk factors, and utilizing this information in estimating their level of CVD risk. There is also emerging evidence on CVD risk management activities by community pharmacists supporting their role in Steps 4-6 of the process described above; that is,

designing a pharmaceutical care plan which includes lifestyle and pharmacotherapy interventions, setting personalised treatment targets for CVD risk factors and overall absolute risk, and following up patient outcomes in regards to both, pharmacotherapy and non-pharmacological management strategies.

#### **4.2.1 Identification of individuals at risk of CVD (Steps 1 and 2)**

CVD often occurs without the individual being aware of their risk, since often they may not experience any ill effects from the presence of several CVD risk factors. However, community pharmacists can easily identify several modifiable CVD risk factors such as obesity, unhealthy diet, physical inactivity and cigarette smoking during formal or informal encounters with their customers who visit the pharmacy. Several ways in which pharmacists are able to identify the individuals at risk for developing CVD have been reported in the literature, including:

- Recruiting individuals when they arrive at the pharmacy for filling a prescribed or non-prescribed medication.<sup>12,13</sup> Some studies also indicated that individuals were recruited through self-referral in response to the screening services advertised by community pharmacies, or in the local press.<sup>14-16</sup>
- Identifying individuals on prescription medication used to treat CV risk factors and conditions, as well as those on diabetic medications.<sup>17,18</sup>
- Referral of individuals to the pharmacist by their general practitioners (GPs), other health care professionals (HCPs), or their employers.<sup>19-21</sup>
- Identifying individuals with CV medical history such as previous myocardial infarction events or coronary artery bypass grafts.<sup>19</sup>

Another important contribution of community pharmacists in these first steps to CVD risk assessment is their increased accessibility to at risk individuals who otherwise would not be assessed and/or referred to their GPs for further assessment and management. Results from several studies have suggested that community pharmacists can, not only identify significant numbers of people at risk of CVD, but also

that screening programs in community pharmacies are a useful way of targeting some hard to reach groups such as males, ethnic minorities and socially deprived communities.<sup>12,15,18,22</sup>

Due to technological advances and the development of various point-of-care (PoC) testing services that provide adequate, rapid and reliable results in a short time, individuals at risk of CVD can be identified and screened appropriately in community pharmacy settings.<sup>23-25</sup> Community pharmacists have utilized PoC testing as a key component of disease state management programmes, particularly for screening CVD risk factors, and these have been frequently reported in the literature.<sup>14-16,18,20,26-28</sup> As presented in Chapter 3 of this thesis, the results of our national survey showed that the most frequently offered screening-type services provided in NZ community pharmacies were related to CVD risk factors, such as measurement of body mass index, blood pressure, and blood glucose. However, screening for other CVD risk factors such as dyslipidaemia or absolute CVD risk assessment were infrequently reported.

Case finding has been suggested as a more appropriate approach for pharmacists for the identification of individuals at greatest need for intervention.<sup>29</sup> Case finding uses demographics, risk factors and/or symptoms at an individual level to decide whether to apply a test or proceed with further testing.<sup>30</sup> Case finding is a proactive approach which requires actively seeking patients who can benefit from an intervention. As a consequence, case finding usually yields higher recruitment of patients at greatest need for an intervention. As pharmacists cannot assume that patients will self-refer or that doctors will identify and refer patients, case finding may be a better strategy for pharmacists for the identification of individuals at highest risk of CVD.<sup>29</sup>

#### **4.2.2 Assessment of cardiovascular risk (Step 3)**

The next step in the CVD management process is the assessment of the individual's absolute CV risk. This assessment takes place after the identification of the individual's risk factors and after conducting PoC services to determine the extent of the risk. The purpose of performing these assessments is to determine the likelihood of the individual experiencing a CV event over a given time period. Increasingly, multifactor

risk prediction scores are being used to inform treatment decisions and the intensity of management instead of using individual risk factor thresholds.

Recommendations do exist that provide an indication of when it is advisable to perform risk assessment on individuals. In terms of age and gender, most current international guidelines suggest that CV risk assessments be performed in males over the age of 40 years and females over the age of 50 years, even though the individual presents with no symptoms.<sup>10,31-36</sup> The NZ guidelines further recommend that if the individual is at higher risk of developing CVD - due to the presence of a family history of CVD, cigarette smoking and sedentary lifestyle - the screening should instead be performed at 35 years in males and 45 years in females. If an individual is newly diagnosed with diabetes, the CV risk screening should be performed at the time of diagnosis.<sup>10</sup>

To implement these guidelines in clinical practice, clinicians need an accurate and feasible means of calculating global CVD risk. For this, the majority of guidelines recommend the use of a CVD risk prediction tool.<sup>10,31-39</sup> The Framingham risk score (FRS) (derived from the Framingham Heart Study), such as the NZ risk tables, the Sheffield Risk Table, the Heart (Cardiovascular) Age calculator and others, are the most commonly recommended for estimating CV risk.<sup>39-41</sup> Other risk assessment tools that are used include the Scottish Intercollegiate Guidelines Network to assign preventative treatment (ASSIGN)<sup>42</sup>, the systematic coronary risk evaluation (SCORE)<sup>43</sup> the ETHRISK<sup>44</sup>, and others.<sup>45</sup> The tools often reported to be used in community pharmacy CVD risk assessment studies are summarised in [\*Table 4.1\*](#).<sup>40</sup>

**Table 4.1: Prediction tools for assessing cardiovascular risk<sup>40,46,47</sup>**

Tool	Features	Input Data	Output Data	Predictive Value*
<b>Framingham Risk Tables (FRT)</b>	Charts	Diastolic BP, HDL, LDL, Diabetes status	10-year absolute risk in 18 categories	Sv=67-95%** Sp=83-98%**
<b>New Zealand Guidelines Group</b>	Coloured charts Lists number of CVD events prevented with treatment and the NNT for each risk level	Diastolic BP, HDL, diabetes status	5-year absolute CVD risk in 8 categories.	Sv=56-94%** Sp=58-100%**
<b>Canadian Risk Nomogram</b>	Charts	HDL, diabetes status, LVH	10-year absolute risk in 3 categories.	Sv=95-98%*** Sp=92-95%***
<b>National Cholesterol Education Program Risk Calculator</b>	Web-based Handheld computers Spreadsheet	Diastolic BP, HDL and diabetes status	10-year absolute CVD risk in 3 categories	As per FRT
<b>Joint European Societies Coronary Risk Chart</b>	Charts	HDL, diabetes status	10-year absolute CVD risk in 4 categories	Sv=75-95%** Sp=71-100%**
<b>Modified Sheffield Tables</b>	Charts	Diastolic BP, HDL, diabetes status	10-year absolute CVD risk in 3 categories	Sv=92-98%*** Sp=89-95%***
<b>American Heart Association's Calculator</b>	Web-based	HDL, diabetes status, use of BP medications	10-year absolute CVD risk in 4 categories	As per FRT

**Legend:** BP=Blood pressure, HDL=high density lipoprotein cholesterol, LDL=low-density lipoprotein cholesterol, Sv=sensitivity, Sp=specificity, CVD=cardiovascular disease, NNT=number needed to treat, LVH=left ventricular hypertrophy.

\* The reference standard is the full Framingham equation; sensitivity and specificity estimates do not account for indeterminate values of either the risk tool or the reference standard.<sup>40</sup>

\*\*At Framingham risk of  $\geq 20\%$ .<sup>46</sup>

\*\*\*At Framingham risk of  $\geq 15\%$ .<sup>46</sup>

From the mid 1990s, NZ national guidelines developed by the NZGG have recommended conducting a formal CVD risk assessment using a Framingham 5-year CVD score. Patient information necessary to calculate the CVD risk using this tool includes age, gender, total cholesterol value, high-density lipoprotein (HDL) cholesterol level, smoking history and the systolic blood pressure value. The risk value is expressed as a percentage risk over the next five years and the higher the value, the greater the risk of CVD. The intensity of management of single risk factors is then determined by the calculated risk score – the higher the score, the more immediate and more intensive the recommended management.

The majority of studies assessing pharmacist role in CVD risk assessment and management report the utilisation of a FRS-based risk prediction tool.<sup>18,20,22,28</sup> It has been reported that utilisation of the tool not only allows pharmacists to target interventions to those who need them the most, but also allows pharmacists to counsel patients on their overall CVD risk. The use of the prediction tool has been reported to be an effective method for pharmacists to inform individuals of the extent of their risk and to improve compliance with CV medications.<sup>8,40, 48,49</sup>

The Cardiovascular Age calculator uses standard risk factors for heart disease or stroke to estimate an individual's "heart age", which could be higher than their chronological age if personal CVD risk factors are high. The use of the tool has been recently recommended in the 2012 Canadian Cardiovascular Society Dyslipidaemia Guidelines Update to be used when discussing with patients their CV risk.<sup>41</sup> In relatively recently published studies, the use of the tool when counseling patients about their estimated CV "age" showed better patient adherence to CV risk factor treatments and improved doctor's adherence to national guidelines.<sup>50-52</sup>

Grover *et. al.*<sup>50</sup> presented findings from a practice-based clinical trial that tested whether providing high-risk CV patients with a CV risk profile conceptualised as their "CV age" along with their lipid profile results, improved optimal cholesterol management consistent with the national dyslipidaemia guidelines. Although the intention-to-treat analysis showed a small benefit after 1 year (a decrease of 0.09 mmol/L for LDL-C between treatment arms) was statistically significant ( $p = .02$ ), when the CV age was

significantly discrepant from the patients' chronological age, the percentage of patients reaching guideline-recommended cholesterol goals increased by close to 50%. These results suggest that an informed, activated patient using an "age-equivalent risk communication strategy" as part of a patient-centred approach to cholesterol management seems to be quite effective. Other investigators using a similar approach have also demonstrated promising results.<sup>51,52</sup>

The Cardiovascular Age tool could be a powerful way for pharmacists to help motivate their patients, at all levels of risk, to make the behavioural changes necessary to keep their hearts healthier for longer. A recently published study in Canada demonstrated the feasibility and utility of this tool in community pharmacy settings.<sup>53</sup> More studies using this tool by pharmacists and investigating the effects on patients reaching guideline-recommended treatment goals for their CV risk factors are needed and could have real clinical relevance.

It is important for pharmacists to ensure effective communication channels exist - with both the patient and the GP - as once the CV risk is determined, patients may need to be referred to receive care on multiple levels.<sup>49</sup> This may be particularly important for people at high CVD risk. Several ways to refer these individuals to their GPs have been reported. Pharmacists who participated in the SCRIP study, referred patients to their GP through written referral forms that were faxed to the practitioner and included the results obtained from the PoC screening service, as well as any recommendations or suggestions regarding possible treatment.<sup>18</sup> Other studies have also reported on pharmacist contacting GPs via telephone to discuss the individual's assessment and other related results obtained.<sup>16,54</sup> Some studies reported that these pharmacists' referrals lead to changes in the medication prescribed.<sup>16,18,20</sup>

It is notable that these screening and referral activities initiated by pharmacists were not designed to supplant the important role of GPs in individual CV care. Pharmacists appear to have acted within their competencies, and case detection generally resulted in a large proportion of screened individuals being referred for in-depth medical examination or treatment. As presented in Chapter 3, the results of our national survey showed that amongst those pharmacists who provided screening services, the most

frequent method of follow-up on abnormal test results was referring customers to other health care professionals. The desire to work with GPs, rather than to compete, is underlined by an increasing number of studies highlighting the benefits of collaborative care processes. The clinical benefits of team-based collaborative care compared with pharmacist- or GP-only care are becoming increasingly apparent in the CVD risk assessment process.<sup>55</sup>

#### **4.2.3 Establishment of a management plan (Steps 4-6)**

After conducting a CV risk assessment and estimating the level of CVD risk for an individual, a management plan needs to be elaborated and implemented. The management plan targets the presence of modifiable risk factors - such as cigarette smoking, obesity, unhealthy diet and physical inactivity - through various non-pharmacological interventions; as well other modifiable risk factors - such as blood pressure, blood cholesterol and blood glucose - which often require not only lifestyle modifications, but of pharmacotherapy.<sup>10</sup>

Pharmacists, as medication specialists, have been reported to be involved in the establishment of a management plan for patients once their level of CV risk was estimated. Several studies such as SCRIP<sup>18</sup>, Project ImPACT<sup>20</sup>, PAART CVD<sup>22</sup>, CCARP<sup>49</sup>, and others, have extensively reported on how pharmacists have a positive role in the management of CVD risk. While these trials demonstrate the benefits of pharmacists' interventions for several individual risk factors, it must be acknowledged that management of these patients often requires concurrent consideration of multiple risk factors and interventions. Thus, more recent studies have examined the clinical effectiveness of pharmacists delivering multi-faceted interventions and addressing multiple CV risk factors and their impact in terms of absolute CVD risk factor reduction.

As such, Lee *et.al.* evaluated the impact of clinical pharmacist interventions - which involved individualised medication education, medication dispensing using medication aids, and regular follow-up - in reducing modifiable CV risk factors compared with usual care.<sup>56</sup> Pharmacist interventions significantly improved systolic blood pressure, medicine adherence and medicine persistence for an elderly population taking multiple

medications. In another relatively recent Australian study conducted by Mc Namara *et al.*, which evaluated multiple risk factor interventions by community pharmacists to prevent CVD, reported a 25% proportional risk reduction for CVD onset over the following five years.<sup>28</sup> Significant reductions also occurred in mean blood pressure and waist circumference, with trends toward improvement for most other observed risk factors.

After a treatment plan has been designed and instituted, individualised treatment goals should be determined. Treatment goals are clearly delineated in the national guidelines and are set based on the patient's CVD risk score. A monitoring or follow up plan must also be established as part of the CVD risk management strategy, as it will enable the assessment of the efficacy of the interventions and the consequent patient outcomes. Guidelines also provide recommendations for follow up risk management interventions. It is also well established that pharmacists are often involved in this final step of the process, as evidenced in several studies of pharmacist-led CVD risk management. During the follow-up of these patients, pharmacists have been reported to assess and confirm medication compliance,<sup>54</sup> perform PoC re-assessments,<sup>18,20</sup> reinforce patient education and counselling,<sup>49</sup> and modifying the CVD risk management plan as necessary to address the patient's needs. The results of these studies suggest that pharmacist's involvement in follow-up and continuous disease management could have a beneficial impact on patient outcomes.

Despite the large numbers of studies often demonstrating clinically significant benefits of pharmacist care in CVD risk factor management, these positive results have not been able to generate sustainable change in community pharmacy practice. Although this poor uptake is likely to be multifactorial, it has been suggested that it may be influenced by the fact that the vast majority of these trials have largely been observational and thus their results are unable to generate high levels of evidence. Although these single trials can influence practice, it is the totality of the evidence - best expressed as a formal systematic review - that will bring this evidence to the highest level.<sup>57</sup>

A recently published systematic review by Santschi *et al.*<sup>8</sup> examined the impact of pharmacist care interventions (exclusively conducted by a pharmacist or implemented in collaboration with doctors or nurses) on CVD risk factor management among outpatients. Results showed that of the 30 studies reviewed (which included a total of 11,765 patients), 19 showed beneficial and statistically significant differences in participants' systolic and diastolic blood pressure readings between pharmacist intervention groups and control groups receiving usual care. Two studies demonstrated the impact of pharmacist care on smoking cessation, showing a statistically significant reduction in smoking for patients that accessed the services of pharmacists compared to those who received usual care. Lastly, six of nine studies reporting total cholesterol levels, and four of seven reporting LDL cholesterol levels, showed a statistically significant benefit of receiving care from pharmacists.

This chapter contributes to the overall objectives of this thesis research by presenting the results derived from a systematic review of the published evidence which was gathered from RCTs on the effect of pharmacist care, including screening and treatment, on the management of patients with dyslipidaemia.

### **4.3 Pharmacists and dyslipidaemia management: A systematic review**

#### **4.3.1 Methods**

##### **4.3.1.1 Literature search**

The following 19 databases and four trial registries were systematically reviewed: MEDLINE (1950–February 2010); MEDLINE In-Process and Other Non-Indexed Citations (through February 2010); Ovid Evidence-Based Medicine Reviews, which includes Cochrane Central Register of Controlled Trials, Cochrane Database of Systematic Reviews, and Database of Abstracts of Reviews of Effects (through 2nd quarter 2008); EMBASE (1988–February 2010); HealthSTAR (1975–February 2010); International Pharmaceutical Abstracts (1907–February 2010); Pascal (1984–February 2010); Academic Search Complete (1987–February 2010); Cumulative Index to Nursing and Allied Health Literature Plus with Full Text (1937–February 2010); HealthSource:

Nursing/Academic Edition (1952–February 2010); BIOSIS (1926–February 2010); Science Citation Index Expanded (1900–February 2010); Social Sciences Citation Index (1956–February 2010); PubMed (1950–February 2010); Proquest Dissertations & Theses (1861–February 2010); Online Computer Library Center ProceedingsFirst (1993–February 2010); Online Computer Library Center PapersFirst (1993–February 2010); Conference Papers Index (1982–February 2010); Health Sciences: A SAGE Full-Text Collection (1982–February 2010); the Australian New Zealand Clinical Trials Registry, ClinicalTrials.gov, the metaRegister of Current Controlled Trials, and the Community Pharmacy Research Database. All databases were searched from their inception to February 21, 2010, with no language restriction. An update was performed in PubMed in September 2011.

Web sites of relevant professional associations, scientific meetings, and research groups were also reviewed ([Appendix 4.1](#)) and a manual search of select journals ([Appendix 4.2](#)) was performed. For the search strategies, a combination of subject headings and key words were developed for each electronic resource based on the Ovid MEDLINE search strategy ([Appendix 4.3](#)).

#### **4.3.1.2 Article screening and selection**

The titles and abstracts of the articles retrieved from the literature search were independently screened by two different reviewers, after which the full text of all articles that appeared to fit the inclusion criteria was retrieved for full independent review by the same investigators. Inclusion criteria were set *a priori* as follows: prospective, randomized controlled trials that included a pharmacist intervention compared with usual care (control group), with the patient as the unit of randomization; outcomes that included total cholesterol, low-density lipoprotein cholesterol (LDL), high-density lipoprotein cholesterol (LDL), or triglyceride (TG) level measurement, and/or the percentage of patients who achieved a target lipid level, started a lipid-lowering therapy or increased its dosage, or adhered to therapy; and pharmacist intervention that included provision of enhanced pharmacist care, such as (but not limited to) assessment of therapy, education, and/or adherence. The third criteria could be

accomplished independently (pharmacist directed) or as part of a health care team (collaborative care).

Three exclusion criteria were applied to the articles: studies that reported only process measures (e.g., number of drug-related problems identified, recommendations made, or recommendations accepted); studies that had only one visit (or some form of contact) between the patient and pharmacist; and studies in which the pharmacist's intervention could not be defined. No restrictions on sample size, practice site, study duration, or publication status were made. All inclusion and exclusion criteria were applied in the full review of selected articles. Any articles that were unclear as to their eligibility for inclusion in the review were discussed between the two independent reviewers to reach consensus. If consensus could not be reached, third-party adjudication was used.

#### **4.3.1.3 Data extraction**

After all articles were screened, the same two reviewers independently extracted data from the selected articles using a standardised collection form. The primary outcome measure was the difference in the LDL level between the groups (pharmacist intervention vs. standard care) at the end of follow-up. Secondary outcome measures included the difference between the groups at the end of follow-up in total cholesterol, high-density lipoprotein cholesterol, and triglyceride levels; and the proportion of patients who achieved target lipid parameters, underwent lipid panel measurements, adhered to therapy, and/or were instructed to change their lipid-lowering therapy. Target lipid parameters were determined using the guidelines available at the time of the specific study.

For included articles, all primary study authors were asked to complete a questionnaire to clarify the outcomes, any incomplete results, and any methodologic issues, and to provide a more complete description of the pharmacist's role in the intervention. If the study authors did not respond, any unclear data were treated as missing data.

#### **4.3.1.4 Risk of bias assessment**

Risk of bias was assessed using the Cochrane Collaboration's Risk of Bias tool,<sup>56</sup> and studies were judged as low risk of bias, high risk of bias, or unclear. Blinding was not considered, as the nature of these studies prevented any of them from being blinded. The same two independent reviewers assessed risk of bias, and disagreements were resolved by discussion.

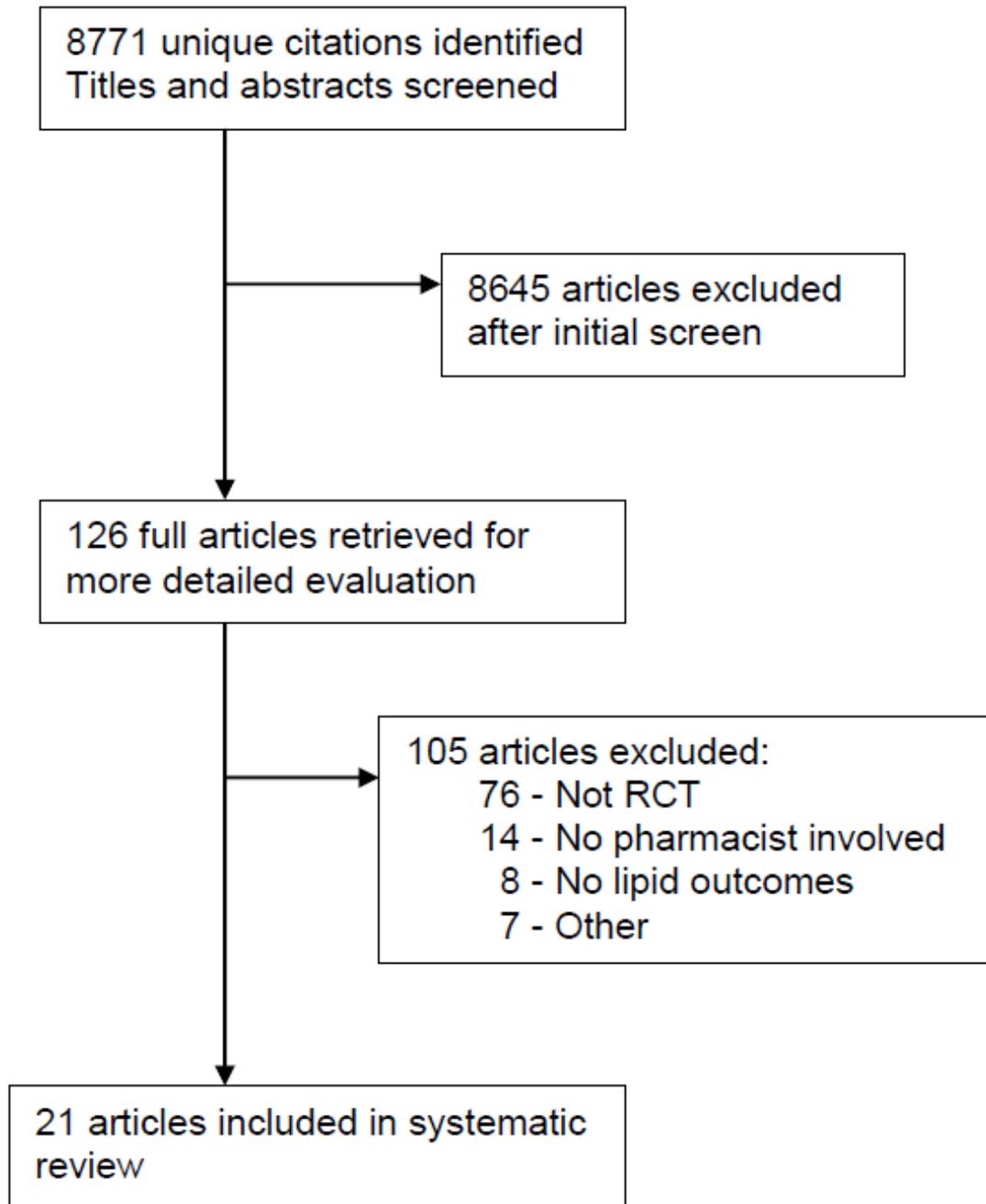
#### **4.3.1.5 Data analysis**

Data analysis was conducted using Cochrane Review Manager 5 software, version 5.0.24 (RevMan 5, The Nordic Cochrane Centre, Copenhagen, Denmark). Data were analyzed with a random-effects model using odds ratios (ORs) for dichotomous data and weighted mean differences for continuous data. Lipid levels at the end of follow-up were used rather than the change from baseline, as there was minimal reporting of the standard deviation of the change, making meta-analyses of change from baseline impossible. Heterogeneity was analysed using the  $I^2$  statistic. Sensitivity analyses were performed based on the risk of bias.

### **4.3.2 Results**

A total of 8771 articles were identified from the literature search; 126 were reviewed in full and 21 were included in the systematic review (*Figure 4.2*). Nine primary authors responded to our data request. Specific details regarding each study are included in *Table 4.2*.<sup>14,18, 56, 59-76</sup> Pharmacists provided care in a variety of outpatient settings, the majority being clinics. In terms of the practice model, 11 of the studies used a collaborative care model; in the remaining 10 studies, the pharmacist practiced independently (pharmacist directed). The pharmacist-specific interventions most commonly cited included education (all the studies), drug therapy recommendations (16 studies), and adherence assessment (15 studies). Duration of the studies ranged from 16 weeks to two years, with a median of 12 months.

**Figure 4.2:** Flow diagram of the literature search process



**Table 4.2: Characteristics of included studies**

Citation	Participants	Setting	Pharmacist Care	Duration of Follow -Up	Intervention
Jaber et al <sup>59</sup> , 1996	African-American pts. with diabetes	Clinic	Independent	4 months	Education Drug therapy recommendations Medication changes by protocol
Ellis et al <sup>60</sup> , 2000	Pts. at high risk of adverse events	Clinic	Collaborative	12 months	Education Drug therapy recommendations Laboratory tests ordered/performed Adherence assessed
Faulkner et al <sup>61</sup> , 2000	Pts. with recent CABG/PTCA elevated LDL level	Home	Independent	2 years	Adherence assessed Education
Nola et al <sup>62</sup> , 2000	Pts. at risk of coronary artery disease	Community pharmacy	Collaborative	6 months	Education Drug therapy recommendations Laboratory tests ordered/performed Adherence assessed
Tsuyuki et al <sup>18</sup> , 2002	Pts. at high risk of CV events	Community pharmacy	Independent	4 months	Education Drug therapy recommendations Laboratory tests ordered/performed
Taylor et al <sup>63</sup> , 2003	Pts. at high risk of adverse events	Clinic	Collaborative	12 months	Education Drug therapy recommendations
Peterson et al <sup>64</sup> , 2004	Recent discharge from acute CV admission	Home	Independent	6 months	Adherence assessed Education Laboratory test ordered/performed Drug therapy recommendations
Clifford et al <sup>65</sup> , 2005	Pts. with type II diabetes	Clinic	Collaborative	12 months	Adherence assessed Education Drug therapy recommendations
Paulos et al <sup>14</sup> , 2005	Pts. receiving drug therapy for dyslipidaemia	Community pharmacy	Independent	4 months	Laboratory test ordered/performed Education
Choe et al <sup>66</sup> , 2005	Pts. with diabetes and HbA1c $\geq$ 8.0%	Clinic	Collaborative	2 years	Drug therapy recommendations Education
Fornos et al <sup>67</sup> , 2006	Pts. with diabetes mellitus	Community pharmacy	Independent	13 months	Education Adherence assessed Drug therapy recommendations

Lee et al <sup>56</sup> , 2006	Older pts. taking 4 or more chronic medications	Clinic	Independent	12 months	Education Laboratory test ordered/performed Adherence assessed
Scott et al <sup>68</sup> , 2006	Pts. with type II diabetes	Clinic	Collaborative	9 months	Drug therapy recommendations Education Adherence assessed
MedMAN Study <sup>69</sup> , 2007	Pts. with coronary heart disease	Community pharmacy	Independent	12 months	Drug therapy recommendations Education Laboratory test ordered/performed Adherence assessed
Chiu et al <sup>70</sup> , 2008	Pts. with ischemic stroke	Clinic	Collaborative	6 months	Education Adherence assessed
Al Mazroui et al <sup>71</sup> , 2009	Pts. with type II diabetes	Outpatient pharmacy	Collaborative	12 months	Drug therapy recommendations Education
Doucette et al <sup>72</sup> , 2009	Pts. with diabetes	Community pharmacy	Independent	12 months	Drug therapy recommendations Education Adherence assessed
Lee et al <sup>73</sup> , 2009	Pts. receiving drug therapy for dyslipidaemia	Clinic	Collaborative	12 months	Drug therapy recommendations Education, including diet and lifestyle Adherence
Villa et al <sup>74</sup> , 2009	Pts. with dyslipidaemia	Clinic	Collaborative	8 months	Drug therapy recommendations Education Laboratory test ordered/performed Adherence assessed
Eussen et al <sup>75</sup> , 2010	New statin users	Community pharmacy	Independent	12 months	Education Laboratory test ordered/performed Adherence assessed
Tahaine et al <sup>76</sup> , 2011	Pts. with dyslipidaemia	Clinic	Collaborative	6 months	Drug therapy recommendations Education Laboratory test ordered/performed Adherence assessed

**Legend:** CV=Cardiovascular, Pts=Patients, LDL=Low density lipoprotein, CABG/PTCA=Coronary artery bypass graft/Percutaneous coronary transluminal angioplasty

Table 4.3 summarises the difference between the enhanced pharmacist care groups and the standard care groups with respect to LDL, total cholesterol, HDL cholesterol, and TG levels at the end of follow-up. For the primary outcome, the

difference in LDL level between the groups at the end of follow-up, nine of the 21 studies (960 patients) had data available. The weighted mean difference in LDL level was 0.28 mmol/L lower in the enhanced pharmacist care groups compared with the standard care groups at the end of follow-up (95% confidence interval [CI] -16.9 to -4.6 mg/dl), with moderate heterogeneity (*I*<sup>2</sup>=73%) (*Table 4.3, Figure 4.3*). Total cholesterol level was significantly lower in the enhanced pharmacist care groups at the end of follow-up in the 10 studies that reported this outcome; however, these results were highly heterogeneous (*I*<sup>2</sup>=73%) (*Table 4.3, Figure 4.4*). Triglyceride levels were also significantly lower in the enhanced pharmacist care groups compared with the standard care groups (*Table 4.3*). High-density lipoprotein cholesterol level at the end of follow-up was not statistically significantly different between the groups (*Table 4.3*).

***Table 4.3: Difference in lipid parameter measurements between groups at the end of study follow-up***

Measurement	Number of Patients	WMD in mmol/L (95% CI)	Heterogeneity ( <i>I</i> <sup>2</sup> )
LDL <sup>56,60-62, 67, 69, 72-74</sup>	960	-0.28 (-0.44, -0.12)	49%
TC <sup>14,60-62,64,65,67,70,72,73</sup>	1196	-0.39 (-0.62, -0.16)	73%
HDL <sup>60-62,65,67,73,74</sup>	911	0.01 (-0.05, 0.06)	41%
TG <sup>14,60-62,65,67,70,73,74</sup>	1082	-0.26 (-0.42, -0.10)	29%

**Legend:** LDL = low density lipoprotein, TC = total cholesterol, HCL = high density lipoprotein, TG = triglycerides, WMD = weighted mean difference, CI = confidence interval

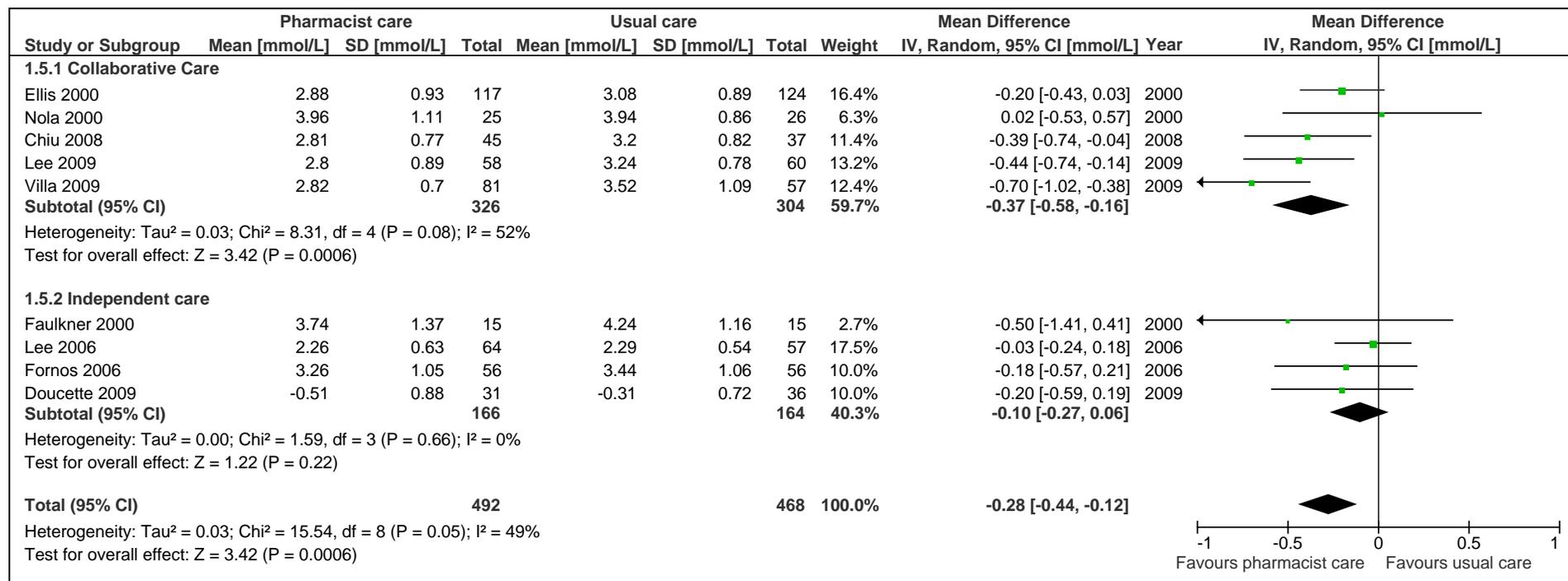
The primary outcome (difference in LDL level between groups) was also analysed in the subgroups of independent (pharmacist directed) and collaborative care (*Figure 4.3*). Collaborative care with a pharmacist had a greater effect relative to independent care (decrease of 0.37 mmol/L vs. a decrease of 0.10 mmol/L); however, the CIs of this comparison overlapped.

Patients who received enhanced pharmacist care (both collaborative and independent) were twice as likely than those receiving standard care to attain target lipid levels (eight studies, 2089 patients, OR 2.46, 95% CI 1.43–4.25). In addition, patients who received a pharmacist intervention were more likely to have a lipid panel

ordered or recommended by a pharmacist during the study (four studies, 1346 patients, OR 2.05, 95% CI 1.30–3.24).

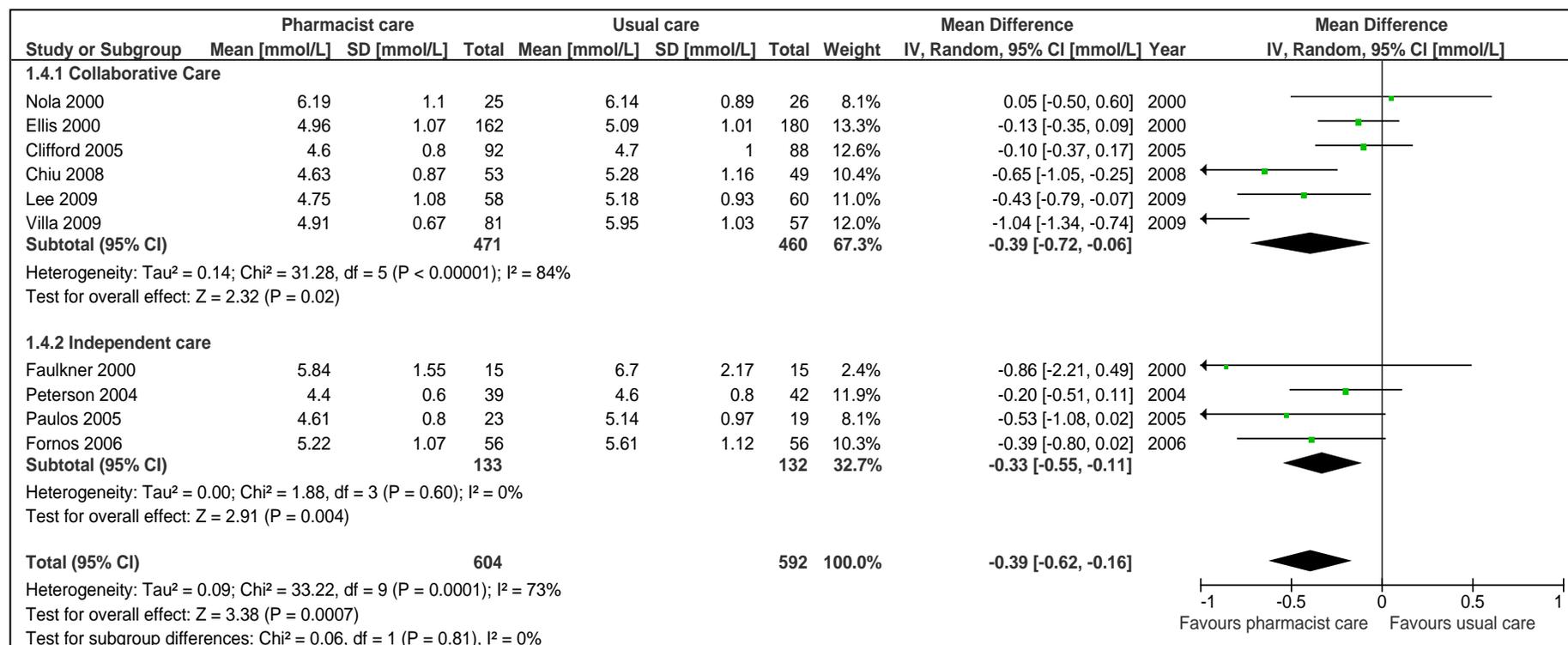
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**Figure 4.3: Forest plot of LDL cholesterol levels at the end of follow up**<sup>56,60-62,67,70,72-74</sup>



**Legend:** LDL = low density lipoprotein, CI = confidence interval, SD=Standard deviation. The values of one study are reported as the absolute change scores<sup>70</sup>

**Figure 4.4: Forest plot of total cholesterol levels at the end of follow up**<sup>14,56,60-62,64,65,67,69,73,76</sup>

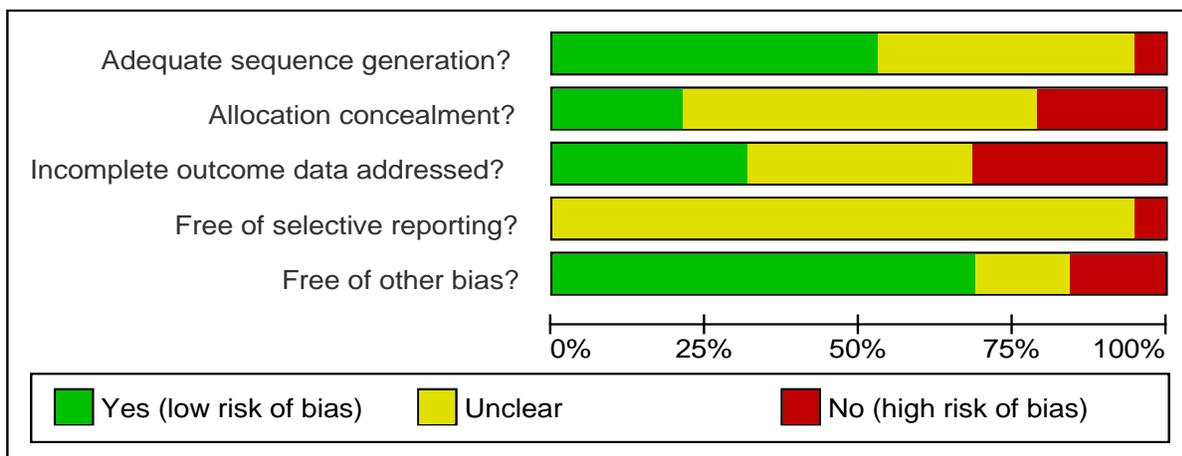


**Legend:** CI = confidence interval, SD=Standard deviation.

In the five studies that reported whether patients had a change in their lipid-lowering therapy (addition of lipid-lowering agents or increase in dose) during the study, patients in the pharmacist intervention groups were almost twice as likely as patients in the standard care groups to have a change (2436 patients, OR 1.82, 95% CI 1.09–3.06). Adherence was reported in an analyzable fashion in five studies (1202 patients). Heterogeneity with these studies was high ( $I^2 = 92\%$ ); therefore, meta-analysis of these data was not appropriate.

Risk of bias for all included studies was assessed across five domains based on judgments of each methodological quality item. Values are presented as percentage of studies that met the criteria outlined in *Figure 4.5*. The majority of studies had low risk of bias for random sequence generation (12 out of 21 studies) and other biases (14 out of 21 studies), which were primarily rated on how similar the groups were at baseline in terms of cholesterol levels. For allocation concealment, incomplete data, and selective outcome reporting, the majority of studies were rated as high risk of bias or unclear.

**Figure 4.5: Assessment of risk of bias (n=21)**



For sensitivity analysis based on risk of bias, only those studies that were judged to have adequate sequence generation were selected. There were 12 studies which had adequate sequence generation, however only five reported LDL levels. Although the difference between groups at end of follow-up for LDL level in these studies was

qualitatively similar, in the sensitivity analysis it was no longer statistically significant (WMD -0.18 mmol/L, 95% CI -0.38, 0.02).<sup>56,61,62,67,73</sup>

### 4.3.3 Discussion

This systematic review provides the highest level of evidence currently available for the role of pharmacists in the care of patients with dyslipidaemia. Pharmacist care improved lipid parameters, notably LDL levels, as well as increasing the proportion of patients who achieved targeted levels. These results demonstrate the benefit of pharmacist care across the spectrum of dyslipidaemia management, from screening patients to recommending treatment to assisting patients to attain clinical targets. As such, a greater involvement of pharmacists in the management of dyslipidaemia would have an important beneficial effect on public health.

One review of pharmacist-directed interventions for patients with dyslipidaemia found significant improvement in patients' total cholesterol levels only.<sup>77</sup> This review had some limitations in its methods and data analysis, and it included a heterogeneous group of studies.<sup>78</sup> The search performed for the systematic review presented in this chapter was broader and resulted in the inclusion of a total of 21 RCTs compared with eight in the review by *Machado et. al.* of which three were not consistent with the definition of a RCT according to the inclusion criteria. In addition, the study populations included in the present review were more homogeneous, making it more appropriate to pool and interpret their results statistically. Furthermore, the present systematic review included far greater numbers of patients. In addition, the methods used in this systematic review more closely resemble those recommended by the *Cochrane Handbook for Systematic Reviews of Interventions* in terms of search strategy, determination of included studies, data analysis, and risk of bias assessment.<sup>568</sup>

Although two other systematic reviews with similar objectives have been published, both looked primarily at adherence.<sup>79,80</sup> Neither of these reviews were specific to pharmacists; however, one did include a few pharmacist-directed interventions. The authors found that intensified patient care was the most useful intervention in improving adherence.<sup>74</sup> The latest systematic review by *Santschi et.al.* which assessed the impact

of pharmacist care in the management of CVD risk factors, also reported significant reductions on total and LDL cholesterol levels.<sup>8</sup> However, this review included a slightly lower number of studies and patients (9 studies including 1121 patients which reported cholesterol levels and 7 studies including 924 patients which reported LDL levels) compared to our review (10 studies including 1196 patients reporting cholesterol levels and 9 studies including 960 patients reporting LDL levels). Although adherence has been linked to improvements in patient outcomes in terms of management of dyslipidaemia, measures of LDL and other lipid parameters have more meaning for clinical decision-making.<sup>81</sup>

Some of the limitations of this systematic review include the fact that there was variability in the study designs included, specifically with respect to the pharmacist interventions. It was attempted to address this limitation by contacting authors from each study. The authors were specifically asked if the pharmacist was a significant driver of the intervention and in what activities did the pharmacist participate. The trouble with this type of research is that the strength of the intervention is hard to measure. It is nearly impossible to determine exactly which part of the intervention makes a difference, or whether the difference results from a combined effort of each act (*i.e.*, a complex intervention).

Another limitation of the findings is the difficulty in making assumptions of clinical improvements based on the modest change in LDL parameters observed in the studies included. This finding was disappointing, and may not be clinically significant. It was estimated that for every mmol/L (38.61 mg/dl) decrease in LDL level, a 20% decrease in CV events could be expected.<sup>80</sup> Extrapolating this figure to our results, active pharmacist involvement in dyslipidaemia management could be assumed to reflect a 5% decrease in CV events in the population studied through this systematic review. Our modest, but statistically significant, results may be related to the fact that the majority of the included studies were not designed exclusively to measure outcomes of pharmacist interventions in dyslipidaemia management, but rather outcomes in the presence of a combination of CV risk factors or in patients with diabetes.

Our results also show a greater benefit on LDL level reduction in collaborative care settings. This finding is not surprising given the types of patients included in these studies, whose drug management is usually complemented by care given by other health care providers. This is consistent with previous studies<sup>18,83-84</sup> and a systematic review of pharmacist interventions in heart failure, which also showed a greater effect when pharmacists worked as part of a team, rather than independently.<sup>86</sup>

It is important to consider that none of the reported interventions in these studies included independent prescribing by pharmacists. There is a significant lag time between pharmacist assessment of the patient, the pharmacist making a recommendation to the physician, the physician accepting the recommendation, and the patient actually filling the prescription and taking the new agent or dose. Previous research has shown this timing to be influential - recommendations made early in an intervention are the only ones that are significantly related to clinical improvements.<sup>87</sup> In addition, the act of “making recommendations” imposes a ceiling effect because doctors may not accept them (either due to disagreement, or process of care issues). If pharmacists were able to take the next step of prescribing and titrating statins, it seems likely that the effects of pharmacist involvement would be much greater. Indeed, this was demonstrated in a systematic review of pharmacy care on glycemic control in patients with diabetes, where pharmacist prescribing led to a greater effect.<sup>88</sup>

Not surprisingly, after performing the sensitivity analysis, our results were blunted when studies of lower methodological quality were removed. More than half of our included studies were published more than five years ago, with the oldest study published 14 years ago. Reporting of methods has significantly advanced over this time, which may explain the presence of studies of relatively low quality reported in the literature. There was only a 10% change in the results when only studies with low risk of bias in three domains were included. This sensitivity analysis represented less than one third of the total population of patients included in the primary LDL analyses. Although it is important to know that the overall effect may be slightly less than what we reported in our primary outcome when taking study quality into consideration, the benefits are still clear.

#### 4. 4 Conclusions

It is evident from the variety of studies presented in this chapter that community pharmacists, because of their accessibility, are in a unique position to provide appropriate interaction and/or collaboration with patients and other health care professionals for the provision of pharmaceutical care services aimed at improving patient outcomes. Community pharmacists' involvement from screening patients right up to initiation of therapy and follow-up is proving to be useful in achieving positive outcomes in patients with CV risk factors, such as blood pressure, cholesterol, and smoking.

The systematic review presented in this chapter has provided the highest level of evidence that pharmacists, either alone or as an integral part of a multidisciplinary team, play a key role in improving lipid parameters in patients with dyslipidaemia across a variety of settings. Similar systematic reviews are providing additional evidence that the integration of pharmacists in primary health care initiatives should be considered as a valuable solution for improving the management of CVD risk factors and as they are able to play a critical role in each step of the disease management process and are therefore a critical component of any chronic disease management programme. It is hoped that policymakers will embrace this evidence and take steps toward supporting the pharmacy profession in implementing these services. Future research should be targeted at pharmacist prescribing to take interventions to the next level.

It is also important to highlight that the role that community pharmacists play in NZ with regard to CVD risk assessment and management remains largely unknown. As presented in Chapter 3 of this thesis, the results of our national survey was indicative that absolute CVD risk assessment is only minimally performed by pharmacists in NZ community pharmacies (reported by only 10% of those offering screening services). No other similar published reports with NZ data were found in the literature reviewed. Despite the international literature, pharmacists do not appear to take the necessary steps to their integration in the care of patients as a valuable solution for improving the management of CVD risk factors.

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## 4.6 Appendices

### ***Appendix 4.1: Searched Websites for Relevant Grey Literature***

<b>Website</b>	<b>URL</b>
<b>Associations &amp; Societies</b>	
Academy of Managed Care Pharmacy	<a href="http://www.amcp.org">www.amcp.org</a>
American College of Cardiology	<a href="http://www.acc.org">www.acc.org</a>
American College of Clinical Pharmacists	<a href="http://www.accp.com">www.accp.com</a>
American Diabetes Association	<a href="http://www.diabetes.org">www.diabetes.org</a>
American Heart Association	<a href="http://www.americanheart.org">www.americanheart.org</a>
American Medical Informatics Association	<a href="http://www.amia.org">www.amia.org</a>
American Society of Health System Pharmacists	<a href="http://www.ashp.org">www.ashp.org</a>
Australian Diabetes Society	<a href="http://www.diabetessociety.com.au">www.diabetessociety.com.au</a>
Australasian Pharmaceutical Sciences Association	<a href="http://www.apsa-online.org">www.apsa-online.org</a>
Canadian Association for Population Therapeutics	<a href="http://www.capt-actp.com">www.capt-actp.com</a>
Canadian College of Clinical Pharmacy	<a href="http://www.cccp.ca">www.cccp.ca</a>
Canadian Diabetes Association	<a href="http://www.diabetes.ca">www.diabetes.ca</a>
Canadian Pharmacists Association	<a href="http://www.pharmacists.ca">www.pharmacists.ca</a>
Canadian Society for Clinical Pharmacology	<a href="http://www.cscp.net">www.cscp.net</a>
Canadian Society of Hospital Pharmacists	<a href="http://www.cshp.ca">www.cshp.ca</a>
Commonwealth Pharmacists Association	<a href="http://www.commonwealthpharmacy.org">www.commonwealthpharmacy.org</a>
Diabetes Australia	<a href="http://www.diabetesaustralia.com.au">www.diabetesaustralia.com.au</a>
European Association of Clinical Pharmacology and Therapeutics	<a href="http://www.eacpt.org">www.eacpt.org</a>
European Forum for Primary Care	<a href="http://www.concepts-ict.nl">www.concepts-ict.nl</a>
European Society of Cardiology	<a href="http://www.escardio.org">www.escardio.org</a>
European Society of Clinical Pharmacy	<a href="http://www.escpweb.org">www.escpweb.org</a>
International Pharmaceutical Federation (FIP)	<a href="http://www.fip.org/www/index.php?">www.fip.org/www/index.php?</a>
International Society for Pharmacoeconomics and Outcomes Research	<a href="http://www.ispor.org">www.ispor.org</a>
International Society of Pharmacoepidemiology	<a href="http://www.pharmacoepi.org">www.pharmacoepi.org</a>
National Cholesterol Education Program	<a href="http://www.nhlbi.nih.gov/about/ncep">www.nhlbi.nih.gov/about/ncep</a>
National Community Pharmacists Association	<a href="http://www.ncpanet.org">www.ncpanet.org</a>
National Heart, Lung, and Blood Institute	<a href="http://www.nhlbi.nih.gov">www.nhlbi.nih.gov</a>
National Lipid Association	<a href="http://www.lipid.org">www.lipid.org</a>
National Medical Association	<a href="http://www.nmanet.org">www.nmanet.org</a>
National Prescribing Service	<a href="http://www.nps.org.au">www.nps.org.au</a>
National Stroke Foundation	<a href="http://www.strokefoundation.com.au">www.strokefoundation.com.au</a>
Royal Australian College of General Practitioners	<a href="http://www.racgp.org.au">www.racgp.org.au</a>
Royal Pharmaceutical Society of Great Britain	<a href="http://www.rpsgb.org.uk">www.rpsgb.org.uk</a>
Society of Behavioral Medicine	<a href="http://www.sbm.org">www.sbm.org</a>
Society of Hospital Pharmacists of Australia	<a href="http://www.shpa.org.au">www.shpa.org.au</a>
<b>Scientific Meetings</b>	
American Heart Association's Scientific Conference on Compliance in Healthcare and Research	<a href="http://www.americanheart.org">www.americanheart.org</a>
American Heart Association's Scientific Forum on Quality of Care and Outcomes Research in Cardiovascular Disease and Stroke	<a href="http://www.americanheart.org">www.americanheart.org</a>

American Society of Health-System Pharmacists	<a href="http://www.ashp.org">www.ashp.org</a>
Pharmacy Guild of Australia (Australian Pharmacy Conference)	<a href="http://www.guild.org.au">www.guild.org.au</a>
Royal Pharmaceutical Society of Great Britain (RPSGB) (British Pharmaceutical Conference)	<a href="http://www.rpsgb.org.uk">www.rpsgb.org.uk</a>
Canadian Society of Hospital Pharmacists Professional Practice Conference	<a href="http://www.cshp.ca">www.cshp.ca</a>
Canadian Association for Population Therapeutics (Canadian Therapeutics Congress)	<a href="http://www.capt-actp.com">www.capt-actp.com</a>
Health Services & Pharmacy Practice Research	<a href="http://www.hsrpp.org.uk">www.hsrpp.org.uk</a>
<b>Other Related Sites</b>	
ScanGrants (Community Pharmacy Practice)	<a href="http://www.scangrants.com/category/community-pharmacy-practice.aspx">www.scangrants.com/category/community-pharmacy-practice.aspx</a>

#### **Appendix 4.2: Hand-searched journals for relevant grey literature**

*Journal of Managed Care Pharmacy*  
*Pharmacotherapy*  
*Journal of Clinical Pharmacy and Therapeutics*  
*Journal of Pharmacy Practice and Research*  
*The Annals of Pharmacotherapy*  
*American Journal of Health-System Pharmacists*  
*Pharmacy World and Science*  
*Canadian Journal of Cardiology*  
*Journal of the American Pharmacists Association*  
*Canadian Pharmacist Journal*

Also, bibliographies of identified studies were hand searched

### **Appendix 4.3: Subject headings and key words based on the MEDLINE® search strategy**

Ovid MEDLINE® 1950 to February Week 3 2010

1. exp Dyslipidemias/
2. dyslipid?emi\$.mp.
3. dyslipoprotein?emi\$.mp.
4. hyperlipid?emi\$.mp.
5. hyperlipoprotein?emi\$.mp.
6. hypolipoprotein?emi\$.mp.
7. dyslipid?emi\$.mp.
8. dyslipoproteinemi\$.mp.
9. hyperlip?emi\$.mp.
10. lipid?emi\$.mp.
11. lip?em\$.mp.
12. hypercholesterol?emi\$.mp.
13. hypercholester?emi\$.mp.
14. exp Lipids/bl [Blood]
15. lipid\$.mp.
16. lipid disorder?.mp.
17. hypertriglyceridemi\$.mp.
18. exp Cholesterol/
19. hypocholesterol?emi\$.mp.
20. hypocholester?emi\$.mp.
21. exp Triglycerides/
22. triglyceride\$.mp.
23. cholesterol.mp.
24. LDL\$.mp.
25. HDL\$.mp.
26. VLDL.mp.
27. or/1-26
28. pharmacists/
29. pharmacy/
30. pharmacies/
31. prescriptions/
32. drug information services/
33. adverse drug reaction reporting systems/
34. clinical pharmacy information systems/
35. community pharmacy services/
36. pharmacy service, hospital/
37. pharmaceutical services/
38. drug monitoring/
39. pharmacist?.mp.
40. pharmacy.mp.
41. pharmacies.mp.
42. druggist?.mp.
43. prescription\$.mp.
44. (oral and (dyslipid?emia or lipid-lowering or cholesterol) and (monitor\$ or management or managing or test or tests or testing)).ti,ab.
45. (oral and (dyslipid?emia or lipid-lowering or cholesterol) and (therapy or clinic? or service?)).ti,ab.
46. (pharmacist? adj3 (manage\$ or run or staff\$ or supervi\$ or led or based or assisted or provided or service? or monitor\$)).ti,ab.
47. (pharmacy adj3 (manage\$ or run or staff\$ or supervi\$ or led or based or assisted or provided or service? or monitor\$)).ti,ab.

48. or/28-47
49. exp Patient Care Management/
50. exp patient care/
51. Professional Role/
52. "quality of healthcare"/
53. or/49-52
54. 53 and pharmac\$.mp.
55. or/48,54
56. randomized controlled trial.pt.
57. controlled clinical trial.pt.
58. randomi?ed.ab.
59. placebo.ab.
60. dt.fs.
61. randomly.ab.
62. trial.ab.
63. groups.ab.
64. or/56-63
65. (animals not (humans and animals)).sh.
66. 64 not 65
67. and/27,55,66
68. case reports.pt.
69. editorial.pt.
70. historical article.pt.
71. letter.pt.
72. news.pt.
73. newspaper article.pt.
74. or/68-73
75. 67 not 74
76. remove duplicates from 75

#### 4.7 Acknowledgements for Chapter 4

The research presented in this Chapter is the result of the valuable contributions of the following individuals and funding agencies:

- a. *This systematic review was supported by the Epidemiology Coordinating and Research (EPICORE) Centre/Centre for Community Pharmacy Research and Interdisciplinary Strategies (COMPRIS), University of Alberta, Edmonton, Alberta, Canada.*
- b. *Theresa Charrois, currently at the School of Pharmacy, Curtin Health Innovation Research Institute, Curtin University, Perth, Western Australia, Australia; who was the main co-investigator in this systematic review.*
- c. *Tamara Durec, Medical Librarian from Information Services Inc., St. Albert, Alberta, Canada; for her assistance in performing the systematic search of databases and trial registries.*
- d. *Drs. Ross Tsuyuki, Sheri Koshman, Glenn Pearson, and Mark Makowsky, from the Division of Cardiology, Faculty of Medicine and Dentistry and the Faculty of Pharmacy and Pharmaceutical Sciences at the University of Alberta, Edmonton, Alberta, Canada; for their guidance throughout the process of this systematic review.*
- e. *Ben Vandermeer from the Department of Pediatrics, Faculty of Medicine and Dentistry, University of Alberta, Edmonton, Alberta, Canada; for his statistical assistance.*
- f. *The following authors of the included studies who responded to our requests for further information: Barry Carter, Pharm.D.; Rhonda Clifford, Ph.D.; Michele Faulkner, Pharm.D.; Jose Fornos, B.Pharm.; Dick R. Gourley Pharm.D., FAPhA; Mariesha Jaffray, M.Sc.; Jeannie Lee, Pharm.D.; Vivian Lee, Pharm.D.; Lorenzo Villa, B.Pharm.; and Matthew Witry, Pharm.D.*

The results derived from the systematic review of the literature presented in this chapter has already been published. The following is the citation to this publication:

- Charrois TL, Zolezzi M, Koshman SL, Pearson G, Makowsky M, Durec T, Tsuyuki RT. A systematic review of the evidence for pharmacist care of patients with dyslipidemia. *Pharmacotherapy* 2012;32(3):222–33.

## CHAPTER 5:

# **BARRIERS AND OPPORTUNITIES FOR NEW ZEALAND PHARMACISTS' INVOLVEMENT IN CARDIOVASCULAR RISK ASSESSMENT AND MANAGEMENT: A QUALITATIVE ASSESSMENT OF CONSUMERS', GENERAL PRACTITIONERS' AND PHARMACISTS' VIEWS**

### **5.1 Introduction**

As reviewed in the previous four chapters of this thesis, the role of pharmacy in public health is of increasing importance in New Zealand (NZ). In Chapter 2, various national health strategies and general practice funded programmes were described, all of which are aimed at facilitating a more robust integration of community pharmacy services to target preventative health initiatives that can decrease inequities in access to the primary health care sector, particularly those that can target chronic diseases of priority in NZ, such as diabetes and cardiovascular disease (CVD). The increasing involvement of pharmacists in public health will require changes in the behaviour of key stakeholders towards this role expansion, not only on the part of pharmacists, but also attitudes from local general practitioners (GPs) and patients.

Various international studies have explored attitudes to community pharmacists' role expansion in the past decade from the perspective of GPs, public health care consumers and pharmacists themselves.<sup>1-14</sup> Overall, these have reported that despite the emphasis of national policies and worldwide pharmacists' professional organisations in support of community pharmacists' patient-centred roles, these continue to be undermined not only by a number of important barriers in regard to the scope of practice of GPs and community pharmacists,<sup>1,2,5,11,12,14</sup> but also by consumers' views on the pharmacist's role and overall lack of public trust.<sup>1,6,13</sup> These results do not appear to be substantially different from similar studies undertaken in the 1990's which revealed considerable opposition from GPs towards pharmacists offering screening of chronic conditions (high blood pressure, high blood glucose), selecting medicines or dosages

according to agreed protocols, or running anticoagulant or similar therapeutic monitoring clinics.<sup>15-19</sup> Pharmacists continue to identify similar barriers to implementing patient-centred services in community pharmacies, such as the lack of recognition of new roles by the public and by GPs.<sup>1,3,20</sup>

Surveys performed in NZ in the early 2000s reported similar findings.<sup>21-26</sup> A recently published study which explored the services provided to older people by community pharmacists in NZ reported on pharmacists' perceptions on the benefits of these services.<sup>25</sup> In this survey, pharmacists perceived that resistance from GPs and the general public for pharmacists involvement in the provision of specialized services, were significant barriers. In another recent NZ study which explored GPs' perceptions of pharmacists' new services, GPs were more supportive of pharmacists' playing active roles in medicine use reviews and less supportive of pharmacists practicing screening or monitoring services, or prescribing.<sup>26</sup> In the national survey of pharmacists reported in Chapter 3 of this thesis, similar barriers to the provision of screening and monitoring services in NZ community pharmacies were identified.

Only a limited number of studies have explored the views of these key stakeholders with specific regard to CVD risk assessment and management services provided in community pharmacies.<sup>27-31</sup> However, there appears to be consistency in stakeholders' opinions across the various patient-centred programmes that have been studied. The general consensus is that both pharmacists and GPs have reservations about the feasibility and sustainability of such programmes. Recurring barriers identified in these studies included perceived need for the service, potential 'turf' encroachment, expertise of the pharmacist, access to patient-related medical information, space, time, and remuneration.

Although community pharmacists think they should play a significant role in health promotion and prevention, they recognise a wide gap between their ideal and actual levels of involvement.<sup>27</sup> Other important findings in these studies have emphasized that GPs would like to be assured that patients would be referred back to them for issues that are beyond the pharmacists' capabilities.<sup>28</sup> Lack of adequate space within some pharmacies to conduct private consultations was mentioned as a major barrier to

offering any pharmacy service focusing on chronic disease management, and it has been highlighted that this needs to be addressed within this setting to ensure patient confidentiality.<sup>29</sup>

In a relatively recent telephone survey of 505 households across Australia undertaken to gauge public willingness to embrace involvement of community pharmacists in CVD prevention and management, researchers found a high level of satisfaction with the quality of service provided by regularly visited pharmacies; however, there appeared to be a lack of awareness amongst these consumers about the skills and capabilities of pharmacists and of the services that are available through community pharmacies.<sup>30</sup> The most accepted role for community pharmacists identified by these consumers was the optimisation of medicines use, with the vast majority of consumers indicating a willingness to seek advice on medication use from pharmacists. Many respondents believed that pharmacists were capable of providing screening or testing for hypertension, diabetes and cholesterol, with the majority indicating that they would likely use these screening services if they were provided in their pharmacies. NZ-based research in this particular area is limited.

The overall aim of this chapter is to gain a deeper understanding of the underlying reasons for the relatively slow, or even lack of, implementation of patient-centred services delivered in NZ community pharmacies, with a particular focus on identifying the factors embedded in the attitudes of key stakeholders which may positively or negatively influence their implementation, uptake and success. In keeping with the context of this PhD research, this chapter further explores cardiovascular (CV) risk assessment and management services offered by community pharmacies. The following research questions are addressed in this chapter:

- 1. What are the important factors, as perceived by community pharmacy consumers, GPs, and pharmacists, that are associated with the successful (or unsuccessful) implementation of patient-centred services (in particular those related to the primary prevention of CVD) in NZ community pharmacies?*
- 2. How do these factors interact, both with each other, or with other aspects of primary prevention strategies in NZ to influence increased or reduced*

*community pharmacist engagement in the delivery of patient-centred services  
(in particular those related to the primary prevention of CVD)?*

A qualitative research approach was thought to be the most suitable to help answer the research questions outlined above. Qualitative approaches have gained an increased prominence in health services and pharmacy practice research in recent years.<sup>32</sup> The most commonly employed qualitative approach used by health services and pharmacy practice researchers is the qualitative interview.<sup>32,33</sup> Because flexibility and receptiveness to the perspective of the respondents' points of view is central to qualitative research, it has been suggested that this approach is the most appropriate for exploring processes and patterns in people's thoughts that can influence behaviour.<sup>33</sup> This approach sharply contrasts with quantitative research in which the researcher may be testing a hypothesis, investigating frequencies of events and quantifying relationships between clearly defined variables. Although the numbers of qualitative studies are small compared with those using survey methodology, a substantial body of work has been undertaken in pharmacy practice using qualitative research strategies and has become increasingly common in healthcare.

An inductive approach was used to analyse the qualitative data that resulted from the interviews. The primary purpose of the inductive approach is to allow research findings to emerge from the frequent, dominant, or significant themes inherent in raw data, without the restraints imposed by structured methodologies.<sup>34</sup> Some of the analytical strategies or principles underlying the use of a general inductive approach are described below:

- Data analysis is guided by the evaluation objectives, which identify domains and topics to be investigated. The analysis is carried out through multiple readings and interpretations of the raw data, the inductive component. Although the findings are influenced by the evaluation objectives or questions outlined by the researcher, the findings arise directly from the analysis of the raw data, not from *a priori* expectations or models. The evaluation objectives provide a focus

or domain of relevance for conducting the analysis, not a set of expectations about specific findings.

- The primary mode of analysis is the development of categories from the raw data into a model or framework. This model contains key themes and processes identified and constructed by the evaluator during the coding process.
- The findings result from multiple interpretations made from the raw data by the evaluators who code the data. Inevitably, the findings are shaped by the assumptions and experiences of the evaluators conducting the study and carrying out the data analyses. For the findings to be usable, the evaluator must make decisions about what is more important and less important in the data.

As the overarching aim of this research chapter was to gain a deeper and more comprehensive understanding of the factors related to the poor implementation of patient-centred roles in NZ community pharmacy settings – based on the results of the NZ survey as reported in Chapter 3 - the use of qualitative methodology was the most suitable to explore this phenomenon from the perspective of those most likely to be affected, taking into account the social context, and using mainly inductive rather than deductive analytic process. As such, through a series of qualitative studies, the views of GPs, community pharmacy consumers and community pharmacists in regards to the role of pharmacists in CVD risk prevention strategies were explored.

The overarching research strategy used was the use of semi-structured interviews. Semi-structured interview questioning enabled examination of spontaneous expressions, reducing pre-conceptualised boundaries and allowing adherence to the interview agenda.<sup>32-36</sup> A mixed-methods strategy was used to integrate qualitative and quantitative data derived from semi-structured interviews. This methodology was considered as more desirable to build from the previous quantitative phase of this research to be able to obtain more detailed specific information on the challenges in regard to the implementation of CVD risk assessment and management services in

community pharmacies.<sup>37</sup> The interviews were conducted either face-to-face or by telephone. The specific modality used is further described under each of the qualitative studies outlined in sections 5.2, 5.3 and 5.4 of the thesis.

## **5.2 Pharmacy consumers' views on the provision of cardiovascular risk assessment and management in New Zealand community pharmacies**

### **5.2.1 Research objective**

This study explored consumers' awareness of the primary health care services provided by community pharmacists, and examined their perceptions whether expanding the pharmacists' primary health care role within community pharmacies, such as provision of CVD risk assessment services, could meet their health care needs and expectations. At the time this research took place, limited research in this area was available in NZ.

### **5.2.2 Methods**

#### **5.2.2.1 Interview instrument**

A pilot interview tool with open-ended questions was first developed based on a literature review of similar studies which explored customer perceptions of pharmacies, pharmacists and service expectations. The instrument was developed by the interviewer and tested for face and content validity by the other two investigators ( $n = 3$ ); as well as by two willing participants whose feedback was incorporated into its final version (*Appendix 5.1*). Questions were framed to explore primarily consumer awareness of overall community pharmacy health screening services and the current role of community pharmacists; and consumer perceptions, including enabling (positive) and oppositional (negative), on the provision of CVD risk assessment by community pharmacists. The final field instrument consisted of ten questions. Interviews were designed to take around ten minutes and were conducted either face-to-face or via the telephone. The University of Auckland Human Participants Ethics

Committee granted ethical approval for the study, the interview tool, the participant information sheet and the consent form (reference code 2008/511).

### **5.2.2.2 Participant recruitment**

Using a list of community pharmacies available from the Pharmacy Guild of New Zealand, an invitation letter requesting participation in the study was sent to pharmacies within Auckland, NZ. Five pharmacies in West and Central Auckland agreed to participate in this study. Follow up with each of the pharmacies was made three weeks after letters were sent, and suitable times for consumer interviewing were arranged. The inclusion criteria consisted of consumers who presented to the participating pharmacy with a prescription for medications indicated in the management of CVD or for the treatment of individual CVD risk factors. Participants were given the option of being interviewed in private while they waited for their prescription, or at a later time (either face-to-face or via the telephone) based on their convenience. Those who agreed to participate in the interview also signed a consent form. The interview objectives and procedures were clarified, and an assurance was given of the ethical principles of inquiry, assuring participants' anonymity and data confidentiality.

### **5.2.2.3 Data collection and analysis**

Consumer responses were manually recorded by the interviewer directly into the interview tool. Each interview lasted between 15 to 20 minutes. Interviews were not audio taped. Participants were asked to identify which pharmacy health screening services they were aware of, what health related problems they would feel comfortable discussing with their pharmacist and their overall opinion on community pharmacies providing CVD risk assessments or other related health screening services. Consumers did not have to respond to any question that they were not comfortable with. Field notes of open-ended questions were also made at the time of the interview.

Systematic revision of the collected data allowed an inductive enhancement of the interview schedule, in structure and wording, until a stable semi-structured format emerged. Codes were created for each interview question and named according to the

overall theme of the question. All transcripts and field notes of open-ended questions were also categorised into emerging themes. During the entire interview process, another researcher systematically revised the responses to assure internal validity of the emerging themes. Responses were classified according to specific themes. Demographic information and emerging themes were then entered into *Microsoft Excel* (version 11, 2003). The coded qualitative data were then explored for relationships with participants' attribute profile. Illustrative quotations were chosen to provide justification for the definition/basis of themes and potential variables, as is standard practice for qualitative studies.<sup>38</sup>

## **5.2.3 Results of pharmacy consumers' interviews**

### **5.2.3.1 Sample characteristics**

In total, 44 pharmacy consumers selected from the five participating pharmacies were interviewed. The majority of participants were male (n=25) with a median age of 61 (range 45 to 74 years). The majority of the participants were of NZ/European ethnicity followed by Pacific Islanders, and only a few were Indian or South African.

The majority of the pharmacy consumers interviewed were on prescription medications for the management of CV risk factors or CVD, including: cholesterol-lowering medications, angiotensin converting enzyme inhibitors or angiotensin receptor blockers, aspirin, calcium channel blockers, beta blockers, and others. On the day of the interview, most of the consumers were at the pharmacy to fill a prescription.

Filling prescription medicines was the most commonly quoted role of community pharmacists, followed by the provision of medicine information or advice on minor ailments. Most interviewed consumers stated that they were aware of the health screening services provided by community pharmacies, and particularly of the weight loss programmes.

Table 5.1 lists the various community pharmacy services that were quoted by the interviewed consumers. However, despite having heard of these pharmacy services,

only a few reported to have ever used them in the past. Of those who used the services, blood pressure check was the most frequently cited.

***Table 5.1: Consumers’ awareness of health screening services provided in community pharmacies***

<b>Pharmacy Service</b>
<b><i>Weight Loss</i></b>
<b><i>Blood Pressure Testing/Monitoring</i></b>
<b><i>Blood Cholesterol Testing/Monitoring</i></b>
<b><i>Medication Use Reviews</i></b>
<b><i>Blood Glucose Testing/Monitoring</i></b>
<b><i>Smoking Cessation</i></b>
<b><i>Disease Monitoring</i></b>
<b><i>Pregnancy Testing</i></b>

Consumers identified community pharmacies mostly as a place to purchase medicines and other non-medicinal products. Consequently, most of the participating pharmacy consumers identified that community pharmacists’ main role was to dispense medications, although many also identified the provision of health advice as an important role. Further exploration of the latter revealed that the majority of consumers were comfortable talking to their pharmacist rather than to their GP – mostly regarding minor ailments - and had sought their advice for a health-related problem at some point in the past.

Almost half of the consumers were in agreement that pharmacists could be involved in the provision of CVD risk assessments, but the other half were either in disagreement or were uncertain. Upon further questioning on this specific issue, a total of ten dominant themes emerged. Saturation of themes was reached by the 30<sup>th</sup> interview. These themes were further subdivided as “*enabling*” (favouring pharmacist-

led CVD risk assessment services in community pharmacies) or “*oppositional*” (favouring GP practices as more appropriate for CVD risk assessments).

### 5.2.3.2 Enabling themes

**Increased access to primary health care** was the predominant enabling theme for the implementation of CVD risk assessment services in community pharmacies that emerged from the interviews with consumers. Consumers mentioned that people present to their pharmacy much more often than to their GP. Many believed that a pharmacist would have a much greater opportunity of delivering health messages to people with high risk of CVD, and could reinforce critical information in CVD risk management more regularly, especially lifestyle advice. Consumers also observed that they felt much more comfortable visiting their pharmacy than their GP; the relaxed environment made them feel less intimidated and as a result they were often more ‘upfront’ with the pharmacist. Because the majority of consumers could not access their GPs after hours or during weekends, they saw potential benefits of pharmacist involvement in the opportunistic provision of these services. In addition, many mentioned that reduced waiting time would be expected from pharmacists involvement, including getting results from tests and managing overall CVD risk factors.

“...access to a pharmacist at any time – sometimes [it is] hard to get in touch with a doctor...”

Consumer 9

**Lower cost of service** was also perceived as an advantage to community pharmacist involvement in CVD risk assessment. Consumers indicated that many individuals, even if they were enrolled in a primary health organisation (PHO), could not afford the rising costs of consultant fees, or paying for preventative services. It was a common perception that community pharmacies would be able to offer CVD risk assessment services at a lower cost than those offered by their GPs.

“...other people can’t afford the doctor so it would be very helpful for families...”

Consumer 39

Many consumers also observed that CVD risk assessment could be a future role for pharmacists provided it is offered in either a **complementary** or a **collaborative** model, working closely with a doctor, within a referring process or protocol, but not independently.

### 5.2.3.3 Oppositional themes

**Pharmacists' competency**, which encompassed comments from consumers in regards to their qualifications, skills or training in the provision of CVD risk assessment services, was also an important dominant oppositional theme which emerged from the consumers' interviews. In the view of the participating consumers, pharmacists' training was generally perceived as being deficient. Although some consumers indicated pharmacists were knowledgeable in pharmacotherapy, the majority perceived their doctor to have a greater knowledge of anatomy and physiology, and was more skilled in diagnosis than the pharmacist, particularly if it was related to CVD.

*"...doctor has a greater knowledge of health problems and general physiology"*

Consumer 29

Because of this perception, these consumers preferred GP-led assessments as they considered their doctor to be able to offer more **comprehensive** CVD assessments than those that could be done by pharmacists. Various views were expressed in regards to their disbelief about the possibility of providing a comprehensive CVD risk assessment service in community pharmacies, including inappropriate facilities, inappropriate documentation and insufficient access to the consumers' medical histories.

**Hierarchy** also emerged as an oppositional theme from the consumer interviews. Consumers viewed GPs as having greater **responsibility** and resulting **accountability** for the long term management of CVD risks than pharmacists. Some consumers were uncomfortable with the concept of CVD risk assessment by pharmacists, believing it

was primarily their doctor's role, perceiving pharmacists to be stepping into GP roles or **duplicating** primary care services.

*"...I am satisfied with the existing system...Medlab and doctor well co-ordinated...resource is already there – competing with existing one..."*

Consumer 35

**Privacy** in community pharmacy settings was also of concern to consumers who observed that they were not appropriately resourced to undertake CVD risk assessment activities; unlike the doctor's offices which were private and away from other patients seeking consultation. Consumers indicated that this lack of private space for consultations could deter people from utilising community pharmacies for health screening services.

*"...I prefer privacy at doctor... one-on-one consultation without other people around..."*

Consumer 43

#### 5.2.4 Discussion

The findings of this study in regards to the perception of consumers on the role of community pharmacists were consistent with other findings in the literature, which also identified dispensing of prescription medicines as the community pharmacist's main role.<sup>39</sup> However, provision of health advice and medication information was also frequently quoted as an important role for pharmacists.

Other studies have also suggested that there is a higher level of advice given out by pharmacists with around one-third of customers reporting to receive unsolicited advice about their medicines or general health.<sup>40,41</sup> Although the majority of consumers were aware of many health screening services provided by community pharmacies, only a few reported ever having used them. Interestingly, similar findings were observed in a survey conducted by the Department of Health in the United Kingdom (UK) which found that few members of the public reported using health-related services offered by some pharmacies, although many also reported that they would be interested in using them.<sup>42</sup>

This represents the first published qualitative study in NZ that has focused on the views of community pharmacy consumers in regard to pharmacist-led CVD risk assessment services. These results are indicative that consumers of pharmacy services may not be entirely supportive of pharmacists expanding their role to the provision of CVD risk assessment services. Although consumers identified community pharmacies as being able to offer increased access to primary health care, viewed positively the decreased waiting times and the possibility of less costly services; oppositional themes were also frequently voiced.

In addition, some of the enabling themes voiced by consumers may have lacked a substantiated basis (*e.g.*, assumptions of less costly services) and overall reflected a poor expectancy level for pharmacist-led services (*e.g.*, concerns that pharmacists were not sufficiently trained or skilled for identifying CVD risk factors). Although this study and similar consumer surveys indicate that pharmacy could play a greater role in helping to tackle health inequalities, the published studies add little to our understanding of the effectiveness of community pharmacies in engaging 'hard to reach' higher-risk individuals in assessments of their CV health. Therefore, the issue of whether services should be 'open access' and available on a walk-in basis to all (often argued to be the strength of a community pharmacy setting) versus a more targeted approach, remains unresolved.

Overall, the community pharmacy consumers in our study consistently appeared to prefer consulting their GP rather than their pharmacist for more complex health concerns, this preference was stronger when it was related to CVD risk assessments than when consulting for minor ailments. Many consumers commented that CVD risk assessments were mostly the responsibility of GPs; that pharmacists' involvement in this practice would lead to duplication of primary care services; and that GPs offered - in general - more privacy for such consultations than community pharmacies. In addition, adequate pharmacist training, qualifications or skills were viewed by consumers as concerns, particularly when related to CVD risk assessments.

Similar findings were reported in other studies which also expressed consumer concerns at community pharmacists taking on extended clinical roles;<sup>1,6,10,13,43,44</sup>

however, none specifically explored pharmacist-led CVD risk assessment services. The consumers also suggested that if CVD risk assessments were to be provided by pharmacists these would be best offered as complementary to the services provided by their GPs. A collaborative approach was generally viewed as a feasible way for pharmacists to expand their role in this area. These findings were also consistent with consumers' views expressed in other surveys, although these did not specifically explore CVD risk assessment services.<sup>8,45</sup>

Although NZ is a small country, the results from this study cannot be extrapolated to the general population. This study was limited in the selection of the participants who were from a relatively small geographical area (West Auckland), were already community pharmacy consumers, and were mostly already being treated for one or more CVD risk factors by another primary care practitioner, mostly by their GP. This population was targeted because it was assumed that these individuals would already have some awareness or education about CVD and would thus be able to offer more informed views on the role of the pharmacist in the overall assessment and management of this disease. Therefore, the respondents may have been biased in that those who participated were more interested in their overall health, and in their CV health in particular. However, this increased consumer awareness did not reflect positively on the role of pharmacists in CVD risk assessment, as consumers indicated that they were more supportive of pharmacists' involvement in assessing 'minor' ailments. Another potential for error may have been introduced via the inclusion criteria as participants were already under the care of a GP. Therefore, consumers who have not been previously screened or treated by a GP may have different opinions.

Another limitation of our study may be related to its qualitative nature. Most of the available literature exploring consumers' perceptions on pharmacy services used a quantitative survey methodology, making comparison of previous results with those derived from this study difficult. Despite its limitations, the present study provides useful information regarding some of the challenges for expanding the role of community pharmacists in NZ, particularly as they relate to CVD risk assessment services, and identified issues which warrant further exploration, particularly those which can enable

building on the positive aspects that consumers identified with the patient-centred services that community pharmacies can provide.

### **5.3 General practitioners' views on the provision of cardiovascular risk assessment and management in New Zealand community pharmacies**

#### **5.3.1 Research objective**

This study explored the opinions of GPs regarding the provision of patient-centred services in community pharmacies and touched on the inter-professional relationships that exist between GPs and pharmacists within the primary health care setting by focusing on GPs' attitudes towards pharmacists' involvement in CVD risk assessment and management services. At the time when this research took place, limited research in this area was available in NZ.

#### **5.3.2 Methods**

##### **5.3.2.1 Interview instrument**

A semi-structured interview tool was built from a literature review of similar qualitative studies examining GP perceptions of pharmacists' services published between January 1990 and January 2009<sup>11,12,14,20,36</sup> by the team of investigators ( $n = 2$ ) as well as by two willing participants whose feedback was incorporated into its final version ([Appendix 5.2](#)). The interview topics covered the following: information about the GP and his/her practice particularly as it related to CV risk assessment and the GP's experiences with current or past interactions with community pharmacists. GPs were also specifically asked about their awareness and perceptions surrounding community pharmacists' involvement in CV risk assessment services. Interviews were designed to take around thirty minutes and were conducted either face-to-face or via the telephone. Participant information sheets and consent form were also developed. The University of Auckland Human Participants Ethics Committee granted ethical approval for the study, the interview tool, the participant information sheet and the consent form (reference 2008/511).

### **5.3.2.2 Participant recruitment**

Non-probability, purposive sampling was used to recruit GPs in the West Auckland area.<sup>33</sup> West Auckland was selected because GPs in this area were considered to be the most accessible to the research team. The sample population ( $n = 50$ ) was identified from a list of GPs available from the NZ Medical Council website (as of December 2009). Each GP in the sample population was posted an invitation to participate in the study; the information sheet, consent form, and the researcher's contact details were included. With the purpose of achieving a maximum variation of samples in order to capture a wide range of respondents' perspectives in the interviews, GPs from other Auckland areas (selected at random by the researchers from the same list of GPs described above) were also invited to participate. A follow up call to the GP was made two to three weeks after posting the invitations, and where possible interview times were arranged. If possible, consent forms were signed and collected at the time of the interviews. The interviews were either face-to-face or by telephone at a time that was convenient to the GPs; the majority of interviews took place at lunchtime or after hours when the GP had finished work for the day. No incentives were offered to the participants.

### **5.3.2.3 Data collection and analysis**

Each interview lasted between 30 to 45 minutes. GP responses were collected using the semi-structured interview tool ([Appendix 5.2](#)) and manually recorded directly into the interview tool at the time of the interview. Interviews were not audio taped. Data were analysed using the constant-comparative method of qualitative analysis.<sup>34,35</sup> The research team independently reviewed each transcript and field notes of open-ended questions to identify and sort segments of data with similar concepts into distinct categories, with particular attention to the following content areas: (i) awareness of pharmacist-led CVD risk assessment services in community pharmacies, (ii) oppositional attitudes regarding pharmacist-led CVD risk assessment services in community pharmacies (iii) enabling attitudes regarding pharmacist-led CVD risk assessment services in community pharmacies.

The sorted categories evolved into a coding system of emerging themes which were reviewed and agreed upon by the research team, then systematically applied to each transcript. Demographic information and emerging themes were entered into *Microsoft Excel* (version 11, 2003). During the last five interviews, no new themes emerged, and thematic saturation was believed to have been achieved. Illustrative quotations were chosen to provide justification for the definition/basis of themes and potential variables, as is standard practice for qualitative studies.<sup>38</sup>

### **5.3.3 Results of general practitioners' interviews**

#### **5.3.3.1 Sample characteristics**

Of the 50 GPs invited to take part in the study, a total of 25 agreed to be interviewed (50%) and saturation of themes was achieved within this number. Of these 25 GPs, the majority (18, 72%) had their practices located in West Auckland, three (12%) in South Auckland, three (12%) in Central Auckland and only one (4%) in North Auckland. Face-to-face interviews were conducted for almost all of the participating GPs (94%), with only one GP interviewed by telephone.

The majority of the GPs who participated in the interviews were male, had obtained their medical degree in NZ, and had been in general practice for more than 10 years. All details regarding year of registration and training institution were checked against the NZ Medical Council Register for confirmation. Although the practice setting for the majority of the GP participants was not located within a medical centre where other health-related services were available, close to 50% had community pharmacies located within the same building or less than 30 metres away. Other descriptive characteristics of study participants are summarised in Table 5.2.

When questioned about CVD assessment services provided in their practice, the majority of GPs interviewed indicated that they were using computer prediction software to assist in the management of patients at risk of CVD. *Predict®* software - based on the NZ Guidelines Group evidence based recommendations for CVD assessment and management<sup>46,47</sup> - was the most commonly used software reported by the participating

GPs. GPs also indicated that nurses were often involved in the CVD screening process before patients were further assessed by the GPs in the practice.

**Table 5.2: Characteristics of GP participants and their practice settings**

Sample characteristic	Frequency (n,%)
<b>Gender:</b> <i>Male</i> <i>Female</i>	 16 (64%) 9 (34%)
<b>Ethnicity:</b> <i>NZ/European</i> <i>Asian/Indian</i> <i>South African</i>	 15 (60%) 6 (24%) 4 (16%)
<b>Years in GP practice:</b> <i>≤ 10 years</i> <i>11-20 years</i> <i>21-30 years</i> <i>≥ 31 years</i>	 3 (12%) 10 (40%) 8 (32%) 4 (16%)
<b>GP training:</b> <i>In NZ</i> <i>Overseas</i>	 17 (68%) 8 (32%)
<b>Practice setting:</b> <i>Within medical center</i> <i>Pharmacy in same building or next door</i> <i>More than 2 GPs in same practice</i> <i>Uses prediction software for CVD risk assessments</i>	 10 (40%) 12 (48%) 17 (72%) 17 (72%)

About half of the interviewed GPs indicated that they were aware of community pharmacies offering CVD risk assessment services. For those who were aware of the services, blood pressure screening was the service that was the most familiar to them. Few GPs were aware of the other services offered, such as blood glucose and cholesterol screening or weight-loss and smoking-cessation programmes. The majority did not have any previous experience with patient-centred services provided by community pharmacists, and only six of the participating GPs had received a formal referral from a pharmacist-led screening test or similar CVD risk assessment.

When asked directly whether they thought community pharmacists should have a role in CVD risk assessments in the primary care setting, most (19/25) were in

agreement, but a few (3/25) were either in disagreement (3/25) or had mixed opinions (3/25). On further questioning on this specific issue, a total of nine dominant themes emerged. These themes were further subdivided as “*enabling*” (favouring pharmacist-led CVD risk assessment services) or “*oppositional*” (favouring GP practices as more appropriate for CVD risk assessments).

### 5.3.3.2 *Enabling themes*

***Increased access to primary health care*** was the predominant enabling theme for the implementation of CVD risk assessment services in community pharmacies that emerged from the GP interviews. GPs often mentioned that pharmacists are known to be the health care professional most often approached by the general public, and consequently considered that this would improve access to screening services.

*“... pharmacists have the appropriate training to perform such checks - after all they are the health professionals seen more often...” - GP2*

*“... [Pharmacists] should offer more screening - they are the health professional you see most often - patients see pharmacists more regularly than GPs...” - GP12*

In the context of CVD risk assessment, the interviews with GPs revealed that this improved access would also facilitate recognition of individuals with CVD risk factors who would not visit their GP regularly. GPs interviewed pointed out that there are still a significant number of individuals who are not enrolled in a PHO, and consequently do not have a regular GP.

*“...allows you to catch up with the population of people who do not have a GP or belong to any medical practice...” - GP1*

*“... [pharmacists] can pick up those [patients] who wouldn't bother to make an appointment...” - GP13*

*“... big proportion of population not enrolled [in a PHO] possible role of pharmacist useful. [Pharmacists] can pick up people by those not [previously] picked...” - GP14*

Having CVD risk assessment services available within local community pharmacies would facilitate reaching this group of people by creating greater access to primary preventative healthcare services. In addition, a wider access to opportunistic

screening for CVD, in particular for those individuals considered at high risk, was also perceived as a benefit by the GPs interviewed. Because the general public is more likely to visit a community pharmacy or consult with their pharmacist more frequently than visiting or consulting their GP, there would be increased opportunity for the general public to have access to opportunistic health screening services.

*"...another net for catching people...specially men over 50 who don't go to their GP regularly, if ever - by pharmacist being involved would catch people like this who otherwise would go undetected..." - GP4*

*"... worthwhile as [it] would definitely identify high risk [individuals]..." - GP15*

**Complementary CVD services** offered in community pharmacies were the next predominant enabling theme which emerged from the GP interviews. Pharmacists were viewed by GPs as being in an ideal position to offer “*green prescription*” advice, such as changes in diet, increasing exercise, and smoking cessation. Many believed that the pharmacist may have more success at delivering healthy lifestyle messages because they may not be perceived by patients to be as intimidating as a GP. GPs also perceived that pharmacists have a greater chance of addressing modifiable CVD risk factors and reinforcing health-related messages, particularly when patients pick up their repeat prescribed medications.

*"... Pharmacist is additive... [has] a role in targeting at risk people – reinforcement of message..." - GP9*

*"... Pharmacist could contribute [with] green advice. Getting people to do healthy lifestyle -all give same message get through..." - GP22*

*"... Pharmacist may be in a better position to talk about smoking - what's available..." - GP24*

Patient follow up and monitoring of CVD medication therapy was overall perceived by most interviewed GPs as a complementary role for pharmacists, but it was not voiced as an enabling theme as frequently as the provision of healthy lifestyle advice.

*"... management of multiple side effects - that's the pharmacist's role..." - GP5*

*"...pharmacist knows medicines way better than a doctor - they are brilliant at picking up side effects and drug interactions - this is the area where they shine..." - GP11*

**Collaborative care** for patients with CVD was the last of the enabling themes that emerged from the GP interviews. Most GPs were familiar with, or had been previously involved in, medication use review (MUR) services offered by community pharmacists and had very positive experiences with the resulting interaction with the pharmacists and the outcomes of such services. Consequently, the majority saw great potential for pharmacists being involved in continuing their MUR services for patients with CVD risk factors, as long as the pharmacist and GP collaborated and communicated frequently.

*“... MUR – rest homes worthwhile exercise... is time consuming...but very worthwhile” - GP8*

Further, in the context of CVD assessment and management services, GPs felt that a coordinated approach between pharmacists and GPs would be of benefit to the overall care of the patient. GPs perceived that a referral system would be instrumental and conducive of a collaborative care approach for CVD risk assessment.

*“...pharmacists can refer patients to GP to coordinate care...” - GP2*

*“...pharmacists track high risk patient[s] and bounce to GP. I feel warmly about pharmacist and GP collaboration...” - GP4*

However, it was infrequently voiced by the GPs interviewed that CVD assessment and management should be a shared role for both. When this theme emerged in the discussion, it was always perceived as a positive approach to optimise patient care.

*“...CVD [is] a big problem, [doctor and pharmacist] should work as a team - highlight and pick up people. Good...” - GP13*

*“...[I do] not [get] upset of dose changes [made by pharmacist] if we are informed. Needs to be some form of follow up whether GP or pharmacist...” - GP18*

### **5.3.3.3 Oppositional themes**

Overall, oppositional themes were predominant during the GP interviews. Although, when directly asked, the majority of the participating GPs (19/25) indicated agreement with community pharmacists becoming involved in CVD risk assessment services, most had strong opinions against this concept. The four dominant barriers

related to pharmacist involvement in CV risk assessment that emerged from the GP interviews are described below.

**Hierarchy**, in terms of professional standing and role in health care was apparent in almost all of the GP interviews, and emerged as the predominant oppositional theme, either implicitly or explicitly. GPs expressed concerns about pharmacists assuming roles they considered to be general practice activities and were not enthusiastic about their involvement in CVD risk assessment services.

*“...you see your pharmacist for medicines and medicines advice not for diagnosis...” – GP6*

*“...it is the GP's job not pharmacist's...” – GP19*

*“...diagnosis and all its' ramifications - management, treatment - [it's the] doctor's role...” - GP23*

It was also evident from the GP interviews that because general practice in NZ has an established government funding agreement in place for CVD risk assessments – for which GPs were already being reimbursed – having access to these assessments in community pharmacies would lead to either duplication or fragmentation of primary care services. Concerns were raised as to who would be the ultimate health professional held responsible for the management decisions made following these assessments, and who would then be reimbursed.

*“...the GP is set up for CVD risk assessment and remunerated by the government...” - GP6*

*“...most GP practices funded to get data so almost doubling up when Rx doing it...” – GP7*

*“...more duplication, [we need the] best use of resources. Negative duplication and fragmentation...” – GP14*

*“...legally the doctor is responsible...” - GP23*

**Comprehensiveness of CVD risk assessment services**, if offered by a pharmacist, was also a frequently identified oppositional theme that emerged from the GP interviews. There was skepticism on the part of most of the interviewed GPs that pharmacists would be able to provide services that require not only having access to important patient history and laboratory data, but also concerns in regards to community pharmacies having appropriate and accurate instrumentation or technology to measure

important patient parameters, such as blood pressure and blood cholesterol. GPs perceived themselves as collators of a patient's medical information, they believed it would be far more accurate and efficient if only they performed such assessments.

*"...[at the GP] the patient can get lab forms and go and have proper blood tests..." – GP1*  
*"...pharmacist will probably not have patient history and not sure how they are going to administer an accurate cholesterol check..." – GP2*  
*"...general practice has patient history something the pharmacist doesn't have..." – GP3*

In addition, there were also concerns raised in regards to accuracy of point-of-care testing and the instruments available at community pharmacies. Blood pressure was the area most discussed as many of the respondent GPs had experience with pharmacists measuring blood pressure for their patients.

*"...the types of machines that would be used in pharmacy are [not] all that accurate..." – GP1*  
*"...the main issue is the correct technique of BP measurement..." – GP6*

Within the context of this emerging theme, it was also a common concern of the interviewed GPs that the CVD risk assessments performed by pharmacists would be targeted to the wrong group of individuals, who were often referred to as the "*worried well*"; that is, those that are considered as being at low-risk for developing CVD.

*"...I have concerns that [it] will target the 'worried-well' [and] not the target group..." – GP1*  
*"...what concerns me is the selection process for screening patients..." – GP7*  
*"...unduly distressing people and underplaying high risk..." – GP23*

**Pharmacists' competency**, which encompassed their qualifications, skills or training in the provision of CVD risk assessment services, was also an important dominant oppositional theme which emerged for the GP interviews. Pharmacists' training in CVD risk assessment was often perceived by the participating GPs as being deficient.

*“...pharmacists have basic training to identify risk factors but they would need to up-skill...” – GP6*  
*“...can't vouch for pharmacist training. Heart can mimic so many other things. What worries me is the symptomatic patient. I have vast training and I have missed this...” – GP9*  
*“...realistically how many pharmacists are trained in [this] area” - GP15*  
*“...not sure of training - [pharmacist] would need special training...” – GP20*

Many of the GPs interviewed were unsure of the extent of pharmacist training, and only a few were relatively confident that community pharmacists were adequately trained for screening individuals for potential CVD risk factors.

*“...pharmacists do have the appropriate training to perform such checks...” – GP2*  
*“...[screening for CVD risk factors] is not rocket science...” – GP24*

However, GPs showed skepticism about pharmacists having sufficient training for adequately interpreting the results of screening tests and were concerned of them diagnosing CVD based on a limited knowledge of individual risk factors. One of the concerns raised by several GPs was whether a pharmacist could clearly distinguish between those cases that required referral for further investigation by a GP from those that would not need a more thorough follow-up assessment. Also of concern was whether or not there would be a proper follow-up system in place at the pharmacy, and if it was made in a timely manner. A few GPs indicated that as long as there were clear guidelines regarding referral, especially in difficult cases, it may be acceptable.

*“...pharmacist could be led onto a track which is not correct following [a] patient [who is] not disclosing important information. [What is] important is [to] identify [a] serious case [and then establish a] referral...” – GP15*  
*“...anyone can do checking - it's what happens after that -recognizing [the] problem then [provide the] right advice...” - GP16*  
*“...[the pharmacist] may not know how to best interpret information...” – GP23*

**Costs** associated with CVD risk assessment services provided in community pharmacies was the fourth dominant oppositional theme that emerged from the GP interviews. Although there is a cost associated with a GP consultation, some GPs pointed out that there would also be a cost associated with a pharmacy-based CVD risk

assessment. It was also highlighted that if the pharmacist assessment resulted in a GP referral, the patient would have to pay twice for an assessment and follow-up management that could have been done in only one consultation. Some GPs made reference to the funding available through some of NZ's district health boards (DHBs) for CVD risk assessment services in primary care. Overall, it was viewed that primary care services provided in community pharmacies would be an inappropriate utilisation of this funding.

*"...in the end it's going to cost the patient more –they pay \$5 -\$10 to have their blood pressure at the pharmacy and then pay again at the doctor..." - GP11*

*"...cost [is] a barrier if [patients] have to pay. Free through GP - pharmacies charging – [at GP] being funded through DHB, [it is] free of charge [for the patient]..." – GP14*

Within the context of this oppositional theme, the interviewed GPs also viewed the provision of CVD risk assessment services in community pharmacies as being in conflict of interest associated with commercial pressures in retail pharmacy which could influence the advice given to pharmacy consumers by community pharmacists.

*"...are the pharmacists just doing it to make money? To supplement their income?..." – GP5*

*"...[I] cannot see the point of pharmacists being involved other than for financial opportunity..." – GP11*

*"...[community pharmacies] charging people - [will consumers be] pushed into doing something?..." - GP20.*

Another potential barrier for pharmacist-led CVD risk assessment services which emerged predominantly as an oppositional theme from the GP interviews was **patient acceptability** of the services, although these were brought up during the interviews by only a few GPs. Maintaining patient privacy and confidentiality of the information in a community pharmacy setting was seen to be problematic for the purposes of private consultations and advice provision.

*"...confidential room must be used..." – GP18*

*"...[patient] consent is an issue..." – GP21*

**Time** required for the provision of CVD risk assessments in community pharmacies emerged mostly as an oppositional theme from the GP interviews, who indicated that time constraints related to the operation of a retail pharmacy would make it difficult to comprehensively also operate effectively patient-centred services.

“...it is time intensive so would need to have time to devote in amongst all the other things that need to get done [in the pharmacy]...” - GP3

“...[it] is extra work...” - GP15

However, a few GPs viewed having pharmacists involved in CVD risk assessments as being a potential benefit for their busy practices, acknowledging that although it is a time-consuming service, having other healthcare practitioners involved would be beneficial.

“...it is good -[often] a time issue when people present to GP...” - GP13

“...may be pharmacists would have more time and [may be] less threatening [for the patient]...” – GP8

#### **5.3.3.4 Additional findings from the GP interviews**

Although not specifically related to CVD risk assessment and management, this study enabled the exploration of GPs' views on other important issues relevant to the provision of patient-centred services in community pharmacies. When directly asked about their opinion on pharmacist involvement in **medication management** services, particularly those which would involve pharmacists' **prescribing, altering medication doses, and issuing repeat prescriptions**, GPs expressed concerns and were not supportive about pharmacists' involvement in prescribing. Regardless of whether pharmacists were able to access results of relevant laboratory tests and having a complete patient history, almost all interviewed GPs were opposed to the idea of pharmacists altering doses or prescribing for CV risk factor management. Some mentioned they were comfortable with a pharmacist providing continuing supply of previously prescribed medications, provided these were issued to regular (known) patients and for a limited supply (2 to 3 days), particularly on weekends.

When directly asked what GPs perceived to be the **pharmacist role** in the provision of primary care services, medicines information was the most frequent response obtained, this included roles such as counseling patients on relevant side effects of medications, advising or alerting prescribers and patients on drug interactions, and teaching patients on medicine indications and the goals of pharmacotherapy. Only a few of the interviewed GPs perceived patient-centred services to be the pharmacists' role, a few mentioned involvement in smoking cessation and anticoagulation monitoring services would be of potential benefit.

### 5.3.4 Discussion

The themes identified as a result of the GP interviews were largely consistent with findings of previous studies exploring GP perceptions on the provision of health screening services in community pharmacy settings; that is, GPs generally are not supportive of pharmacists involvement in patient-centred services and largely favour the preservation of the “product-focused” role for pharmacists.<sup>5,11,20,28,48</sup> The findings from NZ surveys are very similar.<sup>22, 23,26,36</sup> What is most concerning about these results is that despite the significant advancement in clinical pharmacy practice since the early 1990s<sup>43,49</sup> and more dramatically in the last decade with several countries legislating pharmacist prescribing, little change in GPs' views in regards to the extended clinical role of pharmacists has been seen since the earlier reports. These also favourably rated pharmacists' traditional functions, including dispensing medications, patient counselling, medication information, and basic follow-up monitoring of medication therapy – usually limited to side effect/drug allergies/interactions.<sup>15-19</sup> One would have expected that over the last decade GPs - who most likely have been experiencing increasing contact with pharmacists through various forms of professional interactions or interdisciplinary clinical encounters, and exposed to the substantial literature available supporting pharmacists in primary care roles - would have had a more positive view towards the evolution of community pharmacists' role and provision of more patient-centred services. It is also possible that despite the available literature, GPs have never seen a pharmacist in these roles.

Only a few studies have examined GPs' views specifically related to CVD risk assessment and management by pharmacists.<sup>28,36</sup> In this study, the interviews revealed that GPs perceived that if community pharmacists were to engage in CVD risk assessments their role should, at best, be complementary to their own role. Investigation of the main underlying oppositional themes cited (hierarchy, comprehensiveness of services, pharmacists' competency, and cost of services), revealed that GPs had significant concerns about competition from pharmacists for services traditionally provided in general practice, and particularly for those for which a funding structure already existed. This suggests that the GPs were possibly motivated to protect their own business interests, which may have influenced their views in regard to CVD risk assessments, an important revenue stream for many general practices in NZ.

Studies between 2000 and 2010 in the UK, Australia, and the United States (US) have shown similar findings in relation to extended roles for community pharmacists, most of them indicating strong opposition for pharmacists performing CVD risk factor-related screening services.<sup>1,5,11,12,14</sup> A recent study which explored GPs' perceptions of pharmacists' new services in NZ indicated similar oppositional views to those reported in the earlier studies.<sup>26</sup> The overall results of the studies reviewed, show that although many GPs appear to be accommodating to some of the professional changes and initiatives in community pharmacy, they also perceive that some of these initiatives constitute a threat to their autonomy and control. Such unchanging attitudes in the part of GPs are likely to prevent community pharmacy from achieving a professional status within primary care, particularly in regard to CVD risk assessment services.

Another important perceived barrier for the provision of pharmacist-led CVD risk assessment services in community pharmacies cited by the participant GPs in this study related to inadequate pharmacist training. GPs questioned the pharmacists' competency for identifying individuals at potential risk of CVD, being able to perform or interpret relevant laboratory data, and being able to refer suitable patients to their GPs for further assessment and/or management in a timely manner. These results suggest that GPs appear to have limited awareness of pharmacists' training or continuing

professional development obligations in order to fulfill the requirements to renew their annual practising certificate. Results of other previous studies have revealed that many GPs are generally unaware of the depth of pharmacists education, particularly with respect to pharmacotherapy.<sup>20,50</sup>

Interestingly, in a study in Scotland which explored the views of GPs in regard to pharmacists' involvement in monitoring the use of over-the-counter (OTC) simvastatin for the management of dyslipidemia, GPs did not agree that pharmacists should have access to information in medical records to be able to perform CVD risk assessments to assess if OTC simvastatin was indicated.<sup>28</sup> In this Scottish study, GPs perceived that pharmacists lacked sufficient training to be able to interpret relevant clinical information and use it adequately to estimate CVD risk. These results suggest that GPs are possibly uninformed about the extent of pharmacists' training and are largely unaware of the curriculum for the formative professional education of pharmacists - which has also been evolving and becoming more patient-focused rather than product-oriented, with an increased emphasis on pharmacotherapeutics.

The provision of pharmacist-led CVD risk assessments was also perceived by the participant GPs as a potential for duplication and/or fragmentation of primary care services. These were thought to duplicate, to some extent, the current practices of GPs and nurses. Duplication would consequently increase workload unnecessarily and translate into increased associated costs. GPs also feared that the availability of CVD risk assessments services in community pharmacies would cause discontinuity of patient care by reducing the frequency of GPs seeing their patients, and by impairing GP-patient relationships. They feared this fragmentation of patient care could potentially lead to confusion and harm in the part of the patient and also a potential for conflict between the professions.

Very similar views have been expressed by GPs in more recent studies of GPs' perceptions on the extended services provided by community pharmacists in NZ.<sup>26</sup> However, the oppositional views in all of these studies - and more specifically in those related to the role of pharmacists in CVD risk assessment and management services - are contradictory to the available evidence derived from outcome-research studies.

Randomised controlled trials on pharmacist-management of CV risk factors have shown a positive relationship between pharmacy-based interventions and reduction of risk behaviours and better control of risk factors for CVD than those shown by usual care.<sup>43, 51-54</sup> Increased GP awareness of the positive effects of these extended roles for pharmacists need to be better disseminated in the medical literature to support the implementation of clinical services within community pharmacies.

Overall, fewer enabling themes related to pharmacist involvement in CVD risk assessment emerged from our GP interviews. Improved access to primary healthcare services and wider opportunistic screening were predominantly identified, although some GPs voiced reservations regarding the need to assure patient privacy. GPs' positive perceptions of pharmacists included that they were very accessible, had a unique relationship with patients, had convenient opening hours, and were a source of health information for the public. These findings differ slightly from other studies which viewed improved access with skepticism, believing that financial conflicts of interest on the part of community pharmacies required to develop these services and possible fragmentation of care, would outweigh the potential benefits of improved access.<sup>20,36</sup>

In this study, participating GPs voiced predominantly positive attitudes in regard to pharmacists' CVD risk factor assessments as it was perceived that, if working in close collaboration with GPs, these would translate in a greater proportion of the population being properly assessed for modifiable CVD risk factors, and flag individuals at high risk who would benefit most from prompt interventions. Although improved access was also voiced positively by GPs in other surveys, the context of benefit alluded to in most of these studies was related to convenience in location or hours of operation.<sup>11,26</sup> In our study, improved access meant a powerful advantage for pharmacist-led CVD risk assessment services, as it was felt that it would cover a wider catchment area than that available in general practices.

Collaboration between community pharmacists and GPs has often been identified in surveys as a facilitator for the implementation of patient-centred services in community pharmacies. Collaborative care also emerged as an enabling theme in our study. Working as a team was viewed not only to be beneficial to the inter-professional

relationship between GPs and pharmacists, but most importantly it was also viewed as being of direct benefit to the patient. Each practitioner has different strengths which, when creating a united front, will help to improve the quality of life of patients. Studies have demonstrated the effectiveness of collaboration on the provision of better patient care and improved clinical outcomes.<sup>55,56</sup> The NZ Guidelines Group have developed user-friendly CVD risk assessment and management guidelines which are meant for all health practitioners in a primary care role.<sup>46</sup> Addressing the follow-up of these guidelines in a collaborative interdisciplinary environment, would provide a level of consistency for all health practitioners working towards optimisation of CV risk factors.

These findings call attention to a need for systematic support of teams, particularly to ensure that all parties are working towards the same patient goals and that team members communicate effectively and consistently. Reports in other countries have highlighted the need for greater collaboration between the two professions, and if barriers exist, these must be overcome before comprehensive inter-professional working can be realised.<sup>20,56-59</sup> Lack of communication and misunderstanding of roles by GPs and other members of the primary health care team, have been reported to undermine the potential of the primary health care team.<sup>12,19,56</sup>

Professional identities and traditional power structures have often created conflict between GPs and other health care practitioners (HCPs) and managers.<sup>56</sup> Both professions should have a good understanding of and, insight into, practice from a global perspective, including professional training, rights and responsibilities as well as inter-professional relationships. It is also important that pharmacists understand medical practitioners' expectations of them and how they value the pharmacists' input regarding patient care.<sup>12, 57</sup> These findings suggest that a new generation of professionals is required to promote an inter-professional culture. Inter-professional continuous professional development might be a good opportunity to support consistent, efficient and effective CVD risk assessment and management practices in primary care. This multi-disciplinary training - at both undergraduate and postgraduate levels - may go some way to improving mutual understanding, trust and communication.<sup>58</sup>

Exploration of the GPs' understanding and acceptance of the current and potential future roles of community pharmacists in regard to CVD risk management revealed that the majority of GPs were not comfortable with community pharmacists being given the right to make changes on prescriptions without prior consultation with the prescriber. However, other aspects, such as pharmacists' responsibilities related to detecting and preventing medication errors, providing patient education, and suggesting use of non-prescription medications were generally well accepted and supported.

Again, these findings are consistent with those previously reported in the literature for other types of extended roles for community pharmacists.<sup>1,5,11,22,26,57</sup> The acceptability of new pharmacist roles and prescriptive authority is beginning to be further explored in various countries with mixed results being reported.<sup>14,60,61</sup> However, what appears to be a consistent finding is the need to establish more collaborative practices between pharmacists and GPs; and for these to be effective, communication amongst health professionals in primary care settings need to be improved.<sup>59</sup> Several authors have reported on how best to integrate a pharmacist to a primary healthcare team. Using action research, Kolodziejak and colleagues designed a template consisting of eight steps which highlight the importance of selecting a collaborative process and team, defining the role of the pharmacist, determining the logistics of providing care, establishing credibility, re-evaluating the role as it evolves, and obtaining patient feedback.<sup>62</sup> Pharmacists wishing to be involved in primary healthcare teams can follow this template to assist them with integration. Other ways to facilitate this integration include a more close involvement of pharmacists in the development of guidelines and care pathways, as well as educational programmes for GPs and other government stakeholders. In this manner, pharmacists' recommendations on their role in cardiovascular screening programmes, assessment of cardiovascular risk and its management, can be disseminated to a larger segment of those in charge of delivering cardiovascular care for the population.

There were some limitations to this study. Overall, due to the inclusion criteria and non-probability convenient sampling that yielded a small sample size, it is possible that not all relevant themes emerged from the interviews.

The sample of GPs was mostly from practices located in West Auckland; therefore, there is a possibility that GPs' views expressed in these interviews may not necessarily have captured the whole spectrum of opinions of GPs practising in other Auckland areas or other cities in NZ. However, the inclusion of seven other participants from other areas in Auckland may have allowed maximum variability in terms of demographic characteristics. In addition, data saturation occurred in the analysis of interview findings whereby subsequent interviews did not yield new coding categories, may confirm adequacy of the sample recruited.

Recruitment of GPs to participate in the interviews was difficult; some GPs approached were unable to participate despite expressing initial interest, and arranging suitable appointment times with those who agreed to participate was challenging. This posed limitations to our sample size. There are no guidelines in the literature regarding the appropriate number of interviews to achieve data saturation. Although, in pharmacy practice, researchers have typically interviewed between 15 and 50 participants.<sup>63</sup>

It is also likely that those who agreed to be interviewed were highly motivated GPs who may have already background awareness of community pharmacists' enhanced roles in primary care settings and in CVD risk factor assessment or screening services. Issues such as recall and social desirability bias, which may present a threat to the 'trustworthiness' of the data, should be noted.<sup>64</sup> However, these are the individuals who are likely to lead developments and hence their inclusion is justified and provide valuable information.

## **5.4 Pharmacists' views on the provision of cardiovascular risk assessment and management in New Zealand community pharmacies**

### **5.4.1 Research objective**

This research aimed to understand the issues pharmacists face for the provision of CVD risk assessment services, as well as to investigate their perspectives and experience in the provision of these enhanced services in community pharmacies. The

study also aimed to explore pharmacists' understanding of CVD risk assessment, the actual medicine management services they provide to people with CVD, and their views in regard to the challenges and opportunities for the provision of these services within the NZ primary care sector. At the time when this research took place, limited research in this area was available in NZ.

## **5.4.2 Research strategy**

A pilot study was undertaken first in the Auckland area, this included a site visit and a semi-structured face-to-face interview. A second more formalised study was then undertaken which aimed at providing data from pharmacists throughout NZ, and was conducted using telephone interviews.

## **5.4.3 Face-to-face interviews and community pharmacies observation - Pilot study**

### **5.4.3.1 Methods**

Following a literature review, a semi-structured interview tool was drafted, together with a participant information sheet and a consent form. The interview tool was first piloted with two willing pharmacists and their feedback was incorporated. The final interview tool consisted of 23 questions divided into three sections ([Appendix 5.3](#)). In the first section, pharmacists were asked about their views in regard to pharmacists' role in the provision of public health services overall and in CVD risk assessment services in particular. The second part of the interview consisted of obtaining a comprehensive description of the CVD-related services provided in the pharmacy which was also possible through observation of the premises. The last part of the interview explored pharmacists' opinions on the challenges they faced in regard to implementing CVD-related services and their views on how these challenges could be overcome. Ethical approval was granted by the University of Auckland Human Participants Ethics Committee (reference 2006/Q/Q10).

A sample population of thirteen charge pharmacists in the greater Auckland area was selected from the Pharmacy Guild of NZ database of community pharmacies.

Each pharmacy was posted an invitation for their pharmacists to participate in the study; a participant information sheet, consent form and a return envelope addressed to the School of Pharmacy was included. On receiving the consent form, the respondent pharmacist was contacted, and an interview time and pharmacy site visit were scheduled. Pharmacists continued to be recruited into the study until no new themes emerged from the transcribed face-to-face interviews.

A total of 13 pharmacists were interviewed and field notes were made during the site visit. Each interview was audio-recorded and later fully transcribed for analysis. Field notes were entered into MS Word for facilitating the review by the researchers. Coding was assisted by the use of NVivo® (QSR International, Cambridge, MA), a programme for the management of qualitative data.<sup>65</sup> Transcriptions of each interview were read and independently scrutinised by two members of the research team. Systematic revision of the collected data allowed an inductive enhancement of the interview schedule, in structure and wording, until a stable semi-structured format emerged.

Data were then analysed and coded using a thematic content analysis framework. Each analyst read all transcripts several times to familiarise him/herself with the issues raised and developed a coding framework to establish themes. Initial codes were identified independently and all data supporting the codes were highlighted in the field notes that were transcribed into the MS Word files. These initial codes were entered in NVivo® which facilitated the process of sifting through data and to group them to form themes. NVivo® also facilitated the identification of all instances in which a particular theme was raised. This enabled checking the descriptions of views across all respondents and identification of inconsistencies with the emerging themes, which were then corroborated by the research team. Once agreement had been achieved, these themes were written into a narrative form to provide an accurate illustration of the theme using quotations taken directly from the transcripts.

### 5.4.3.2 Results

The sample of pharmacists (n=13) was split into two groups: Group A (n=7) consisted of pharmacists who provided some point-of-care (PoC) testing and/or screening services for the assessment of CVD risk; and Group B (n=6) included pharmacists who did not provide any of these services. Various parameters were explored during the interviews, these are summarised in *Table 5.3*. One of the pharmacists interviewed indicated that the only CVD-related service provided at the pharmacy was measurement of body mass index (BMI). We did not consider this measurement (if done in isolation) as a CVD-related service if it was provided on its own. Blood pressure measurement was the most common service provided by Group A pharmacists. None of the pharmacists interviewed provided a comprehensive CVD risk assessment service as recommended in the NZ Guidelines Group guidelines.<sup>46</sup>

***Table 5.3: Characteristics explored during the pharmacists' interviews***

Characteristics explored	Group A (n=7)	Group B (n=6)
<i>CVD-related services provided</i>	Weight loss programme (1) Blood pressure measurements (6) Blood glucose PoC testing (4) Blood cholesterol PoC testing (4) BMI measurements (2)	None (6) BMI measurements (1)
<i>Pharmacy characteristics</i>	Franchise (6) Independent (1) Separate consultation room (6)	Franchise (2) Independent (4) Separate consultation room (1)
<i>Rx attitude to CVD-related services</i>	Generally positive (4) Positive with reservations (3) Generally oppositional (0)	Generally positive (1) Positive with reservations (3) Generally oppositional (2)

**Legend:** BMI=body mass index; PoC=Point of care testing; Rx=Pharmacist

The attitudes of the pharmacists in relation to their role in CVD-related services was also categorised as “*generally positive*” (pharmacists felt enthusiastic about their role in CVD risk factor assessment and viewed this was a definitive goal for future

pharmacy practice in primary care), “*positive with reservations*” (pharmacists still thought there was a role for pharmacists in CVD risk assessment services, but had lost enthusiasm or had some doubts of the outcomes of such services in public health), or “generally oppositional” (pharmacists had strong negative views, voiced frustration, or had lost enthusiasm in implementing CVD-related services in their pharmacies). Most of the pharmacists showed positive attitudes in regards to the provision of CVD-risk assessment services in community pharmacies, although those in Group B seemed to have more reservations or voiced more opposing comments than those in group A. Also, it was observed during the interviews that Group A pharmacists had separate consultation rooms and were mostly a franchise operation rather than independently owned business.

Emerging themes from the pharmacists’ interviews were categorised as “*challenges/barriers*” or as “*enabling*” themes for the provision of CVD-related services. A total of seven themes emerged as “*challenging/barriers*”, these are described in [Table 5.4](#) together with a supporting pharmacist’s interview quote. A total of five “*enabling*” themes emerged, these are described in [Table 5.5](#) together with a supporting pharmacist’s interview quote.

**Table 5.4: Themes identified as “challenges/barriers” in the provision of CVD-related services in community pharmacies**

<b>Challenge/Barrier (times quoted)</b>	<b>Supporting quote</b>
<b>Time (10)</b>	<i>“... pharmacist time is very expensive and so you have to make sure there is a return on your investment...” - Pharmacist 4</i>
<b>Reimbursement for services (7)</b>	<i>“... I would like to see a program where if I kept my customers healthy, I was paid an endorsement fee...” - Pharmacist 6</i>
<b>Workload/Staffing (6)</b>	<i>“... you would need extra staff I suppose or, put pressure on the staff...” - Pharmacist 11</i>
<b>Privacy/Consult Room (5)</b>	<i>“... we don’t actually have a consulting room at the pharmacy and wouldn’t want to do it in the office so that would certainly be something we would need to look at as well...” - Pharmacist 13</i>
<b>Increased cost to the patient (4)</b>	<i>“... and I don’t think customers are often willing to pay...” - Pharmacist 11</i>
<b>Training (4)</b>	<i>“... the initial challenges would revolve around training. And then the training itself, the time for that. So we’re talking here about staff training...” - Pharmacist 4</i>
<b>Increased cost to the pharmacy (2)</b>	<i>“... I guess there’s some promotional challenges - how you promote the service, and where, how much advertising dollar do you put into it and how should it be promoted...” - Pharmacist 2</i>

**Table 5.5: Themes identified as “enabling” in the provision of CVD-related services in community pharmacies**

<b>Enabling themes (times quoted)</b>	<b>Supporting quote(s)</b>
<b>Remuneration (10)</b>	<p>“... nobody’s running a charity, in the end it comes down to dollars and cents. When dollars and cents arrive, then things happen...” Pharmacist 9</p> <p>“...something that pharmacies should be tasked with doing, some sort of contract...” - Pharmacist 8</p>
<b>Training programme (6)</b>	<p>“ ... understand the significance of a CVD risk assessment and then be able to communicate that to a patient so that they too understand - this needs adequate training...” - Pharmacist 4</p> <p>“...training for doing full assessment not just screening...” - Pharmacist 8</p>
<b>Appropriate staff (4)</b>	<p>“...quality staff who understand what they are doing and why they are doing it – to provide a quality service...” - Pharmacist 9</p>
<b>External support (3)</b>	<p>“... covering how to setup the service and guide to complying with [technical/equipment] audits...” - Pharmacist 7</p>
<b>Collaborative programme (2)</b>	<p>“...there needs to be a big “hui” between prescribers, the doctors, the pharmacists and the practice nurses and to start to get some areas where they feel it’s actually ok for pharmacists to be involved, some reassurance that we are not trying to take their income stream away from them and I think it’s a huge issue that we need to deal with...” - Pharmacist 12</p>

### 5.4.3.3 Discussion

The results of this exploratory study suggest that the pharmacists interviewed were initially generally positive about providing CVD-related primary care services and indicated that this was an important role for community pharmacists. However, their enthusiasm faded as the interviews progressed, concentrating the discussion in the challenges they faced with implementing these services within their practices rather than on the enabling factors which they were willing to explore for making it possible to offer these services. These findings suggest that the changing role of community pharmacy from traditional dispensing activities to greater involvement in health improvement is largely accepted, and the importance of providing these services is understood. However, the bulk of the emerging themes from the interviews indicate that

the public health role is still considered secondary to dispensing and other medication-focused roles.

Another important finding of this exploratory study was that all the pharmacists interviewed indicated that CVD risk assessments - as defined by the NZ CVD risk assessment and management guidelines<sup>46</sup> - were not provided in their practices. In addition, only half of them indicated that they provided CVD-related screening services or CVD risk factor monitoring. Almost all pharmacists interviewed indicated that CVD-related services were actually being downsized in their current practices and viewed growth or expansion of these services as not a priority in their immediate future. Pharmacists viewed public health activities as less important than traditional roles and were less confident in providing these.

*“... probably the desire for [the provision of CVD-related services] is a little bit gone for me because of time and being busy in the dispensary...” - Pharmacist 10.*

This finding is consistent with perceptions of pharmacists in the UK<sup>3</sup>, the US<sup>4</sup> and Canada<sup>2</sup> who felt there would need to be acknowledgement of their expanding roles in health promotion in the form of remuneration and training made available before such activities would be considered for future pharmacy practice. The challenges and barriers voiced by the interviewed pharmacists in this study which explored their views specifically in regards to CVD-related services are in line with those voiced from the national survey of pharmacists in regards to the provision of health/disease screening and/or medication monitoring/management services in community pharmacies - as it has been reported in Chapter 3 of this thesis. Although it is acknowledged that some CVD risk factors (such as blood pressure and obesity) are being monitored by community pharmacists, they are not necessarily working towards achieving the profession's strategic goals of focusing on direct-patient care activities through collaborative care services in primary care, as outlined by the Pharmaceutical Society of NZ, in the document *Focus on the Future: Ten-Year Vision for Pharmacists in New Zealand: 2004–2014*.<sup>66,67</sup>

It is also acknowledged that this pilot study had limitations in regards to sample size and selection. Participants might have been motivated to assist the researchers or had strong feelings and opinions with regards to screening services being offered in community pharmacies, therefore there is a potential source of error as a consequence of self-selection. However, by visiting the pharmacies and interviewing pharmacists *in situ*, it was possible to observe the resources available in pharmacies and better explore the pharmacists' understanding of the issues regarding the provision of CVD risk assessment services. In order to have a larger sample of pharmacists, it was decided to expand these interviews nationwide. The NZ-wide pharmacists' interviews are described in section 5.4.4.

#### **5.4.4 New Zealand wide pharmacists' semi-structured telephone interviews**

##### **5.4.4.1 Methods**

Telephone-based semi-structured interviews were chosen as the method for collecting information from pharmacists located throughout NZ. Similar questions to those in the pilot study described in *Section 5.4.3* of this thesis were used for the telephone interviews. The questions were slightly modified and structured in a way to allow going through the questions in less than 15 minutes. Pharmacist's responses were collected using the semi-structured interview tool (*Appendix 5.4*), with field notes manually recorded directly into the interview tool at the time of the interview. Interviews were not audio taped. Questions regarding pharmacists' role in the provision of overall public health services were omitted as this topic was previously explored in the NZ-wide survey of community pharmacists, as described in Chapter 3 of this thesis. Pharmacists working in community pharmacy throughout NZ were mailed an invitation letter, participant information sheet, consent form and postage paid reply envelopes. A total of 921 letters were mailed out. On receiving the signed consent forms, participants were interviewed at a time that was convenient to them, as indicated on the consent form.

The research team independently reviewed each transcript and field notes of open-ended questions to identify and sort segments of data with similar concepts into distinct categories. The focus was to investigate the capacity of community pharmacy to

provide CVD-related services; therefore the interview concentrated on examining the factors that pharmacists perceived as potential enablers and challenges to providing CVD risk assessment services in community pharmacies.

Data were then analysed and coded using a thematic content analysis framework consisting of each member of the research team reading all transcripts several times to get familiar with the issues raised and develop a coding framework to establish themes, in a similar fashion as that described previously in *Section 5.4.3.1* of this thesis. Coding was assisted by the use of *NVivo®* (version 9, QSR International, Cambridge, MA.)<sup>65</sup> Demographic information of participating pharmacists and other relevant quantitative data (questions 1-7, 12, 14 and 15) were analysed using *Microsoft Excel* (version 12, 2006). Illustrative quotations were chosen to provide justification for the definition/basis of themes and potential variables, as is standard practice for qualitative studies.<sup>38</sup>

#### **5.4.4.2 Results**

A total of 60 pharmacists agreed to participate in the telephone interviews. Saturation of themes was achieved within this number. Of these 60 pharmacists, the majority were males (32, 53%), worked in urban community pharmacies (37, 62%), were in the age group between 46-60 years (22, 37%) and had been in practice for more than 10 years (28, 47%). Descriptive characteristics of the study participants are summarized in *Table 5.6*.

When questioned about CVD-related services provided in their practice, the majority of pharmacists interviewed (34, 57%) indicated they provided some form of PoC or screening for assessing individual CVD risk factors, but only about one-third of these (10, 29%) reported performing a comprehensive CVD risk assessment using prediction tables, as outlined in the NZ CVD risk assessment and management guidelines<sup>46</sup>. Blood pressure screening was offered by all of those providing CVD-related services, while blood cholesterol screening was the least frequently offered. The other CVD-related service provided often was weight management (reported by 24 out of the 34 pharmacists offering CVD-related services). When pharmacists were asked whether offering these screening services would be sufficient to provide a

comprehensive CVD risk assessment, answers were almost equally divided (48%=yes, 50%=no). However, most pharmacists (93%) indicated that they would not need to be authorised to prescribe in order to offer CVD risk assessments.

**Table 5.6: Characteristics of pharmacists participating in the telephone interviews**

Sample characteristic	Frequency (n,%)
<b>Gender:</b> Male Female	32 (53%) 28 (47%)
<b>Age group:</b> < 30 years 30 - 45 years 46 - 60 years > 60 years	17 (28%) 15 (25%) 22 (37%) 6 (10%)
<b>Years since graduation:</b> < 5 years 5-10 years 11-20 years > 20 years	12 (20%) 9 (15%) 11 (18%) 28 (47%)
<b>Practice geographical area:</b> Urban Sub-urban Rural	37 (62%) 9 (15%) 14 (23%)

Regardless of whether the interviewed pharmacist provided CVD-related services in their current practice environment, their views in regard to the overall benefits of providing these services was explored during the interviews. The major themes that emerged when benefits were explored included: *increased and wider access for patients* and *increased pharmacist job satisfaction*; these are further described below.

***Increased and wider access to CVD risk assessment services for patients*** was the predominant enabling theme that emerged from the pharmacists' interviews. Pharmacists mentioned that community pharmacies were "*easily accessible*" making them convenient for patients to undertake CVD-related services and risk assessment.

*“... able to give an immediate result since we don't need to send people away to the laboratory to get their test done...” - Pharmacist 50*

*“... because patients are able to do everything in one go (screening—result—counseling) compared to waiting at home for the result...” - Pharmacist 55*

Other views expressed by pharmacists under this theme were that CVD risk assessments services in community pharmacies have the potential to allow earlier detection of risk factors which could lead to better health maintenance for the patient. Pharmacists also revealed that this improved access would also allow wider screening because a wider variety of people come into the pharmacy and can *“catch people that don't go to see the doctor”*. In addition, this increased access does allow pharmacists to educate and increase public's awareness on CVD, as well as promoting people to undertake the assessment:

*“... we are able to screen a wider range of people, able to promote people to do the screening and raise their awareness of their own CV health...” - Pharmacist 9*

*“... easily accessible, screen a wider range and more people, pick up risk earlier to prevent people ending up in hospital, it is easier to promote such service in pharmacy because of the wide variety and number of people that cone into the pharmacy each day....” - Pharmacist 21*

Pharmacists also felt that this increased access give them the opportunity to build a stronger relationship and trust with their customers as they are able to follow up with them more often. Pharmacists were also seen as more approachable and less threatening because *“public are not as intimidated by pharmacist's knowledge”*, thus can encourage more people in the community to undertake CVD risk assessments. Pharmacists perceived that this has the potential to improve their customers' adherence with cardiovascular medications and follow the advice they are given after the assessment has been completed:

*“... pharmacists see the patient more often than doctor thus easier to follow up and we have better relationship [with patients] which can lead to increase compliance...” - Pharmacist 17*

**Increased pharmacist job satisfaction** was another dominant emergent theme in regards to benefits. The pharmacists who took part in the interviews clearly saw themselves as playing a part in the provision of primary health care and that they believed that redefining community pharmacy practice, being considered as part of the primary health care team, and enhancing their professional status would provide them with job satisfaction:

*“... [provision of CVD-related services in community pharmacies] enhance the health professional image of a pharmacist and reinforce to the patient that pharmacists do more than just dispensing and that we also help with managing their general health ...” - Pharmacist 2*

There was a general feeling that their skills were being under-utilised and that they could play an important role in CVD primary prevention strategies. The majority of the pharmacists expressed a sense of achievement when they were able to find patients with modifiable risk factors, they believed that they could provide more help with medicines management, promotion of healthy life-styles and giving advice to their patients. Some pharmacists also identified that they felt being involved in the provision of CVD risk assessments allows them to utilize their clinical knowledge and make their job more interesting.

*“... [I feel] able to prevent or delay those at risk from going on to medication...” - Pharmacist 33.*

*“...[makes job] interesting, build[s] strong long term relationship with both the patient and other health professionals, more opportunity to communicate with the patient at different level...” - Pharmacist 49.*

Although some financial benefits for pharmacists were voiced as perceived benefits of providing CVD risk assessment services, this benefit was often voiced in the context of job satisfaction:

*“... [provides] job satisfaction and [it is] good for business since can build relationship with customer...” - Pharmacist 31.*

Although pharmacists were able to identify the benefits associated with offering CVD-related services, many themes emerged from exploring the challenges pharmacists were facing in offering and/or implementing CVD risk assessment services

within their current practice environment. Their comments on challenges focused on four main barriers related to the perceived competency of the pharmacist in regards to being able to provide CVD risk assessments in a comprehensive manner, considering that they are already busy running a dispensary-focused community pharmacy practice which operates mainly on internal, dispensary-based funding models. These themes are further described below.

Themes relating to pharmacists' perceived **competency** in regards to CVD risk assessment emerged mainly as barriers. Lack of confidence or not feeling comfortable performing CVD risk assessments because pharmacists perceived they had **inadequate knowledge, training or skills** required for the provision of these services was quoted frequently. Some pharmacists also commented that because these services need specific PoC testing, additional skills are required to do this properly, which many felt had not received appropriate training for.

*"...[I] need to brush up the skills and knowledge that are required to provide such service..." - Pharmacist 27.*

*"... [I] need to keep up to date with current information and knowledge regard[ing] CVD..." - Pharmacist 38.*

*"... [pharmacists] are not adequately trained thus [they are] not comfortable to provide new services [which] results in pharmacists [continue] doing what they know..." - Pharmacist 52.*

**Comprehensiveness** of CVD risk assessments if provided in community pharmacies was a major concern of the pharmacists. Lack of equipment or access to medical information required for the provision of a comprehensive CVD risk assessment was a dominant barrier quoted by pharmacists. The concerns centred particularly on the accuracy of the equipment available in pharmacies, as well as access to patient-specific clinical information; pharmacists felt that without these they would be unable to provide effective CVD risk assessments to their patients. Some pharmacists also added that GPs and the public would disapprove of CVD risk assessment in community pharmacies because they do not have confidence in the equipment that pharmacists use in community pharmacies for screening CVD risk factors.

*“...doctors oppose pharmacists providing CVD risk assessment because they are not confident in the equipments used in [community] pharmacy[ies]...” - Pharmacist 9.*

*“...pharmacist[s] cannot do a high accuracy CVD risk assessment with the accessible equipment and limited knowledge in this field...” - Pharmacist 22.*

*“...can only provide the basic assessment. Cannot access patient's medical history or other important information...” - Pharmacist 26.*

*“...cannot give a comprehensive assessment based solely on the information that the patient has told the pharmacist...” - Pharmacist 42.*

**Time** required for the provision of CVD risk assessments in community pharmacies emerged mostly as a barrier. Pharmacists identified a perceived lack of time outside the current dispensing responsibilities for performing CVD risk assessments. Various time constraints related to the operation of a retail pharmacy while offering services requiring performing PoC testing, interpreting results, and gathering patient information would make it difficult to effectively offer these services in the established community pharmacy model.

*“...there is not enough time to go through the full process with each individual patient thoroughly in the pharmacy...” - Pharmacist 29*

*“... it takes time to do a CVD risk [assessment] which can be hard in the context of pharmacy environment because people come in and out and expect to be served on the spot...” - Pharmacist 60.*

**Costs** associated with implementing or continuously offering CVD risk assessment services in community pharmacies was the fourth dominant barrier that emerged from the pharmacist interviews. Currently there is no external funding available to community pharmacies for the provision of any patient-centred CVD-related service; consequently these services are often offered at the patients' cost or at no profit for the operating pharmacy.

Almost all of the pharmacists offering the services perceived that they are forced to keep costs as low as possible and many ran the services at a loss, because if costs were high patients would prefer to have their CVD risk assessed at a GP practice, where it is usually reimbursed or cheaper. Some pharmacists also stated that they

were forced to discontinue offering CVD-related services because they could not longer afford the costs. In addition, if pharmacists were not currently offering the services, many voiced their reluctance in setting up the services because of the costs involved, many stating that there needs to be a review of the business model of community pharmacy before implementing patient-centred services can be considered.

“...no funding, patients are unlikely to pay if it is expensive...” – Pharmacist 2.

“...funding [issue], [it] needs to be viable long term...” - Pharmacist 4.

“...no funding, if the cost is too high they will just go to the GP to get it done...” - Pharmacist 31.

Regardless of whether the interviewed pharmacist perceived the provision of CVD-related services to be of benefit for improving primary healthcare delivery in NZ, pharmacists were asked about what would encourage them to offer these services within their current practice environment. The following enabling themes emerged from the interviews.

**Remuneration and funding** emerged as the most prominent enabling factors viewed by the vast majority of the interviewed pharmacists as an important incentive for offering CVD-related services in community pharmacies. Some pharmacists also indicated that **remuneration** to the pharmacy or pharmacist directly from the government or the DHB would likely provide a means of making these services sustainable over time.

External **funding** for service provision was also frequently mentioned by pharmacists as being of vital importance, not only to start but also to continue to offer the services. Funding for equipment and related resources for the provision of CVD risk assessment services was also mentioned as an enabling factor, not only for adequate service provision, but also for making the service sustainable and reliable over time. Having access to affordable equipment - the cost of the cholesterol POC machine and testing supplies was often referred to - as well as having standardized protocols and guidelines for providing the services, was often mentioned as important to assure continuity. Overall, when “*having adequate equipment and resources*” were viewed as

enabling factors, pharmacists also mentioned that these would only be possible if remuneration or funding for the services was readily available.

**Acceptance and awareness** from the public and other health care professionals for the role of the pharmacist in CVD-related services also emerged as a prominent enabling factor. Pharmacists felt that it was not sufficient to continue being active advocates of increasing public awareness on cardiovascular risks and their significance in the development of CVD, but that other health care professionals needed to understand better the role of the pharmacists in disease prevention and community pharmacies needed to be recognised as public health centres where CVD risk can be adequately assessed by a health professional.

Some pharmacists also indicated that it is vital that GP feel that *“pharmacists are assisting them rather than competing with them”*. Although this emerged predominantly as an enabling factor, when pharmacists were specifically asked if they had collaborative agreements or similar patient-focused services offered in close collaboration with general practice, the vast majority (91%) of interviewed pharmacists indicated they did not. Appreciation of the service from the public was also viewed as encouraging.

*“...pharmacy needs to be recognised as one of the place[s] [where] cardiovascular risk assessment can be done, increase public awareness of the importance of CV risk assessment...” - Pharmacist 36.*

**Comprehensive training** was another enabling factor that emerged from the pharmacists' interviews, they felt that training could provide them with the confidence to be more actively involved in offering CVD risk assessment services. When specifically asked, the vast majority of the participants indicated that they were willing to receive further formal training to be able to provide the service. Some were interested in shadowing other pharmacists who are already providing the services, so that they would have a good understanding of what it entails. Also, participants strongly felt that pharmacists with prescribing authorization would not necessarily be better equipped to offer CVD risk assessment services. However, a few had negative remarks about training programmes:

*"...[I am] sick of doing training for programmes that end up not working or not getting paid for..." - Pharmacist 19.*

Pharmacists were split in their views of the extent of the training needed. About half indicated that pharmacists are able to correctly take measurements, gather the required information from the patient and follow the current guidelines to do the assessment with the information available to them. The other half of the interviewees argued that pharmacists have limited capacity and lacked the clinical knowledge to perform CVD risk assessments. This latter group indicated that CVD risk assessment requires more experience and comprehensive knowledge to become competent to provide such a service. As such, they believed that CVD-related services can only be offered in community pharmacies as screening services, useful only to detect individual cardiovascular risk factors, for which individuals would need to be referred to other trained professionals - such as GPs - for an in depth assessment and management.

When specifically asked if they would take additional courses/further training to enable them to offer comprehensive CVD risk assessments, the vast majority indicated that they would. Although training emerged predominantly as an enabling factor, some pharmacists pointed out that offering the services was more related to the willingness of the pharmacists to implement practice change rather than having adequate training, as service provision requires them to step out of their dispensing role.

*"... [training] is good, but we need to encourage pharmacist[s] to step out of their dispensing role and change their way of practice..." - Pharmacist 18.*

**Evidence** supporting the efficacy and sustainability of offering CVD risk assessment services in community pharmacies often emerged as another enabling factor. Pharmacists felt that there was a need to have documented examples of the successes of these services to be able to demonstrate their utility to prospective funding stakeholders. In addition, some pharmacists felt they would like to be actively involved in NZ-based research that could lead to obtaining this local evidence.

*“... study showing that the provision of such service through pharmacy is beneficial to both the patient and GP as well as financially...” - Pharmacist 34.*

#### **5.4.4.3 Discussion**

In the two separate studies which explored pharmacists' views on the provision of CVD-related services in community pharmacies - as presented in sections 5.3 and 5.4 of this chapter – the pharmacists voiced ambivalence on this service provision. On the one hand they expressed positive views about providing CVD-related primary care services, indicating that this could translate into important benefits to patients – particularly increased and wider access for health screening and monitoring by a health care professional - and they acknowledged that their involvement would also translate in increased job satisfaction on their part; but on the other hand they expressed frustration and disappointment when they discussed their actual degree of involvement.

Amongst the sample of pharmacists who participated in these interviews only a few reported to be currently offering comprehensive CVD risk assessment services (as outlined in the NZ CVD risk assessment and management guidelines<sup>46</sup>). Some pharmacists reported to have experienced difficulties in running these services in the past, and reported that despite being enthusiastic and having a firm belief that the provision of CVD preventative services was an important role for community pharmacists, provision of such services in the future would only be considered if there was sufficient support in place to meet their business needs and if there was sufficient demand from patients; as well as appropriate recognition and a positive attitude towards the role of community pharmacists on the part of GPs.

These apparently conflicting views were evident from analysing the themes that emerged from the interviews. Many of the themes which emerged as challenges or barriers for service provision also emerged when pharmacists were asked to identify enabling factors. For example, pharmacists viewed the associated costs of running a CVD risk assessment service as a significant barrier, some even reported that they were forced to discontinue the services due to being unable to afford the expenses

associated with running some PoC tests and felt that the majority of consumers do not want to pay for these services and end up going to their GPs; therefore, they stated that having a suitable funding model or being remunerated for these services would eliminate this important barrier, or that remuneration would be an incentive to them for implementing or continuing to operate such a service. While discussing costs, pharmacists voiced that the complexities surrounding setting up these services are often initially underestimated and that the true cost per assessment is difficult to anticipate, which results in inadequate sustainability over time. Similar findings have been reported in the international literature.<sup>3,4,27,31</sup>

Another ambivalent attitude identified from the pharmacists' interviews was related to their competency in the provision of comprehensive CVD risk assessment services. Lack of confidence – mainly related to their skills in performing PoC testing rather than in interpreting the results of such tests – also emerged as a predominant barrier. Pharmacists viewed training as an enabling factor and pointed out that a more formalised course and hands-on training programmes in this area would enable them to become competent and confident in providing these services. Interestingly, when discussing training either as a barrier or as an enabling factor, some pharmacists indicated that more or less training would not really make a significant difference, that rather a change in practice in their part was necessary.

This diversity of thought and opinions in regard to competency and training needs may be related to misperceptions on the part of pharmacists in regards to the extent of knowledge and skills necessary to provide CVD risk assessment services. The split in the pharmacists' answers to the questions of whether already offering CV screening services would be sufficient to provide comprehensive CVD risk assessment, their ambivalence in regards to their willingness to engage in formal training to be able to provide comprehensive CVD risk assessments, and the vast majority indicating that they would not need to be authorised to prescribe in order to offer comprehensive CVD risk assessments may be indicative of their misperceptions in regards to their knowledge and competency in this area. Other studies have also reported pharmacists' lack of confidence, and their perceived need for further training or becoming accredited

as barriers for implementing new patient-focused services.<sup>24, 27</sup> However, studies have also shown that this extra training does not necessarily result in optimal or sustained provision of patient-focused services.<sup>68,69</sup>

An important barrier for the provision of CVD risk assessment services in community pharmacies that emerged from the pharmacists' interviews was related to the time demand that is normally associated with offering patient-focused services – not only time in regard to being able to sustain the operation of the pharmacy while becoming engaged in a new service, but also the time necessary to spend with patients, and the time required to train and become competent or maintain competency. Because this barrier has been cited in other pharmacists' surveys both in NZ<sup>21,22</sup> - including our own national survey on the provision of screening and monitoring services in NZ community pharmacies as described in Chapter 3 of this thesis - and abroad<sup>2,27,70-73</sup>, it warrants further discussion as this barrier may have implications for the sustainability of patient-focused services in community pharmacies.

The pharmacists interviewed in this study voiced concerns on their time limitations and indicated that the current model for practice was not flexible enough to incorporate this type of service. Findings from a NZ postal survey published in 2009 showed that about half the pharmacists agreed that the current NZ health environment provided a good opportunity to change and redefine the roles of health care providers.<sup>22</sup> However, in our pharmacists' interviews - which took place in early 2011 - it became evident that pharmacists continue to struggle with accommodating new patient-focused services because they have not been able to find a way to free themselves from traditional roles. This is strongly indicative that community pharmacists have not really passed the contemplation stage in practice change, and that they continue to be reluctant in shifting the priority of their services. Researchers of similar studies have voiced that if the business orientation of the pharmacy does not perceive pharmaceutical care services as a priority, it will likely not occur.<sup>74,75</sup>

Once again, ambivalence, or divergence of opinion, was noted when discussing time as a barrier and evidence as an enabling theme. Some pharmacists were interested in participating in pilot projects where they could be shown alternative models

of practice with greater time flexibility that they could replicate in their own practices. Innovative ideas on how to implement new programmes, taking into account the individual characteristics of the setting, may be a way to overcome the time barrier, particularly for those pharmacists who are showing an interest in practice change.

A study in the UK which explored this particular barrier amongst pharmacists who participated in the provision of a health check service in community pharmacies<sup>31</sup>, showed that because it had originally been expected that pharmacists would deliver the service to customers themselves, once the services were implemented it became clear that this was impractical due to the fact that many pharmacists are sole providers and have a variety of other daily commitments. As a consequence, in order to assure continuance of service provision, other pharmacy staff – such as pharmacy technicians – were trained to carry out the initial assessment (including collection of patient information and performing PoC testing) so that the pharmacist would only be involved in the assessment process, reviewing the results, recommending therapy or other management strategies, and counselling the patient. Similar innovative ideas may also work for community pharmacies in NZ.

Acceptance and awareness of the pharmacists' role in the provision of CVD risk assessment services on the part of both consumers and other HCPs emerged predominantly as an enabling theme in this study. Interviewed pharmacists perceived that they would be "*encouraged*" for service provision if consumers would show an increased "*demand*" for pharmacy services. This focus of the discussion surrounding this emerging enabling factor in relation to pharmacy consumers may be indicative of a continuing tendency on the part of community pharmacists on providing product-centred services that meet operation-related needs rather than patient-focused services oriented to meet the patient's needs. Similar perceived opinions of pharmacists have been reported in other surveys.<sup>1,2,13,74</sup>

Interviewed pharmacists also felt that working collaboratively with GPs was necessary when providing patient-focused services to make the services more acceptable and more meaningful to the patients they serve. Many felt that having GPs' acceptance of the pharmacist role in CVD risk assessment would also lead to an

increase in trust in the part of pharmacy consumers. This enabling theme has often emerged from other similar studies and been extensively reported in the literature.<sup>1,2,13,14,20,76</sup>

The research of the NZ-wide survey of pharmacists on the extent of screening and monitoring services provided in community pharmacies - as presented in Chapter 3 – showed that these services were significantly more likely to be offered in pharmacies which had collaborative agreements with general practice. However, in this study undertaken four years later, the vast majority of interviewed pharmacists indicated they had no formal collaborative agreements with GPs in the provision of CVD risk assessment services. These results are indicative that pharmacists in NZ remain very passive in building collaborative practices with GPs, specifically in regards to CVD risk assessment services.

In considering the results of this study, it is important to understand some of its limitations. Although all pharmacists working in community pharmacy throughout NZ were invited to participate in the study – in an attempt to have a more representative sample than the one outlined in the face-to-face pharmacists' interviews described in section 5.4.3 of this chapter - only 60 pharmacists were recruited. This would be suggestive of a low response rate particularly for a quantitative study; however, in qualitative research – which often utilises convenience or non-probability sampling methods – small sample sizes are not necessarily limiting.

A small sample enables detailed work to be conducted, taking into account a range of contextual and associated factors.<sup>33</sup> However, it is still possible that saturation of themes may not have been achieved. It is also important to highlight that because our sample consisted of pharmacists who have agreed to be involved in research, our study could over-represent the opinions of engaged pharmacists and under-represent those of disengaged pharmacists. In addition, the interviews were not audio-taped, so the interviewer had to write down notes during the interviews following a template. It is possible that some content generated during the interviews might have been lost or over-simplified what the participants actually said.

## 5.5 Overall Discussion

When comparing the opinions voiced by the key players interviewed in the four studies presented in this Chapter in regards to the perceived benefits of having a more direct involvement of pharmacists in this key primary health strategy, increased and wider access to these services by the general population was the predominant common and consistent positive view shared by the three groups. This is illustrated in *Figure 5.1* which shows the various identified benefits or the views that predominantly emerged as enabling themes voiced by all three groups. Despite some reservations, pharmacy consumers perceived that community pharmacies are able to offer increased access to CVD risk assessments, with reduced waiting times and possibly reduced costs. Most GPs also agreed with the concept that pharmacist involvement may translate into improved access to primary care services and wider opportunistic screening for those at greater risk.

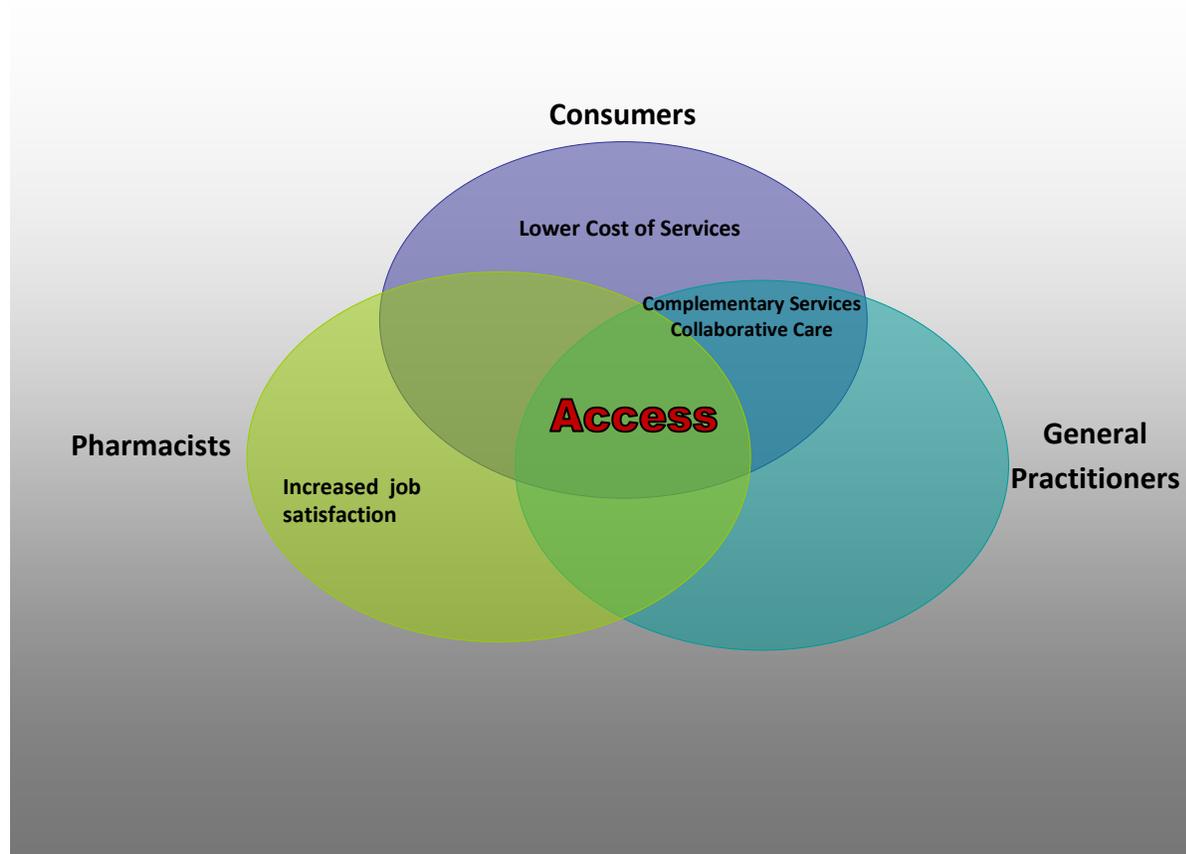
This predominant view is encouraging as it suggests that there may be some background awareness - and perhaps an underlying recognition - that the provision of CVD risk assessment services in community pharmacies may be a worthwhile and suitable strategy to tackle CV health inequalities. The authors of a relatively recent study in NZ which evaluated whether populations gain more through having increased access to CVD risk assessments through general practice (which - as discussed in Chapter 2 of this thesis - is a NZ performance indicator subject to audits by the Ministry of Health); or by improved access to and use of activities likely to improve lifestyle, concluded that effective approaches to CVD impact reduction are likely to be multifaceted as they may be more efficient at changing outcomes.<sup>77</sup>

These NZ findings are encouraging and may be indicative of an underlying support for the provision of CVD risk assessments by community pharmacists. In addition to believing that this involvement would result in increased job satisfaction, pharmacists also appeared to recognise that there is an imminent need for community pharmacists to strategically differentiate their businesses to become more clinically-focused health care providers, and CVD risk assessment - in which many are already involved primarily

in screening individual risk factors and targeting lifestyle advice - may be the most suitable area to build on.

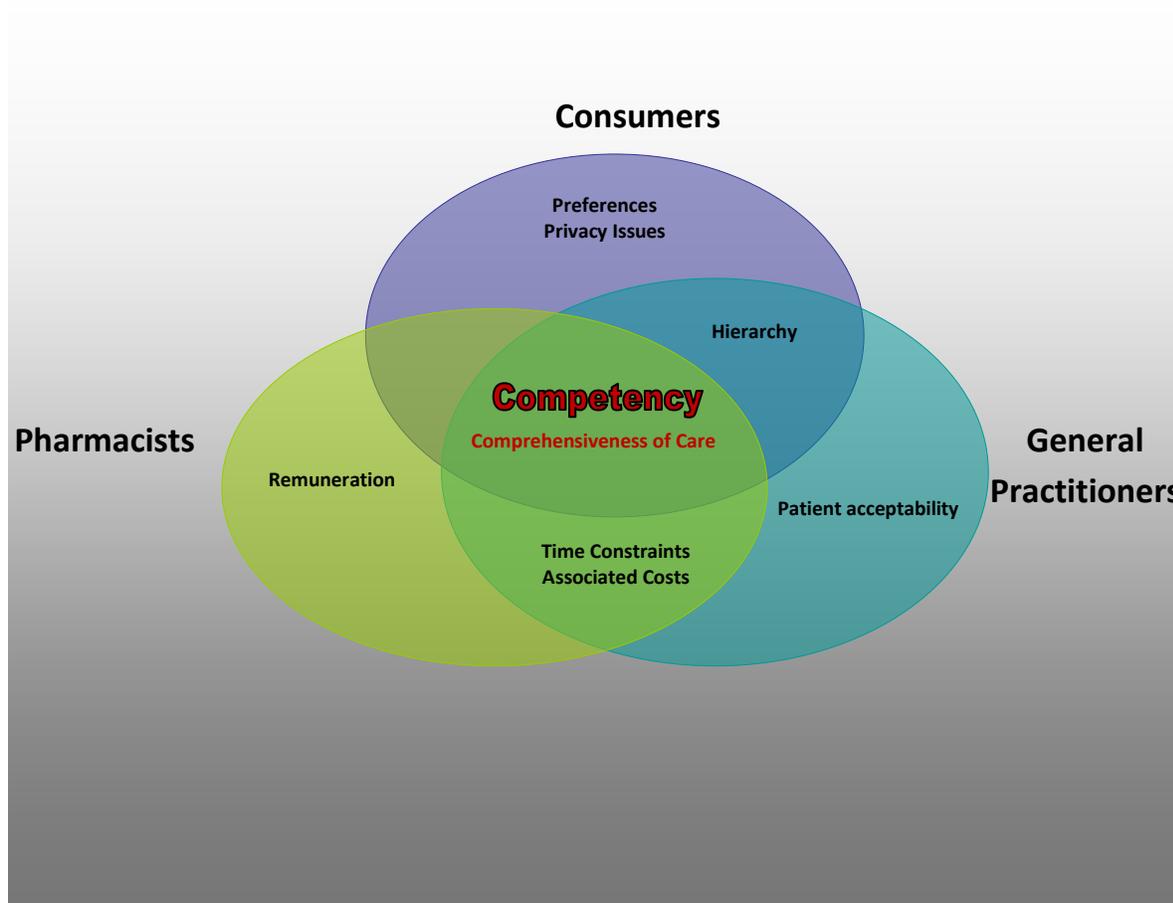
Opinions in regard to barriers or oppositional views were more diverse amongst the three groups interviewed and what was reported as a perceived barrier by one group may have been reported as an enabler by another. This finding may demonstrate that each group has a different perspective in regard to the pharmacist role in CVD risk assessment. Overall, interviews often started providing a general sense of positivism towards the pharmacist in this role, but in general most of the interviews progressed to numerous and strong oppositional views from all of the three groups.

***Figure 5.1: Perceived benefits of offering CVD risk assessment services in community pharmacies.***



The various opinions that emerged frequently as oppositional views voiced by the three groups are illustrated in *Figure 5.2*. As shown in the figure, the common predominant barrier to the implementation of this service in community pharmacies was in relation to the pharmacists' perceived competency. Pharmacists showed ambivalence in regards to their competency in CV risk assessment and were focused on the need for acceptance of this role from GPs and pharmacy consumers. This perception may be interpreted as lack of confidence in their own role in this service provision. Pharmacy consumers voiced their preference for GPs and were concerned with the lack of privacy in community pharmacies; while GPs voiced concerns in regard to pharmacists' limited access to specific patient information and believed that patients would not accept these services coming from pharmacists. Although pharmacy as a whole may be shifting towards achieving meaningful relationships with patients, a failure to account for the complexities of this relationship may result in frustration for pharmacists and confusion for patients.

**Figure 5.2: Perceived barriers of offering CVD risk assessment services in community pharmacies.**

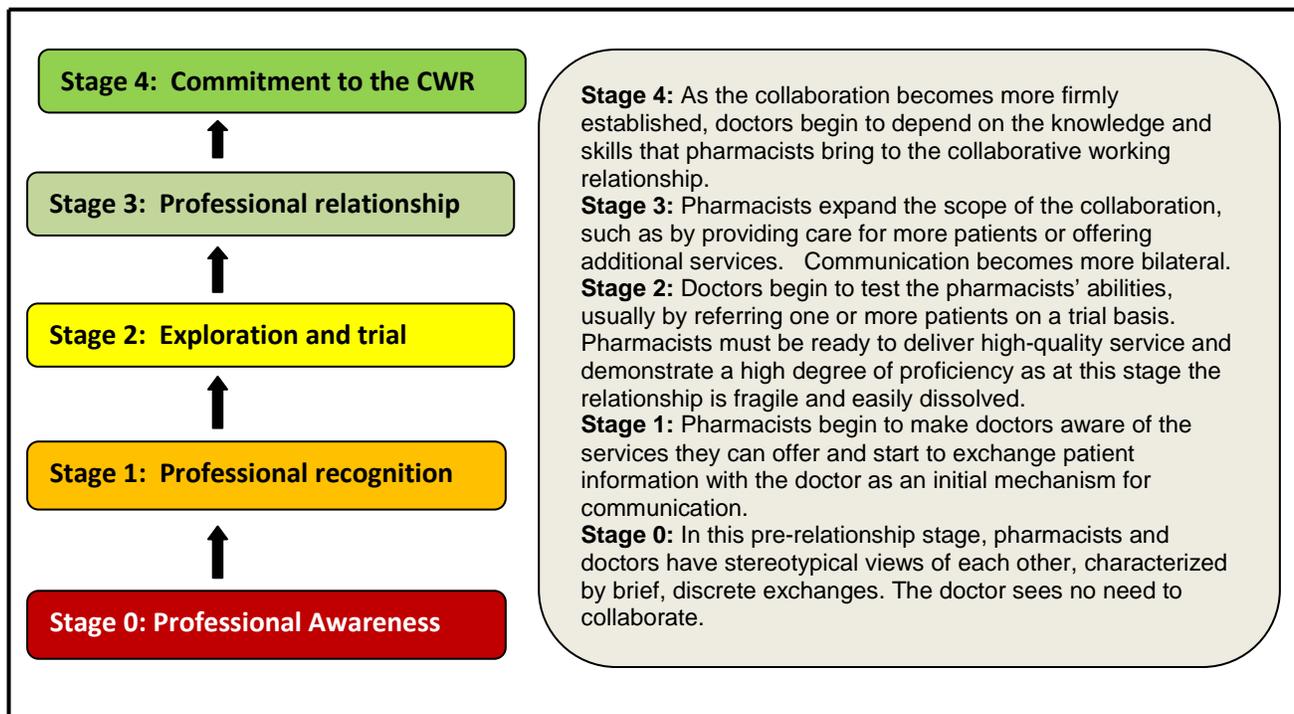


The views from pharmacy consumers and GPs may indicate an underlying lack of confidence in pharmacists from these two groups and highlight the need for a change in the culture not only from the pharmacists' perspective, but in the primary health care system overall. These results highlight that in NZ, where patient-focused services in community pharmacies are still in an early adoption phase, the need to endorse and promote trust in pharmacists - particularly those aimed at delivering unfamiliar services which have the potential to address inequalities in health care access - should remain the focus of any future primary care initiative. Specifically, initiatives that result in well-publicised evidence-based pharmacy services that coordinate with other primary care services will facilitate the development of trust. In particular, mechanisms that

incentivise confidential patient consultations with community pharmacists over a sustained period are likely to build trust. Also, consumers' trust is likely to improve if community pharmacy services are endorsed by GPs and integrate well with other primary care services.

There was also an underlying perception of GPs and the pharmacy consumers interviewed, that this pharmacist role expansion will give rise to duplication of tasks. These opinions are indicative that HCPs in primary care continue to operate in 'silos', and that their roles in primary care service provision are neither complementary, nor collaborative. Similar findings were derived from an Australian study which examined the modes of collaboration between GPs and pharmacists for the provision of extended services in community pharmacies.<sup>11</sup> In this study, authors reported that collaborative relationships showed characteristics of Stage 0 relationship in the Collaborative Working Relationships (CWR) model described by *McDonough and Doucette*<sup>76</sup>, which is illustrated in *Figure 5.3*.

**Figure 5.3: Collaborative Working Relationship (CWR) Model<sup>78</sup>**



In Stage 0, pharmacists and doctors have stereotypical views of each other, characterised by brief, discrete exchanges, whereas there needs to be repeated exposure to raise professional awareness and build the need for collaboration. In Stage 1, pharmacists begin to make doctors aware of the services they can offer and exchange basic information on the patients' health care needs. Although some of the beliefs which emerged in our interviews in relation to collaborative practice had some characteristics of Stage 0, collaborative practice specifically for the provision of CVD risk assessment may be moving towards Stage 1 in the CWR model illustrated in [\*Figure 5.3\*](#).

In a health care environment faced with populations with increasingly complex health care needs, human resource shortages, increases in health care costs and patient safety issues, health professionals must be able to work in collaborative practice models such as inter-professional teams, in order to ensure consistent, continuous and reliable care. Collaboration between GPs and pharmacists has been shown to increase medication adherence, improve patient outcomes, decrease hospital visits, and increase understanding of inter-professional roles.<sup>55,79,80</sup> Building an inter-professional team to facilitate the implementation of CVD risk assessment services in NZ community pharmacies can help address several of the oppositional themes that emerged from our interviews, including:

- reducing service duplication, minimising unnecessary interventions and reducing the overall health care costs;
- enhancing clinical effectiveness which translates into positive patient and health outcomes through the provision of comprehensive care;
- providing integrated, seamless care that is perceived as effective by the patient in a range of settings;
- having more satisfying roles and career paths for primary healthcare professionals; which in turn, can reflect in the retention and recruitment of health providers.

As discussed in Chapter 2 of this thesis, across the NZ health sector several key strategies can be used to incorporate inter-professional collaborative models of care - such as the NZ Health Strategy<sup>81</sup>, the Primary Health Care Strategy<sup>82</sup>, Medicines NZ<sup>83</sup> as well as others more specifically related to community pharmacy practice, such as the NZ National Pharmacist Services Framework<sup>84</sup>, as well as the *Get Checked Diabetes Aotearoa*<sup>85</sup> and *Care Plus*<sup>86</sup> programmes which were implemented to foster team-based service delivery in primary care. All of these key strategies and programmes can be used as the foundation that pharmacists should utilise in the development and implementation of a collaborative CVD risk assessment service in community pharmacies. Having said that, it is also important that they remain cognisant that developing professional roles has been reported to be difficult for all practitioners working collaboratively for the first time.<sup>87</sup>

For those community practices that are still in a Stage 0 in the CWR model previously described, additional difficulties may need to be addressed as they will be required to move away from traditional practice routines, and it will be even more critical for pharmacists who were not taught in a patient-centred care model, but are now expected to work in one. Other researchers have shown that successful collaborative practice requires significant time and training, development of clear roles, efficient communication strategies, trust and respect, shared goals, and clinical and administrative systems to guide cooperative practice.<sup>87,88</sup>

Although numerous compensation models for primary care services offered by community pharmacies have been described in the international literature, at the time when these interviews took place (between 2008-2011), a clear funding mechanism for the provision of CVD risk assessment services in community pharmacies was not available in NZ; consequently, pharmacists argued the lack of funding for either implementing or sustaining CVD-related services was a major obstacle. Fortunately, over the last two years there has been extensive engagement of NZ key players (including several government agencies, community service providers, and pharmacy professional organisations) to consider options to develop a new patient-centred

community pharmacy service model aimed at improving access to services and facilitating pharmacists working more closely with other health providers.

This new Community Pharmacy Service Agreement (CPSA) has been recently approved (October 2012) and will be implemented throughout NZ over the next three years.<sup>89</sup> Although the programmes listed under the new CPSA do not specifically address CVD risk assessment services, they do provide an opportunity to re-orientate pharmacy services to be more patient-centred. In addition, it also supports the provision of 'cognitive' services in community pharmacy - particularly those expected to promote a collaborative and integrative approach to enhance patient outcomes. Thus, the new CPSA appears to be the long-awaited opportunity that was voiced by the majority of pharmacists to address the development and implementation of a sustainable CVD risk assessment service in NZ community pharmacies.

## **5.6 Conclusions**

The qualitative approach taken to examine the views of the key players for the implementation of CVD risk assessment services in community pharmacies has proven to be a useful means of enhancing our understanding of the current state of this service provision in NZ. The findings generated from the four pieces of research described above confirm much of what has already been reported in the literature, but also contribute unique information about the acceptability and readiness for the integration of community pharmacists in CVD risk assessment services into the NZ primary health care environment.

The pharmacy consumers' interviews identified multiple factors that underpin a higher level of trust in GPs relative to pharmacists in the provision of CVD prevention strategies. Reservations in regards to the pharmacists' competency and skills in CVD risk assessment and management were strongly suggestive of lack of trust on the part of the public. Policymakers should be aware that, without considerable changes to system aspects of service delivery, it is improbable that the public will trust pharmacists to deliver unfamiliar services. Specifically, initiatives that result in well-publicised

evidence-based pharmacy services that coordinate with other primary care services will facilitate the development of trust.

Further work is also needed to resolve some of the training and privacy concerns expressed by consumers. In particular, funding mechanisms that incentivise confidential patient consultations over a sustained period with a specific pharmacist are likely to build interpersonal trust. It is also possible that a lack of patient understanding and demand could play a role in affecting pharmacists' interest or motivation to offer these services. Community pharmacists should therefore develop their abilities to present and discuss new services and roles to their patients, including the features and benefits, and to anticipate and deal with patient objections.

Public trust is also likely to improve if community pharmacy services are endorsed by GPs and integrate with other primary care services. Currently, it seems that role expansion gives rise to duplication of tasks because health professionals' roles are not complementary. Community pharmacists should therefore discuss every new clinical service with local GPs and agree on key messages for patients. Policymakers need to take into account the way in which public trust is likely to affect patterns of service uptake. Therefore, it is important that all stakeholders should involve patients more at national and local level in any future discussions about the development of community pharmacy clinical services and in the implementation process.

The GP interviews revealed more barriers rather than benefits in regard to community pharmacists offering CVD risk assessment services. GPs indicated that if such services are to be implemented, comprehensive training for pharmacists needs to be established so that the services offered at a community pharmacy are provided to the same quality and standard to those offered in general practice. Despite this strong opposition, most GPs agreed with the concept that pharmacist involvement may translate into improved access to primary care services and wider opportunistic screening for those at greater risk, provided they are undertaken in a collaborative environment. It is clear that community pharmacists need to improve their working relationships with local GPs, initially by opening the door to discussion points where both parties can share priorities, plans and patient needs in regards to CVD risk

assessment, and then investing in generating evidence-based practice models in support of these discussions.

Because pharmacists were not socialised into a professional culture of engaged patient care, they may not have had the opportunity to learn the various systematic approaches needed in the provision of comprehensive CVD risk assessments. Continuing education for pharmacists in this area is best addressed through inter-professional education programmes. The availability of comprehensive guidelines for the assessment and management of CVD risk in NZ provides an opportunity for the development of such an educational programme, which would not only be useful for disseminating the evidence-based recommendations provided in the guidelines, but also may help in clarifying the roles of the various health care professionals involved, while focusing on achieving the same population health outcomes.

The pharmacists' interviews revealed that this group does recognise the benefits of offering a comprehensive CVD risk assessment service to their patients and the population as a whole; however, they have also demonstrated a worrying paucity of initiative and motivation in implementing these services, or have been unable to implement changes in their practices to allow some of the already established foundation screening services to evolve or be sustained. The underlying reasoning for this attitude on the part of pharmacists was the lack of remuneration or a suitable funding model. Under the new CPSA, pharmacists have now the opportunity to address this perceived funding barrier to develop and implement a sustainable CVD risk assessment service in NZ community pharmacies.

However, it is also important to recognise that the new CPSA may not necessarily provide the total solution to the paucity of practice change seen in community pharmacy over the past decade. Although several successful risk reduction strategies involving community pharmacists have been published, implementation in real-world settings has not occurred due to difficulties in performing protocol-driven activities on a daily basis. New evidence-based strategies are required to further explore the benefits of cardiovascular risk reduction programmes that allow for practical implementation in typical community pharmacy settings.

The most important common perceived benefit of improved access to CVD preventative services is encouraging and must be further strengthened by fostering the team approach and further exploring the positive potential for collaboration between GPs and community pharmacists in the management and prevention of CVD.

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## 5.8 Appendices

### **Appendix 5.1: Pharmacy Consumers - Semi-structured Interview Tool**

1. Is this your usual pharmacy and what brings you here today?		
2. How often do you visit this pharmacy?		
3. Tell me what you think pharmacists (chemists) do?		
4. Are you aware of all the services that this pharmacy provides?	YES* (Read list below and tick mark which ones)	NO* (Go over list below anyway, tick if applicable)
<ul style="list-style-type: none"> <li>● Prescription Dispensing</li> <li>● Health Screening Services, such as: <ul style="list-style-type: none"> <li><input type="checkbox"/> Blood Glucose (sugar)</li> <li><input type="checkbox"/> Blood Cholesterol (lipids)</li> <li><input type="checkbox"/> Blood Pressure</li> </ul> </li> <li>● Smoking Cessation</li> <li>● Weight Loss Programme</li> <li>● Pregnancy Testing</li> <li>● Medication Reviews</li> <li>● Disease Monitoring (e.g. Cardiovascular, Asthma, Diabetes)</li> <li>● Blood Glucose Machine Monitoring &amp; battery change</li> <li>● Access to a Blood Pressure Machine</li> </ul>		
5. Have you ever used any of these health screening or health assessment services (besides "Prescription Dispensing")?	YES* (Ask the following questions)	NO (Go to question No. 6)
<ul style="list-style-type: none"> <li>● Which one in particular?</li> <li>● Tell me about your experience using these services:</li> </ul>		
6. Have you ever seek a pharmacist advice for managing a health problem?	YES* (Write answer below)	NO* (Write answer below)
<ul style="list-style-type: none"> <li>● If YES - Tell me about your experience:</li> <li>● If NO – Tell my why not:</li> </ul>		
7. Would you feel comfortable discussing your health problems with a pharmacist rather than with your GP?	YES* (Write answer below)	NO* (Write answers below)
<ul style="list-style-type: none"> <li>● If YES - Tell me more:</li> <li>● If NO – Would you rather discuss this with your GP?</li> <li>● What influences your choice?</li> </ul>		
8. In the following situations, tell me who would you seek health advice from initially? (Read list below & mark as appropriate)	GP	Rx
<ul style="list-style-type: none"> <li>● Recommend a medication for stomach pain or a headache</li> <li>● Assess if someone is at risk for cardiovascular disease</li> <li>● Assess if someone's diabetes is under control</li> <li>● Advice on how to manage high cholesterol or blood pressure</li> <li>● Recommend how to manage side effects from a medication</li> </ul>		
9. Have you ever discussed your risks for developing cardiovascular disease with your GP?	YES	NO
10. Tell me what you think about pharmacists being involved in cardiovascular risk assessments:		

**Appendix 5.2: General Practitioners - Semi-structured Interview Tool**

GP# \_\_\_\_\_ Date: \_\_\_\_\_

**Practice Information:**  
West / Central / North / East / South      Is the practice located in a medical centre?      Yes / No

If "Yes" which services are available?  
O Pharmacy      O Lab tests      O Dental      O Physio      O Radiology      O Midwife  
O Podiatry      O Dietician      O Other (please specify) \_\_\_\_\_

If "No" what is the distance to the nearest pharmacy? \_\_\_\_\_

No of patients currently enrolled in the practice: \_\_\_\_\_

No of GPs working within the practice: \_\_\_\_\_

Ethnicity of patients:      O NZ / European      O Maori      O Pacific Island      O Indian  
O Asian      O Middle Eastern      O Other: \_\_\_\_\_

**GP Information:**  
How long GP been registered?      O < 5 years      O 5 -10 years      O 10 – 15 years      O >15 years  
Where did they train?      NZ / Overseas (specify) \_\_\_\_\_

**CV Risk Assessment:**

What methods does the practice employ for purpose of CV risk assessment? \_\_\_\_\_

Does the practice use electronic decision support or similar software package in the CVD risk assessment?      Yes / No

If yes, indicate the specific program used: \_\_\_\_\_

Do you follow the *New Zealand Cardiovascular Guidelines* in your CVD risk assessment?      Yes / No

Do you use the *New Zealand Cardiovascular Risk Charts* in your CVD risk assessment?      Yes / No

How long after the initial CVD risk assessment does follow up occur? \_\_\_\_\_

**Pharmacist Involvement:**

Are you aware that pharmacists are becoming involved in CVD risk assessments? Have you had any experience with pharmacist involvement within the area?      Yes / No

If "Yes" what was the situation? \_\_\_\_\_

Do you think there is a place for pharmacist involvement within the area? Why/Why Not? \_\_\_\_\_

In your opinion which services should pharmacists offer? \_\_\_\_\_

What training do you think pharmacists need in order to be able to provide this service? \_\_\_\_\_

Any specific concerns? \_\_\_\_\_

If not CV risk assessment, which other areas in primary health care do you think would be beneficial for pharmacists to be involved in? \_\_\_\_\_

Additional Comments: \_\_\_\_\_

## **Appendix 5.3: Community Pharmacists - Face-to-face Interview Questions**

### **Section 1 - Pharmacist role:**

*What are your thoughts on the view that community pharmacists could have a role in providing CVD risk assessment services?*

*What is your view on the notion that community pharmacists are well positioned to provide CVD risk assessment services for the community?*

*What impact do you think having CVD risk assessment services available from your pharmacy would have on the community you serve?*

*For how long have you been providing services related to CVD risk assessment?*

*Why do you provide these services?*

*How enthusiastic are you (and your staff) about this service?*

*What sort of health outcomes do you see (or would expect to see) from this service? (eg patient feedback re improvements in disease control)*

### **Section 2 - Details of service:**

*Do you have specific space set aside in your pharmacy to operate this service?*

*What specifically do you do in this service (eg. campaigns, make referrals to other health professionals, opportunistic or organised programme).*

*What specialized equipment does this service involve?*

*What quality indicators have you used (or considered) in the provision of these services? (eg calibration of machines, audit against practice standards)*

*What training did you (or your staff) undertake in CVD risk factor assessment?*

*What links do you have in place with other health professionals and drug companies regarding this service?*

*How does your pharmacy advertise/promote this service?*

*Is a fee charged for this service? If so, how much?*

*How often do you provide these services?*

*How would you describe the type of clients who use this service?*

*What have been the clients' attitudes towards this service?*

### **Section 3 - Challenges and Recommendations:**

*What challenges (problems) have you faced in the provision of this service? (eg expense, time, space, equipment, quality assurance, negative reactions, lack of feedback).*

*As a community pharmacist, what do you think are the main barriers for the provision of this service? How do you see these barriers being overcome?*

*What could be done to encourage pharmacists to start specializing in some of these services? (Advertising, undergraduate training, more continuing education, remuneration, role-models-articles etc).*

*What are yours and your staffs' needs for further training so your pharmacy can provide CVD risk assessments service?*

*Is there any form of support or incentives that may encourage community pharmacies to offer this service?*

**Appendix 5.4: Community Pharmacists - Semi-structured Telephone Interview Tool**

Name: \_\_\_\_\_ Contact Details: \_\_\_\_\_ Interview #: \_\_\_\_\_

1. Gender F  M  Age: \_\_\_\_\_ Year of Graduation: \_\_\_\_\_

**2. Employment**  
Current Employment location: \_\_\_\_\_ Years of Employment: \_\_\_\_\_

**3. CV risk factor screening services offered and the method used**  
Blood pressure  Equipment/method used: \_\_\_\_\_  
Blood cholesterol  Equipment/method used: \_\_\_\_\_  
Blood glucose  Equipment/method used: \_\_\_\_\_  
Others  Explain & equipment/method used: \_\_\_\_\_

**4. Formal training**  
Yes  No   
Explain: \_\_\_\_\_

**5. Payment**  
Yes  No   
Explain: \_\_\_\_\_

**6. Utilization of the gathered information**  
Calculate 5-year CV risk using NZGG CV risk assessment tables   
Offer CV risk factor self management advice and monitoring services   
Refer to other health care providers when unable to manage by self   
Others  Explain: \_\_\_\_\_

**7. Collaborate care agreement with other health care provider**  
Yes  No  - Explain: \_\_\_\_\_

**8. Greatest benefits of offering CV risk assessment screening**  
Explain: \_\_\_\_\_

**9. Greatest benefit to you as a pharmacist**  
Explain: \_\_\_\_\_

**10. Greatest barriers of offering CV risk assessment screening**  
Explain: \_\_\_\_\_

**11. Greatest barriers to you as a pharmacist**  
Explain: \_\_\_\_\_

**12. Above CV screening services is sufficient to provide comprehensive CV risk assessment**  
Yes  No  - Explain: \_\_\_\_\_

**13. Factors that would encourage pharmacists to offer CV risk assessment services**  
Explain: \_\_\_\_\_

**14. Provided only by pharmacist who are authorised to prescribe**  
Yes  No  - Explain: \_\_\_\_\_

**15. Interested in getting formal training for providing CV risk assessment services**  
Yes  No  - Explain: \_\_\_\_\_

## 5.9 Acknowledgements for Chapter 5

The research presented in this Chapter is the result of the valuable contributions of the following individuals and funding agencies:

- *Lynne Bye, Senior Tutor at the School of Pharmacy, the University of Auckland, who was a co-investigator in the face-to-face pharmacists interviews research.*
- *Nitin Prakash, former Biomedical Sciences student at the University of Auckland, who was a co-investigator in the face-to-face pharmacists interviews research.*
- *Belinda Robinson, former Pharmacy student at the University of Auckland, who was co-investigator in the pharmacy consumers' and GPs' interviews.*
- *New Zealand Pharmacy Education & Research Foundation, which funded the 2009 and 2010 summer studentships to undertake the consumers' and GPs' interviews.*
- *Linda Tzu-Chien Chiu, former Pharmacy student at the University of Auckland, who was a co-investigator in the New Zealand-wide pharmacists' telephone interviews research.*
- *The National Heart Foundation of New Zealand, which funded the 2011 summer studentship to undertake the New Zealand-wide pharmacists' telephone interviews research.*
- *Lyn Lavery, Director of Academic Consulting in Auckland, who assisted in the qualitative data analysis using NVivo® (QRS International) software.*

## CHAPTER 6:

# PHARMACIST TRAINING IN CARDIOVASCULAR RISK ASSESSMENT AND MANAGEMENT

### 6.1 Introduction

Throughout the previous chapters of this thesis, it has been highlighted that the increasing health care needs of the public are providing opportunities for NZ pharmacists to become more patient-focused and to increase their involvement in more direct primary care services. Despite these pressures, practice change in NZ community pharmacy has been slow over the past decade and many patient-centred services, initiated with hope and enthusiasm, have not been sustained or gained solid acceptance or support from the major stakeholders and/or policymakers. As previously reported, the majority of community pharmacies in NZ continue to offer product-oriented services, following a traditional business model, and have been generally unable to run an integrated or a parallel self-sustained patient-focused service. This has been particularly obvious for the provision of cardiovascular disease (CVD) risk assessment services.

As discussed in Chapter 5, with the advent of the new Community Pharmacy Service Agreement (CPSA) - which was approved by the NZ Ministry of Health (MoH) in October 2012<sup>1</sup>, community pharmacy in NZ has been given the first opportunity to move away from a solely prescription volume-based remuneration model. Although community pharmacy-based services eligible for funding under the new CPSA do not specifically address CVD risk assessment programmes, overall it provides an opportunity to re-orientate pharmacy services to be more patient-centred and supports the provision of 'cognitive' services in community pharmacy particularly those expected to promote a collaborative and integrative approach to enhance patient outcomes - this appears an ideal opportunity for NZ community pharmacists to address the development and implementation of a sustainable CVD risk assessment service model.

Although overall a positive development and opportunity for the advancement of community practice in NZ – particularly to address the lack of remuneration often cited as a significant barrier for the implementation of patient-centred services – the new CPSA also calls into question whether capacity exists in NZ to support the provision of direct patient care services by community pharmacists. This opportunity may have important implications for pharmacy undergraduate education, particularly in relation to the professional development component of the degree. Although international research has shown that community pharmacists possess the clinical competence to provide individual CVD risk factor management services - as reported in Chapter 4 through the systematic review of pharmacist care in dyslipidaemia management - community pharmacists in NZ wanting to engage in direct patient care services have identified other important barriers besides remuneration, such as lack of time or training needed to implement these services. These factors were identified in the national survey and interviews reported in Chapters 3 and 5 of this thesis, respectively. In order to have a fully functional, competent workforce capable of engaging, developing, implementing or improving existing patient-focused programmes in community pharmacies, strong and robust educational systems must be in place to prepare and continuously support both current and future pharmacists in the provision of these services.

Chronic conditions currently account for more than half of the global disease burden and are a major challenge for 21st century healthcare systems.<sup>2</sup> This is a dramatic shift from the health concerns of the 20th century, when acute infectious diseases were the primary focus for public health. Several reports on the challenges and future of public health have identified appropriate training and education for the public health workforce as a top priority along with the need for interdisciplinary participation in public health.<sup>2,3</sup> A well-prepared quality workforce is of paramount importance if the complex public health issues of the 21<sup>st</sup> century are to be addressed. It is evident that educational leaders and health professional bodies need to refocus the training of the healthcare workforce towards early intervention programmes and similar preventative strategies that can decrease the burden associated with the development of these chronic

conditions. Training should therefore be restructured to include a new set of core competencies that prepare 21st century health workers in preventative strategies to help manage today's most prevalent health problems.

A recent review by the World Health Organisation (WHO) listed five core competencies for delivering effective health care for patients with chronic conditions.<sup>4</sup> Determination of the competencies included a review of the literature on educational reform for healthcare providers, examination of published standards and discipline-specific competencies of various professional organisations, and input from various professional groups (including general practitioners, nurses, pharmacists, dentists, and allied health workers). In essence, the resulting core competencies include:

- providing patient-centred care
- partnering and working effectively as members of interprofessional teams
- employing evidence-based practices to optimise care and foster quality improvement practices
- utilising informatics in practice
- fostering a public health perspective of care

It has been extensively discussed in the introductory chapters of this thesis that reducing the impact of CVD is one of the health targets of the NZ MoH.<sup>5</sup> NZ guidelines recommend that cardiovascular (CV) risk assessments should be provided by health professionals who have adequate training and who are supported by appropriate infrastructure and systems for follow-up and quality improvement.<sup>6</sup> Basic clinical preventive services, such as modifying lifestyle through smoking cessation, improving nutrition, increasing exercise and weight loss and implementation of pharmacological treatment for blood pressure, cholesterol and blood sugar levels based on the individual's level of risk are required by all New Zealanders.

Although most international preventative programmes highlight the importance of having pharmacists as part of the multidisciplinary team to support the implementation of evidence-base guidelines for the assessment and management of common chronic diseases, research on pharmacy education on CVD risk assessment has been scarce,

so there is limited evidence on how well academics are preparing pharmacy students for their future roles in preventative CV programmes to meet the needs of the public. Accordingly, training pharmacists as public health providers will need to become a central part of the undergraduate curriculum. The few studies available which have reviewed the undergraduate pharmacy education curriculum on CVD have focused on assessing outcomes such as students' knowledge (as evidenced by their grades) rather than assessing their perceived competency or confidence for undertaking an active role in patient-focused CVD risk assessment and management services at the time of graduation.<sup>7-10</sup>

In this chapter, the NZ pharmacy education curricula are investigated further, and more specifically in relation to CV risk assessment and management. Thus, the research questions to be addressed in this chapter include:

- 1. Does the current undergraduate pharmacy curriculum in NZ address the knowledge, skills and expected competencies required to meet the needs of future pharmacists for patient-centred roles, particularly in community pharmacies? What specific educational challenges need to be addressed in the undergraduate education of pharmacists to meet the public's health care needs in the next decade?*
- 2. Do undergraduate pharmacy students perceive that their training in CVD risk assessment and management has prepared them adequately for a future role in the provision of CV preventative services in community pharmacies? What specific challenges need to be addressed in the undergraduate education of pharmacists to become a competent provider of CVD risk assessment and management?*

The first question will be assessed through a review of the current curriculum and a comprehensive literature review on worldwide undergraduate pharmacy curricula and competencies for pharmacists. To assess if the current undergraduate pharmacy curriculum meets the formative needs of pharmacy graduates for a role in CV preventative services, the opinions of pharmacy students regarding their perceived

preparedness to assume the emerging role of pharmacists in public health needs will be assessed. While there is some literature on nursing and medical students' opinions and attitudes towards public health and health promotion,<sup>11,12</sup> the literature on pharmacy students' opinions towards their perceived preparedness for the provision of preventative CV health is sparse.

## **6.2 Assessment of undergraduate pharmacy education in NZ**

Professional educational requirements provide the foundation for building the capabilities of professionals. The breadth and depth of preparation, perhaps more than any other factor, enables or limits the extent to which students are able to accept personal responsibility for their education and consequently their potential as health care providers. The requisite knowledge, skill sets, and maturity obtained during the undergraduate education needed for success must be aligned with the anticipated roles and competencies for which future practitioners will be educated.

The mission of pharmacy education has been evolving worldwide; the education of pharmacists is now less product-focused (involving the safe and effective preparation and dispensing of medications) to preparing pharmacy graduates for a more patient-centred health role. Because pharmacists are considered one of the most accessible health professionals, today's pharmacy education focuses not only on medications and the treatment of disease, but also on health promotion and disease prevention. In order to accomplish this as a profession, pharmacists will need to be prepared to deliver wellness and disease prevention services. In this section, an overview of the undergraduate pharmacy curriculum in NZ will be provided, followed by a brief review of the CVD risk assessment and management pharmacy curriculum at the University of Auckland.

### **6.2.1 Undergraduate pharmacy education in NZ**

Originally, pharmacists in NZ were educated through an apprenticeship system; however, since the 1960's, this has evolved into high standard university programmes producing broadly educated pharmaceutical scientists with advanced clinical skills who

are eligible for registration as pharmacists after a period of supervised experiential practice. The Bachelor of Pharmacy (BPharm) degree in NZ is a four year degree which is offered by two Schools of Pharmacy, based at the Universities of Otago and Auckland. The Schools are located within the Division of Health Sciences at Otago and the Faculty of Medical and Health Sciences at Auckland, and are co-located with Schools of Medicine and other health disciplines (Dentistry and Physiotherapy at Otago; Nursing and Optometry at Auckland). In general, the two schools combined graduate 210 – 250 students each year (an average of 95 - 100 from Auckland and 115 – 150 from Otago).<sup>13</sup>

The NZ Qualifications Authority (NZQA) assures quality education at secondary and some tertiary levels, and the quality of the education providers in those programmes. It also evaluates overseas qualifications and administers the NZ Register of Quality Assured Qualifications and the National Qualifications Framework and sets standards for education and training in NZ.<sup>14</sup> However, the Committee on University Academic Programmes (CUAP) approves all university-based qualifications and provides quality assurance.<sup>13</sup> The Australian Pharmacy Council Accreditation Committee (previously the New Zealand and Australian Pharmacy Schools Accreditation Committee or NAPSAC) provides accreditation standards for Australian and NZ university pharmacy programmes.<sup>15</sup> Accreditation of new schools of pharmacy involves preliminary approval, provisional and full accreditation processes. Inspection of established pharmacy schools occurs regularly.

At Auckland, approximately two-thirds of students enter the BPharm programme directly from secondary school, although some students transfer from other tertiary (i.e., university) programmes or are university graduates. Generally, many more qualified applicants apply each year than can be accommodated. The early years of the BPharm programme provide a foundation in the enabling physical, chemical, biological, and social sciences, and include pharmacy practice subjects from first year. The programme then leads to more applied and discipline-specific topics, with a strong focus on clinical education.<sup>13,16</sup>

The pharmacy curriculum is guided by a set of comprehensive competency standards for entry-level pharmacists published by the Pharmacy Council of NZ and accepted by the profession.<sup>17</sup> This document outlines the knowledge, skills, and attitudes required by a practising pharmacist. Although they were primarily designed for professional practice, these competencies also provide useful principles for educational purposes. The Competency Standards describe seven functional areas (as summarised in [Appendix 6.1](#)). The seven broad standards are:

- *Practise pharmacy in a professional and culturally competent manner*
- *Contribute to the quality use of medicines*
- *Provide primary health care*
- *Apply management and organisational skills*
- *Research and provide information*
- *Dispense medicines*
- *Prepare pharmaceutical products*

The BPharm degrees at Otago and Auckland are not identical, but share a number of characteristics. The undergraduate curriculum provides a strong foundation in basic and applied sciences in the early years including:

- *Organic, Physical and Medicinal Chemistry*
- *Cell Biology, Biochemistry and Physiology*
- *Microbiology and Immunology*
- *Pharmacology and Toxicology*
- *Pathology*
- *Epidemiology and Public Health*
- *Behavioural Science*
- *Biopharmaceutics, Formulation and Drug Delivery*

In addition, the curriculum also provides the foundation for professional pharmacy studies which includes law and ethics, communication skills, medicines information, compounding, dispensing, responding to symptoms, etc. Professional practice is taught through *Pharmacy Practice* courses that usually are introduced as early as the first year

of the undergraduate programme. *Pharmacy Practice* is taught through a combination of lectures and teaching laboratories, usually staffed by internal and external qualified pharmacists, who use it to replicate as closely as possible the modern practice of pharmacy. Through the laboratory component, academic staff members support the development of clinical skills using role-play as patients or prescribers. The laboratory sessions are usually supported by clinical hospital-, and community-based tutors. These usually involve minimal direct patient contact, so clinical decision making in relation to pharmacotherapy is usually taught through simulation exercises with tutors. Part of this course includes a *Clinical Skills* module (held at the Clinical Skills Centre) where students learn how to take a person's pulse and blood pressure, measure body mass index, listen to heart and breath sounds using a stethoscope, and take peak expiratory flow rate measurements over a three hour period.

A major feature of the third and fourth years of the degree is an emphasis on pharmacology and therapeutics and much of this is presented in an integrated therapeutics programme called *Integrated Pharmacy Studies* (IPS) at the University of Auckland, and *Quality Use of Medicines* (QUM) at the University of Otago. The IPS and QUMs papers use a modular approach with a pharmaceutical care emphasis and aim to enable pharmacy students to contribute to the safe and effective use of medicines and the delivery of pharmaceutical care by the integration of relevant elements of pharmacy practice, pharmacotherapy and pharmaceutical sciences. These content-rich papers use active-learning strategies, such as cases, to facilitate content integration and teach problem-solving skills.

The IPS modules in the fourth year of the BPharm at the University of Auckland are designed to build on the third year introductory Pharmacotherapy courses which are also taught in a modular format and run in parallel with Pharmacology courses. They utilise an organ systems approach (e.g., respiratory, CV, endocrine, renal, dermatology, infectious diseases, cancer/palliative care, neurology, psychiatry, and care of special populations, such as the elderly and paediatrics).

Each two-week module consists of a comprehensive review of the literature in each of the core therapeutic areas described above, consisting of:

- *An introductory overview lecture which includes clinical and pharmaceutical aspects*
- *Self assessment questions on the therapeutic concepts reviewed*
- *Work-up of clinical cases focusing on a problem-based approach to learning*
- *A pharmaceutical care plan workshop which consists of student presentations and peer review and critique of care plans for the clinical cases*
- *Dispensing and pharmaceutical lab which consists of dispensing and counseling for medicines associated with the same clinical cases and*
- *Practice-oriented lectures given by patients, patient advocates and other members of the multi-disciplinary team*
- *A summary interactive lecture usually given by a medical consultant and an exit test.*

The undergraduate pharmacy programmes in NZ also include an experiential component. The extent of this clinical training and its location within the curriculum varies slightly between the two NZ pharmacy schools. At the University of Auckland, community pharmacy placements take place in the third and fourth years; and hospital placements are offered in fourth year after the students have acquired the appropriate level of knowledge in relevant areas such as communication, law, ethics, and therapeutics. Overall, students undertake approximately 96 hours of experiential education in these placements (16 hours in community practice during the third year and 40 hours in the fourth year; plus 40 hours in hospital practice in the fourth year).

At the University of Otago, the total hours spent in experiential education are longer (approximately 120 hours) and comprise several local community pharmacy visits in the second year, two one-week community pharmacy externships in the third and fourth years, and an one-week hospital pharmacy externship during the fourth year.<sup>13</sup> These undergraduate experiential placements are intended to introduce students to the range of professional activities undertaken by pharmacists in a variety of practice settings. Although these placements are compulsory, they are probably not sufficiently long for the students to acquire clinical competence. Both schools are currently exploring an increase in placement hours.

Some inter-professional educational opportunities are in place during the undergraduate pharmacy programme, particularly at the University of Auckland. All second year pharmacy undergraduates are required to complete an inter-professional learning programme with second year medical and nursing students which focuses on the health needs of Māori, the indigenous people of NZ, during the Māori Health Week initiative. During one week, learning about Māori health is achieved through group work, with each mixed-discipline group of 12 students researching one health issue that is prevalent among Māori. Māori cultural advisors play a key role in conducting various sessions and introduce cultural concepts to the students. Cardiovascular illness is a particular focus in the Māori population. On the final day of the programme, each group presents a poster with their findings and recommendations to fellow students and assessors.<sup>18</sup> During this week-long course undergraduates of the three health disciplines are provided not only with an unique opportunity to assess the health needs of their local population, but also to work closely with each other to address their needs within their individual scopes and learn to work together to serve these individuals in their future professional practices.

A second inter-professional initiative is the *Quality and Safety Forum*, where third year students from medicine, nursing and pharmacy, work together for two days on a programme that examines the root causes of medical error and helps students develop strategies to improve safety and quality of healthcare services. This programme functions to demonstrate the pivotal role of pharmacists in the quality use of medicines to their medical and nursing colleagues.<sup>19</sup>

Another key component of the undergraduate pharmacy education at the University of Auckland is the *Research Dissertation* course, offered in the fourth year of the BPharm programme. This is designed to enable students to develop both, a critical awareness of the purpose, nature and practice of research, and an ability to undertake research in the science and the professional practice of pharmacy. In undertaking the course students work in groups of four to six members, under the supervision and guidance of a member of the School's academic staff, and engage in projects determined by those members of staff and, in a number of cases, work in association

with a hospital or community pharmacist. At the conclusion of the course, the students present both a written report and an oral presentation of their work. They also present a personal report on their project and are subject to an individual oral examination. This course has reported notable academic outcomes in the form of posters and papers based on the students' research project findings, and are often presented at professional and scientific conferences and published in refereed journals.<sup>20</sup>

Following successful completion of the university-based BPharm programmes, graduates are required to register with the Pharmacy Council of NZ as Intern Pharmacists and complete an accredited *Intern Training Programme* (ITP) which is an approximately 12 month period of internship (35 hours per week for a minimum of 44 weeks) - during which the trainee receives a salary - in a practice setting under the supervision of a trained and approved registered practising pharmacist. Internships are mostly undertaken in community and hospital pharmacies with some provisions being available for split-site internships which involves at least three days per week in a community pharmacy and two days per week in other pharmacy sectors such as industrial pharmacy, academia or the MoH.<sup>13</sup>

The internship year allows for further development and consolidation of the intern pharmacist's skills in optimising the use of medicines through supervised practice, experience and completing the training and assessment requirements of the accredited ITP. Interns submit four assignments during their internship year and complete three appraisals with their preceptor. Assessment is conducted by the NZ Pharmacy Council using Observed Structured Clinical Evaluation (OSCE) techniques and an interview. An Intern Pharmacist is then invited to register in the Pharmacist Scope of Practice once they meet competence in all seven competence areas detailed in [Appendix 6.1](#).<sup>17</sup> Thus, for those who undertake a four-year BPharm degree, the overall duration of the programme from entry to registration is five years.

## 6.2.2 CVD risk assessment and management in the pharmacy curriculum at the University of Auckland

At the University of Auckland School of Pharmacy, some elements of public health are taught in courses such as *Population Health* (first year), and elements of disease management are taught in a number of the biomedical sciences courses, for example, *Pathology and Pharmacology* (second and third years). CVD risk assessment is specifically taught as part of the Cardiovascular Module in the Pharmacotherapy course (third year) which primarily focuses in understanding the multi-factorial nature of CV risk, the importance of early identification and prevention through evidence based screening and modification of patient risk factors including smoking, diet, hypertension, and dyslipidaemia. Part of the module also introduces the students to concepts related to stable angina. These concepts are only briefly reviewed in the fourth year IPS CV module which concentrates more on the pharmacotherapeutic management of CVD once it develops, concentrating on secondary prevention strategies rather than on primary prevention.

Following the IPS format previously discussed - which utilises self-directed and inquiry-based learning strategies – the third year Pharmacotherapy Cardiovascular Module introduces students to the primary CV risk factors. Case-based clinical pharmaceutical care assignments allow for a review of the main concepts taught in lectures and researched by students through preparatory work. These clinical cases are discussed and completed during a workshop with a total of 20 students divided into four groups, and utilise a peer-based assessment. The Pharmacotherapy CV module runs in parallel with the Pharmacy Practice CV module which allows students to integrate the clinical knowledge with dispensing concepts.

The third year Pharmacotherapy Cardiovascular Module is taught over four weeks, as is the parallel Pharmacy Practice module, and the curriculum outlines the following learning objectives for the under-graduate students:

- *Know how to screen and identify patients at risk of CV risk.*
- *Estimate 5-year CVD risk and identify and discuss appropriate management targets for patients with modifiable risk factors.*

- *Discuss the different therapies available to treat hypertension, dyslipidaemia and lifestyle risk factors, and select appropriate regimens for individual patients.*
- *Describe how stable angina develops and how it is managed pharmaceutically i.e. glyceryl trinitrate, long-acting nitrates, beta-blockers, calcium channel blockers.*
- *Discuss the differences between dihydropyridine and non-dihydropyridine calcium channel blockers and know which ones should be used in angina.*
- *Know how the renin-angiotensin-aldosterone system is involved in the control of blood pressure.*
- *Outline a structured approach to the pharmaceutical management of uncomplicated hypertension and dyslipidaemia and be able to describe the mechanism of action, adverse effects, and monitoring required of medications used in the prevention and management.*
- *Outline a structured approach to managing lifestyle risk factors such as obesity, smoking and low physical activity.*
- *Discuss the counseling needs of patients and learn to be able to apply strategies to address issues that may affect medication adherence and concordance in different individuals. Consider CV risk for patients with co-morbidities, such as diabetes.*

The first graduating class of the Auckland BPharm was in 2003, and during the ten-year period 2003-2012 approximately 800 students have undertaken these elements of the curriculum.

The University of Auckland also offers a post-graduate course on *Cardiovascular Pharmacotherapy* which is offered as part of a selection of courses towards obtaining a post-graduate certificate, diploma or Master's degree in *Pharmacy Practice*. All of the courses contributing to these post-graduate awards are designed to extend prior knowledge and skills in both breadth and depth and to promote deep learning. The *Cardiovascular Pharmacotherapy* post-graduate course is available in a fully web-based, distance-learning, format requiring no University (on-site) attendance. It consists of seven study modules with a nominal student workload of 150 hours across 15 weeks

of the semester, amounting to approximately 10 hours each week. Cardiovascular risk assessment is covered in the second module in the course, following the module which overviews CV anatomy and physiology. The Cardiovascular Risk Assessment and Management Module curriculum outlines the following learning objectives for the post-graduate students:

- *Recognise modifiable and non-modifiable risk factors for CVD.*
- *Estimate 5-year CVD (or CAD and Stroke) risk in line with the NZGG guidelines.*
- *Identify targets for blood pressure and dyslipidaemia and (where appropriate) other targets for diabetic patients.*
- *Discuss the issues surrounding near-patient testing of blood pressure, cholesterol and other relevant patient parameters (liver function tests and glucose) as they relate to pharmacy-based risk assessment programmes.*
- *To be able to produce an evidence-based care plan for patients with a >5% 5-year CVD risk, including both pharmacological and non-pharmacological interventions.*

It is important to note that enrolment in university postgraduate courses is not a compulsory requirement for registration as a pharmacist in New Zealand. Over the ten-year period 2003 – 2012, approximately 100 students took the *Cardiovascular Pharmacotherapy* course; the majority of these students were based in hospital rather than community practice.

### **6.3 Students' perceptions on the CVD risk assessment and management curriculum at the University of Auckland School of Pharmacy**

#### **6.3.1 Methods**

##### **6.3.1.1 Survey instrument**

A questionnaire was designed based on the learning goals of the third year Pharmacotherapy Cardiovascular Module curriculum, as described in section 6.3 of this chapter. Questions were designed to explore pharmacy students' perceived

preparedness for a future role in CVD risk assessment services based on the knowledge and skills gained during their undergraduate education.

The final questionnaire consisted of three sections presented in one double-sided page (*Appendix 6.2*), and was designed to take approximately five minutes to complete. The first section consisted of three questions which addressed student demographics. The second section generally consisted of closed questions about the various components of the students' education and training on CVD risk factors, assessment and management. The first question within this section addressed the students' training in performing health assessments related to CVD risk factors. The next four questions addressed knowledge of general principles in the assessment of CVD risk, and the latter four questions addressed the students' experiences in the application (skills) of these general principles into their practice. The last section of the survey used a 5-point agreement *Likert* scale - ranging from "*strongly agree*" to "*strongly disagree*" - to assess the students' views of their overall perceived preparedness (in regard to knowledge and skills) to perform CVD risk assessments.

Ethical approval for this study and the survey instrument was received from the University of Auckland Human Participants Ethics Committee (UAHPEC) on October 28, 2011. Ethics approval/reference number 7642.

### **6.3.1.2 Participant recruitment**

Students in the last year of pharmacy school taking the fourth year IPS paper were asked by two research assistants to participate in this study during one of their lectures in the latter part of their academic year. The research assistants were not directly involved in teaching the student participants', or linked in any way to their university education. The research assistants were introduced to the students by the relevant Course Coordinator who had provided permission for administration of the survey during this class. The students were forewarned by the Course Coordinator about this research during the previous lecture.

The research assistants distributed the Participant Information (PI) sheets ([Appendix 6.3](#)) and questionnaires to the students, responded to any questions the participants had, and collected completed questionnaires. It was explained to students that participation was voluntary, and they were reassured that the questionnaire was completely anonymous. Although consent forms were not used, the PI sheet explained that in order to maintain confidentiality, students were not asked to sign a separate consent form, but that completion of the questionnaire was regarded as implied consent to participate in this research study, as outlined in [Appendix 6.3](#). Participants were not able to withdraw the questionnaire once submitted, as it was anonymous and therefore not identifiable. This was also addressed in the PI sheet and in the questionnaire.

Because ethical approval for this study was obtained from the UAHPEC at the end of the 2011 academic year when fourth year pharmacy students (BPharm IV) were already writing exams and not attending classes, recruitment was done at the end of their IPS OSCE, but this method was unable to reach the majority of the fourth year students. Therefore, in order to have an acceptable number of participants, the questionnaire was administered again during the first semester of the 2012 academic year. During the 2011 academic year, third year pharmacy students (BPharm III), who were writing their *Pharmacotherapy* course OSCE, were also asked to participate.

### **6.3.1.3 Data analysis**

Data obtained from the paper-based questionnaire were entered on-line by the research assistants in NZ using an online instrument created by the Population Research Laboratory at the University of Alberta (Edmonton, Alberta, Canada) and then exported into IBM SPSS software (version 20 version 20, Armonk, NY, USA) for analysis. Frequency distributions were obtained to summarise demographic data and responses to all the survey questions. Descriptive and univariate analyses were conducted for all the questions. Bivariate cross-tabulations were used to compare responses between BPharm IV and BPharm III students. Mean scores and standard deviations were calculated for each of the *Likert* scale confidence questions.

### 6.3.2 Results

A total of 142 undergraduate pharmacy students completed the survey, 62 and 80 during the 2011 and 2012 academic years, respectively; 23 (16%) were BPharm III students and 119 (84%) were BPharm IV students. Ages ranged between 20-41 years of age (median=21 years, mean = 22, SD=3.1), and they were predominantly female (n=108, 76%). No significant differences were found in the age and gender characteristics between the BPharm IV and the BPharm III student groups.

When students were asked about their future practice setting preference, the majority indicated that they were inclined to undertake a career in community pharmacy (n=96, 68%). This preference became more pronounced for BPharm IV students compared to BPharm III students. Hospital pharmacy practice also appeared to be less preferred by BPharm IV than by BPharm III students. A few students (n=17, 12%) identified other career paths on graduation, including academia, research and the pharmaceutical industry. This information is summarised in [Table 6.1](#).

***Table 6.1: Desired pharmacy practice setting on graduation***

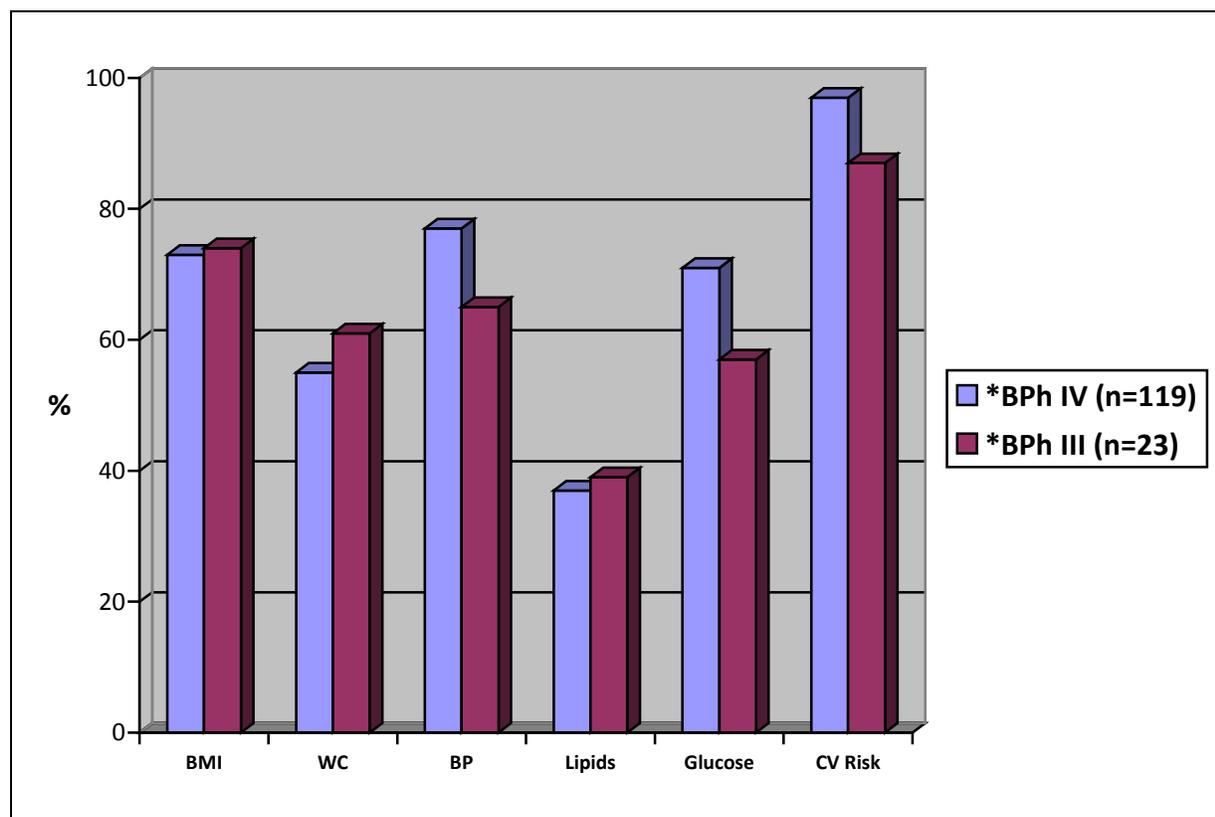
Practice Setting	BPharm III (n*, %)	BPharm IV (n*, %)	Total (n*, %)
<i>Community pharmacy</i>	11 (48%)	85 (71%)	96 (68%)
<i>Hospital pharmacy</i>	12 (52%)	31 (26%)	43 (30%)
<i>Other</i>	3 (13%)	14 (12/5)	17 (12%)

**Legend:** BPharm III = 3<sup>d</sup>-year pharmacy students, BPharm IV = 4<sup>th</sup>-year pharmacy students. \*adjusted for missing values.

The majority of students surveyed (n=126, 89%) reported having performed health assessments related to CV risk factors as part of their undergraduate education and training. A higher proportion of BPharm IV students reported to have performed health assessments compared to BPharm III students (n=108, 91% versus n=18, 78%, respectively); however this difference in the responses between these two groups was not statistically significant.

The health assessments reported to be performed most frequently by the students during their undergraduate training were blood pressure measurement (n=106, 75%) and calculation of body mass index (n=104, 73%); whereas the health assessment reported to be performed least frequently was measurement of blood cholesterol levels (n=53, 37%), as illustrated in *Figure 6.1*. Similar percentages of health assessments performed were reported by BPharm III and BPharm IV students. Although there was a trend for a lower proportion of BPharm III students reporting that they had performed some of the health assessments, these differences were not statistically significant, with the exception of the calculation of absolute CV risk.

**Figure 6.1: Selected CVD-related health assessments performed by students\* during their undergraduate education**



**Legend:** BMI=body mass index, WC=waist circumference, BP=Blood pressure, CV=cardiovascular risk, \*BPh IV=4<sup>th</sup>-year pharmacy students, \*BPh III=3<sup>rd</sup>-year pharmacy students

*Table 6.2* summarises the students' responses to the survey questions which addressed areas in their undergraduate education that provided knowledge of general

principles in the assessment of CVD risk, and the students' experiences in the application of these general principles into practice. Nearly all the students indicated that they had been educated on how to assess individual CV risk factors and how to calculate an individual's absolute risk for developing CVD (n=135, 95%). However, a lower percentage of students indicated that they had learned how to implement CV risk assessment services in various pharmacy practice settings (n=76, 54%), or to have counseled or educated patients on CV risk (n=96, 68%).

**Table 6.2: Pharmacy students' perception of their undergraduate education in CVD risk assessment**

<b>Knowledge - related questions:</b>	<b>Frequency* (n, %)</b>
<i>Assessed CV risk factors and calculated absolute CV risk</i>	135, 95%
<i>Learned the importance of gathering pertinent patient information including past medical history, family history, and smoking history to assess CV risk</i>	121, 85%
<i>Learned the importance of culture, socioeconomic, racial, and ethnic backgrounds when assessing CV risk</i>	127, 89%
<i>Reviewed and used the NZ CV Risk Assessment and Management Guidelines to provide evidence-based recommendations</i>	130, 92%
<b>Application (skills) - related questions:</b>	<b>Frequency* (n, %)</b>
<i>Counseled and educated patients and/or caregivers on CV risk</i>	96, 68%
<i>Identified patients needing to be referred for appropriate follow-up after a CV risk assessment</i>	104, 73%
<i>Identified the role of the pharmacist in CVD risk assessment and management and learned how to collaborate, cooperate, and communicate with other health care professionals</i>	107, 75%
<i>Learned how to implement CV risk assessment services in various pharmacy practice settings</i>	76 (54%)

**Legend:** CV = cardiovascular, CVD=cardiovascular disease. \*adjusted for missing values.

Table 6.3 shows the mean, standard deviations and percentages of combined “strongly agree” and “agree” responses to the eight capability statements for all respondents. The highest percentages of agreement (above 70%) were reported for capability statements relating to the use of the *NZ Cardiovascular Risk Assessment and Management Guidelines* and the lowest percentages of agreement (below 60%) were reported for capability statements relating to the clinical application of CVD-risk assessment knowledge (such as counseling and screening patients, or responding to questions related to CV medications).

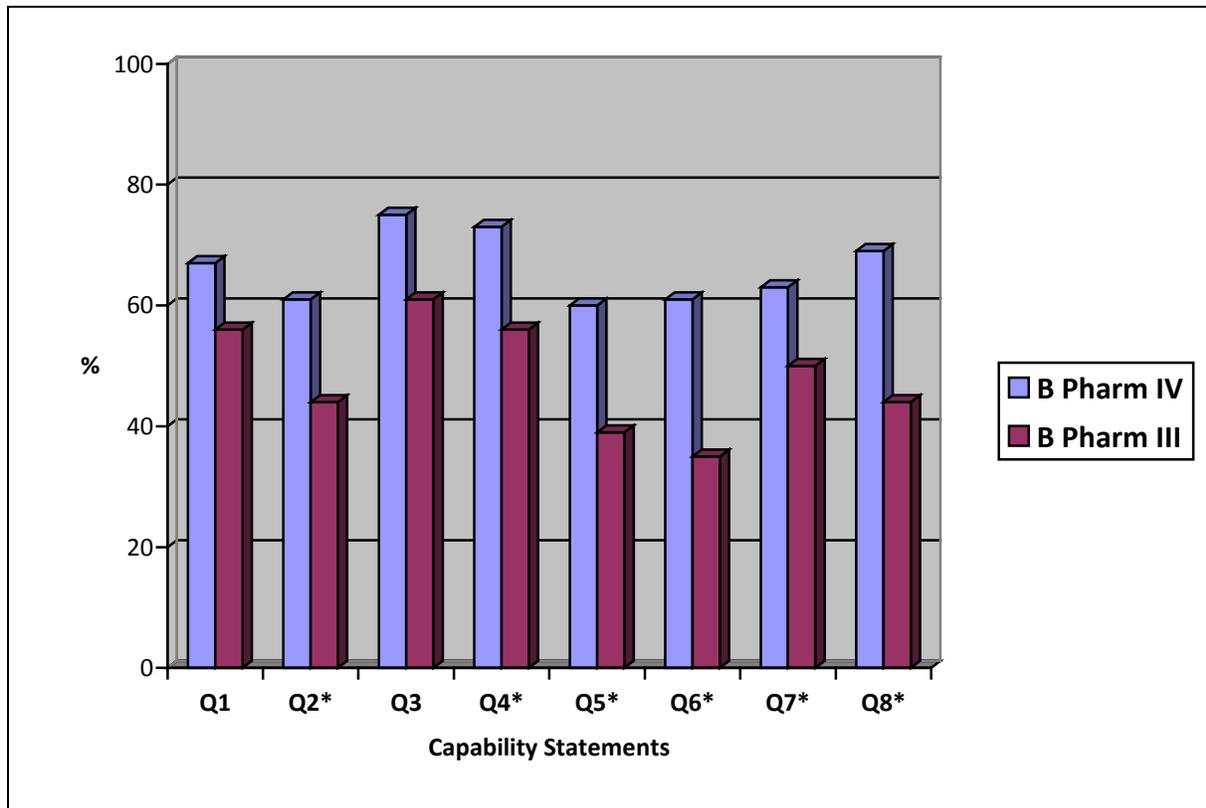
***Table 6.3: Pharmacy students’ responses to their perceived capabilities in regard to their undergraduate education in CVD risk assessment and management (n=142)\****

<b>Capability statements:</b>		<b>Mean<sup>a</sup> (SD)</b>	<b>% A/SA</b>
<b>Q1</b>	<i>My undergraduate training in pharmacy has provided me with the <u>knowledge base</u> required to screen patients for CVD.</i>	2.4 (1.3)	66
<b>Q2</b>	<i>My undergraduate training in pharmacy has provided me with the patient assessment <u>skills</u> necessary to screen patients for CVD.</i>	2.4 (1.0)	59
<b>Q3</b>	<i>I am aware of the recommendations provided by the NZ Cardiovascular Risk Assessment and Management Guidelines.</i>	2.2 (1.2)	73
<b>Q4</b>	<i>I feel confident on using the CV risk tables provided in the guidelines and recognizing individuals at risk of CVD.</i>	2.2 (1.3)	71
<b>Q5</b>	<i>I feel confident counseling patients on CVD prevention strategies.</i>	2.5 (1.2)	57
<b>Q6</b>	<i>I feel confident in responding to questions regarding CV medications.</i>	2.4 (1.1)	58
<b>Q7</b>	<i>The undergraduate training received has prepared me adequately to deliver CV risk assessment services for patients in the community.</i>	2.4 (1.1)	60
<b>Q8</b>	<i>Overall, I feel pharmacists are adequately trained to assess patient’s CVD risk.</i>	2.3 (1.2)	66

**Legend:** Q=question, a=responses based on a Likert scale on which 1= strongly agree, 2=agree, 3=neutral, 4=disagree, 5= strongly disagree, SD=Standard deviation, SA=Strongly Agree, A=Agree, \*Some students did not respond to all capability statements.

The difference in mean scores to questions on capabilities reported by BPharm IV and BPharm III students were not statistically different. However, a higher proportion of BPharm IV students reported combined “strongly agree” and “agree” responses to all of the capability statements compared to BPharm III students; this is illustrated in Figure 6.2. Significant differences in the capability statements between BPharm IV and BPharm III students were found for some of the statements ( $p < 0.05$ ) as indicated in Figure 6.2.

**Figure 6.2: Pharmacy students’ agreement to capability statements with regard to CVD risk assessment**



**Legend:** Q=Capability Question (described below), BPharm IV=4<sup>th</sup>-year pharmacy students, BPharm III=3<sup>rd</sup>-year pharmacy students, \*statistically significant ( $p < 0.05$ ).  
 Q1=My undergraduate training in pharmacy has provided me with the knowledge base required to screen patients for CVD.  
 Q2=My undergraduate training in pharmacy has provided me with the patient assessment skills necessary to screen patients for CVD.  
 Q3=I am aware of the recommendations provided by the NZ Cardiovascular Risk Assessment and Management Guidelines  
 Q4= I feel confident on using the CV risk tables provided in the guidelines and recognizing individuals at risk of CVD.  
 Q5=I feel confident counseling patients on CVD prevention strategies.  
 Q6= I feel confident in responding to questions regarding cardiovascular medications.  
 Q7= The undergraduate training received has prepared me adequately to deliver CV risk assessment services for patients in the community.  
 Q8= Overall, I feel pharmacists are adequately trained to assess patient’s cardiovascular disease risk.

## 6.4 Discussion

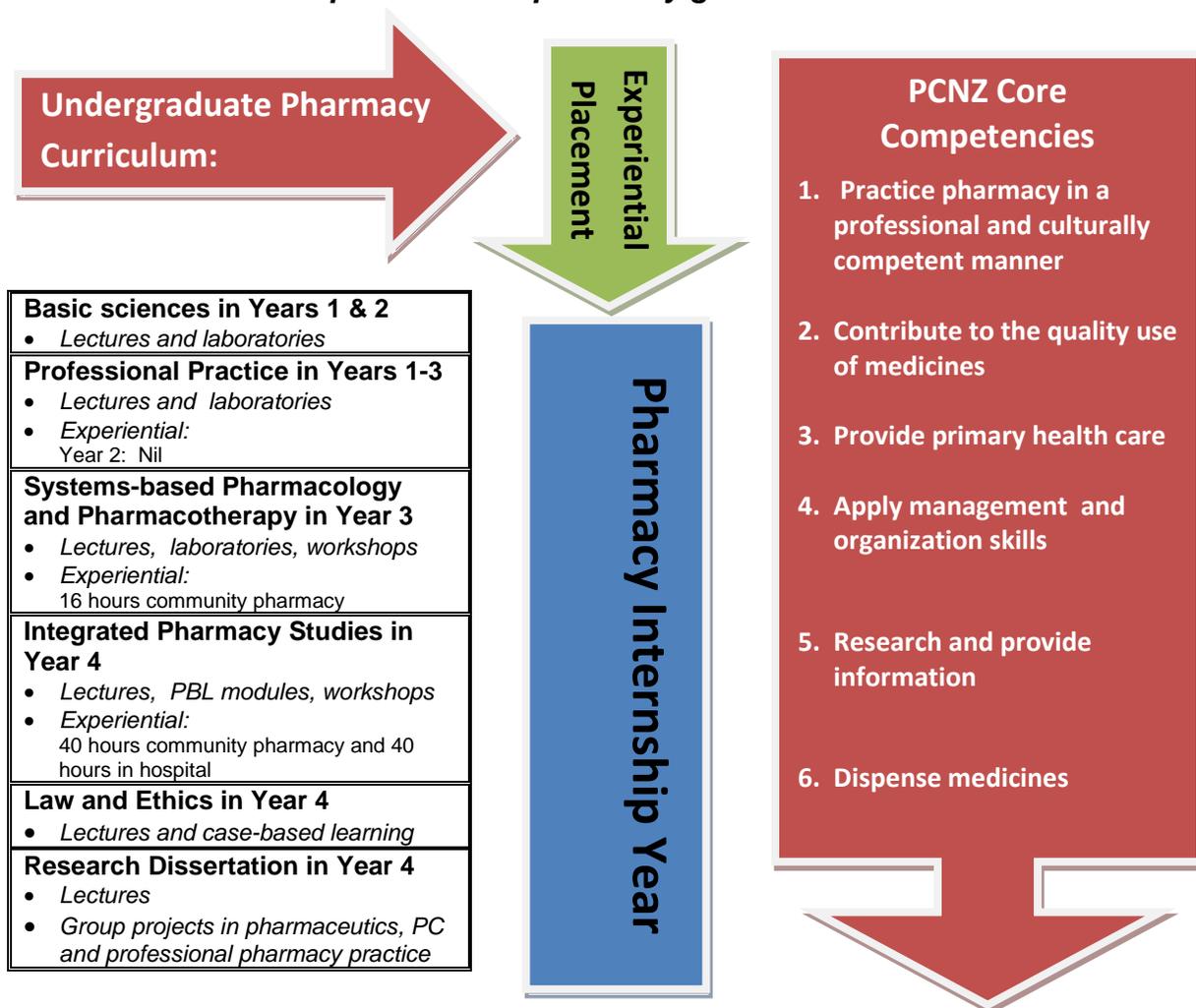
### 6.4.1. Analysis of the undergraduate pharmacy curriculum at the University of Auckland

In order to identify strengths and weaknesses in the current undergraduate pharmacy curriculum at the University of Auckland, a literature search was conducted for graduate competencies and curricula, particularly from the United States (US), Canada, United Kingdom (UK) and Australia. The strategy consisted of using the *Google Scholar* search engine and the following key words: *curriculum pharmacy, pharmacist, professional competencies, and professional accreditation.*

In reviewing the literature<sup>13,16,20-28</sup> and analysing both, the undergraduate pharmacy curriculum at the University of Auckland, and the competency standards for pharmacists set by the Pharmacy Council of NZ<sup>17</sup>, weaknesses and strengths in the current undergraduate pharmacy curriculum were identified by considering the recommendations in the *Global Framework for Quality Assurance of Pharmacy Education* outlined by the International Pharmaceutical Federation<sup>29</sup> and the WHO recommended set of competencies to prepare 21st century health workers to help manage the most prevalent health problems to be encountered in the next decade.<sup>4</sup>

Major weaknesses identified in the current undergraduate pharmacy curriculum at the University of Auckland were in the experiential education component for preparing pharmacy students to deliver patient-centred care, and in educational opportunities to foster relationships for a future inter-disciplinary practice environment. On the positive side, this analysis also identified important strengths, in particular, the integrated approach to the teaching of pharmacotherapy using a problem-based model and the strong research component during the last year of the undergraduate curriculum which fosters developmental education in quality improvement in the delivery of patient care. These weaknesses and strengths in the undergraduate pharmacy curriculum at the University of Auckland are illustrated in *Figure 6.3* and further discussed in Sections 6.4.1.1 and 6.4.2.1 below.

**Figure 6.3: Alignment of the undergraduate pharmacy curriculum at the UoA with core competencies for pharmacy graduates<sup>a</sup>**



WHO Core Competencies:	Strengths	Weaknesses
1. Provide patient-centered care to diverse populations	<i>PBL approaches</i>	<i>SBL approaches</i>
2. Work effectively as members of inter-professional teams	<i>IPS</i>	<i>Experiential education</i>
3. Employ evidence-based practice to optimize care and foster quality improvement	<i>Research Dissertation</i>	<i>IPE</i>
4. Utilize informatics in practice		
5. Foster a public health perspective of care		

**Legend:** a—as per the competencies for registration with the Pharmacy Council of New Zealand (PCNZ)<sup>17</sup> and WHO core competencies for health professionals<sup>4</sup>, UoA=University of Auckland, PBL=problem-based learning, PC=pharmaceutical care, SBL=simulation-based learning, IPS=Integrated pharmacy studies, IPE=inter-professional education.

### **6.4.1.1 Curriculum weaknesses**

Since Hepler and Strand introduced pharmaceutical care as the vision for pharmacy practice<sup>30</sup>, the pharmacy profession worldwide has been struggling to further define and implement this vision and put it into practice. Part of this struggle has been the resultant need to introduce pharmacy education reform to foster pharmaceutical care practices, particularly in the community pharmacy setting where the majority of pharmacy school graduates practise.<sup>13,20,24-26,31-33</sup> Pharmacy education in NZ is facing similar challenges; these challenges relate to changes occurring not only in the profession of pharmacy, but also more broadly with regard to the increased worldwide need for a trained and competent healthcare workforce capable of caring for patients with chronic conditions.<sup>2,4,34</sup> These changes will have an impact on the education that needs to be provided for future generations of pharmacists and therefore for the schools of pharmacy providing this education.

As discussed extensively in Chapter 2, the practice of pharmacy in NZ, as in the rest of the world, has been evolving to embrace the vision of pharmaceutical care, moving from a purely dispensing role into a medication management role, a trend which is likely to continue into the future. In response to this trend, pharmaceutical education has been adapting by placing much less emphasis on the dispensing process *per se* and putting more emphasis on applied therapeutics; that is, moving from a purely product-focused education to one that focuses on patient-centred care.

Despite these changes, the results of our research in NZ regarding the provision of health/disease screening services and disease monitoring/management services in community pharmacies, as presented in Chapter 3, indicated that community pharmacy practice in NZ continues to be mostly product-oriented. However, results of our interviews with NZ pharmacists, as presented in Chapter 5, indicated that pharmacists are aware that community pharmacy practice is evolving and they recognise the need to become more patient-focused; but perceive a deficiency in their educational foundation to be able to appropriately assess, monitor and manage risk factors of leading chronic diseases. Considering that similar risk factors are associated with the development of most of the leading chronic diseases worldwide (such as diabetes, CVD, and chronic

obstructive pulmonary disease<sup>2,4,34</sup>), there is a need for a solid educational foundation in the assessment and management of the implicated risk factors. Pharmacists in NZ will need to strengthen and expand their patient assessment skills in order to adequately evolve to meet the future needs of the population.

The undergraduate pharmacy education curriculum and pedagogical approaches at the University of Auckland have accommodated these new practice directions to some degree by focusing more on teaching patient assessment skills and disease state management, particularly through the IPS modular pharmacotherapy courses taught in the latter two years of the undergraduate programme. Although this course utilises a case-based, problem-based, inquiry-based approach to teaching and learning, which fosters students to self-assessment and reflection, there is limited utilisation of simulation-based learning to enable students the opportunity to apply what they learn during lectures or in workshops. Several types of simulation-based learning activities have been described in the literature; including computer-based simulations<sup>35-37</sup>, virtual patients<sup>38</sup>, and standardised patients.<sup>39,40</sup>

In addition, the movement towards pharmaceutical care and the provision of patient-centred services will likely necessitate an increased exposure of pharmacy students to model practice sites and an expansion of their experiential education. Experiential training is an important building block in the education of pharmacists in order to build the students' understanding of the experience of illness from the patient's perspective – the essence of patient-centred care. The most notable issue with regard to the NZ pharmacy curricula is the limited amount of experiential education embedded in the undergraduate years. This was recognised in the Accreditation Review of the BPharm degree in 2011 and planning has commenced to considerably increase the experiential learning components.

Experiential pharmacy education in NZ, is obtained for the most part through the internship year post-graduation, where there is a drastic separation of the academic and experiential components of the programme. It has been suggested that because the pre-registration trainees are also employees, this experiential programme may inevitably introduce a certain ambivalence into the relationship with the students'

employer preceptors.<sup>16</sup> As a result, internship training as a means for acquiring any professional competence tends to produce highly variable results.<sup>41</sup> The skills learned by the intern depend largely on the approach, motivation, and skill of the practising professional(s) supervising the internship. The pharmacy schools have no direct influence on the content of the preregistration training, and provide or are provided with very limited feedback from the training sites or preceptors involved, as they are run independently.<sup>16</sup> Consequently, quality control is difficult to achieve.<sup>41</sup> Other drawbacks of this kind of placement are that the number of practice sites to which the trainee is exposed to is very limited and on registration an individual may have only ever spent one or two weeks in a hospital setting.<sup>16</sup>

Another important aspect of experiential education is that it provides pharmacy students with the opportunity to foster the concept of *partnering*; which in the context of pharmacy practice refers to the ability to join with patients, other providers, and communities for effective pharmaceutical care. Partnering is one of the five core competencies for delivering effective health care for patients with chronic conditions outlined by the WHO.<sup>4</sup> Thus, training pharmacy students to work collaboratively and communicate effectively with doctors, nurses and other health care providers is necessary. Inter-disciplinary professional education (IPE) is another strategy that is being advocated towards building understanding and appreciation of the expertise that each health discipline brings to solving patient problems, and prepares future health care providers in the development of partnerships for the provision of effective patient-centred care.

A Cochrane review found six studies that evaluated the effects of IPE. Four of these studies found that IPE improved some ways in which professionals worked together and the care they provided. It improved the working culture and patient satisfaction, and decreased errors in an emergency department; it improved the care delivered to domestic violence victims; and improved the knowledge and skills of professionals providing care to mental health patients.<sup>42</sup>

In a relatively recent report of an inter-disciplinary initiative at the University of South Carolina in the US, students participating in an IPE initiative reported increased health

professions students' awareness of the role of pharmacists.<sup>43</sup> The University of Auckland provides undergraduate pharmacy students with a similar opportunity during the Māori Health inter-professional learning initiative (described in detail in Section 6.2.1 of this chapter). This inter-disciplinary initiative has also received positive feedback from the participating nursing, medical and pharmacy students.<sup>18</sup> Although this experience is valuable, the course runs only in the second year of pharmacy school and only limited opportunities to continue building the inter-disciplinary learning activities are provided in later years as students approach graduation. There is a need for a systematic incorporation of inter-disciplinary coursework in the form of both, didactic and experiential training, to help future health professionals acquire teamwork competencies such as team-building and inter-disciplinary health management skills during their undergraduate education to embrace future collaborative practice early during their professional formation.

#### **6.4.1.2 Curriculum strengths**

The integrated approach to the teaching of pharmacotherapy during the two last years of the undergraduate curriculum is considered of particular strength. Integrated course modules are often used in pharmacy curricula to teach pathophysiology, pharmacology, medicinal chemistry, and therapeutics for each organ system.<sup>44</sup> These content-rich courses often use active-learning strategies, such as cases, to facilitate content integration and teach problem-solving skills. In addition, at the University of Auckland, pharmacy students are also taught using inquiry-based models where they learn to retrieve and synthesise information. Inquiry-based approaches are learner-centred, whereby students learn by discovery, as they ask questions in response to problems they are given, with the teacher serving as a guide rather than a source of knowledge. As they develop and answer questions in the context of prior knowledge, students are able to create new knowledge and solutions to problems.

Inquiry-based approaches may have particular value in health professionals' education by allowing students to learn material in the process of applying it to solving actual patient care problems. In addition, it is believed that this approach prepares

students better to be self-directed learners for life.<sup>45</sup> Schools of pharmacy cannot teach or assure knowledge of all relevant topics for pharmacists. Thus, a practitioner must remain a dedicated learner throughout his/her years in practice. A life time of self-directed learning will be required for pharmacists to be viewed as pharmacotherapy experts by other health care professionals. Therefore, incorporating inquiry-based approaches to deliver knowledge and skills is essential in the undergraduate pharmacy programme, as they can stimulate students' intellectual curiosity and foster the pursuit of scholarly activities for the advancement of the practice of pharmacy.

Another strength identified in the undergraduate pharmacy curriculum at the University of Auckland is the year-long *Research Dissertation* course offered in the final academic year. As previously described, this course provides pharmacy students with a solid research foundation and prepares them to be outcome-focused. Such skills include performing systematic data collection, demonstrating the ability to manage data, selecting appropriate data-analysis procedures, analysing data, interpreting research findings, preparing a written report or preparing and delivering presentations about these findings. This skill set also allows students to have a baseline understanding of *quality improvement* processes that they can apply and adhere to in the practice of their profession.

The research component of the undergraduate pharmacy curriculum has been well-recognised worldwide by key stakeholders in the pharmacy profession.<sup>46-52</sup> As such, they have emphasised the need for pharmacy graduates and pharmacists to be able to use research, critical thinking and problem-solving skills to provide optimal patient care. As quoted by the US Accreditation Council on Pharmaceutical Education, '*academic programmes should be responsible for preparing students that will be able to manage medication use systems, through the ability to apply patient- and population-specific data, quality improvement strategies, medication safety and error reduction programs, and research processes to minimize drug misadventures and optimize patient outcomes; to participate in the development of drug use and health policy; and to help design pharmacy benefits*'.<sup>52</sup>

Most undergraduate pharmacy programmes, including at the University of Auckland, require students to complete a statistics course, and a drug-information/literature evaluation course. Applicable research skills training for pharmacy students in the area of drug information entails literature searching, evaluation and critical interpretation. These skills, although undoubtedly important, do not sufficiently address other research skill areas needed to solve problems that emerge and translate these findings into their practice. A relatively recent study which surveyed US colleges of pharmacy reported that although the majority of colleges taught research skills, 75% did not require their students to conduct a research project.<sup>53</sup> Studies investigating the opinions of graduates from pharmacy programmes who developed research skills while in their undergraduate education have indicated that this training improved their decision-making, and enhanced their marketability and effective functioning in their work.<sup>50,53,54</sup> In addition, engaging students in research often provides them with the needed spark to pursue postgraduate studies.

Research as part of undergraduate education programmes can foster a quality improvement approach to the delivery of health care. Quality improvement has been identified by WHO as one of the core set of competencies that the 21<sup>st</sup> century health care worker will need to be able to yield better outcomes for patients with chronic conditions.<sup>4</sup> A quality improvement approach enables workers to translate evidence from their own practices into efforts at improvements and those of others. Improved safety for patients and increased efficiency of service delivery is embedded in this competency; all of which can be fostered by early involvement of health care students in research activities, including critical thinking and problem-solving skill development.

As illustrated in *Figure 6.3*, these weakness and strengths in the undergraduate pharmacy curriculum at the University of Auckland appear to build competent practitioners in the preparation of pharmaceutical products, dispensing medications, researching and providing medicines information, working in a professional and culturally sensitive manner, and contributing to the quality use of medicines. However, to build practitioners who will address the WHO set of core competencies necessary to contribute to the health care needs of the future, more emphasis must be given in the

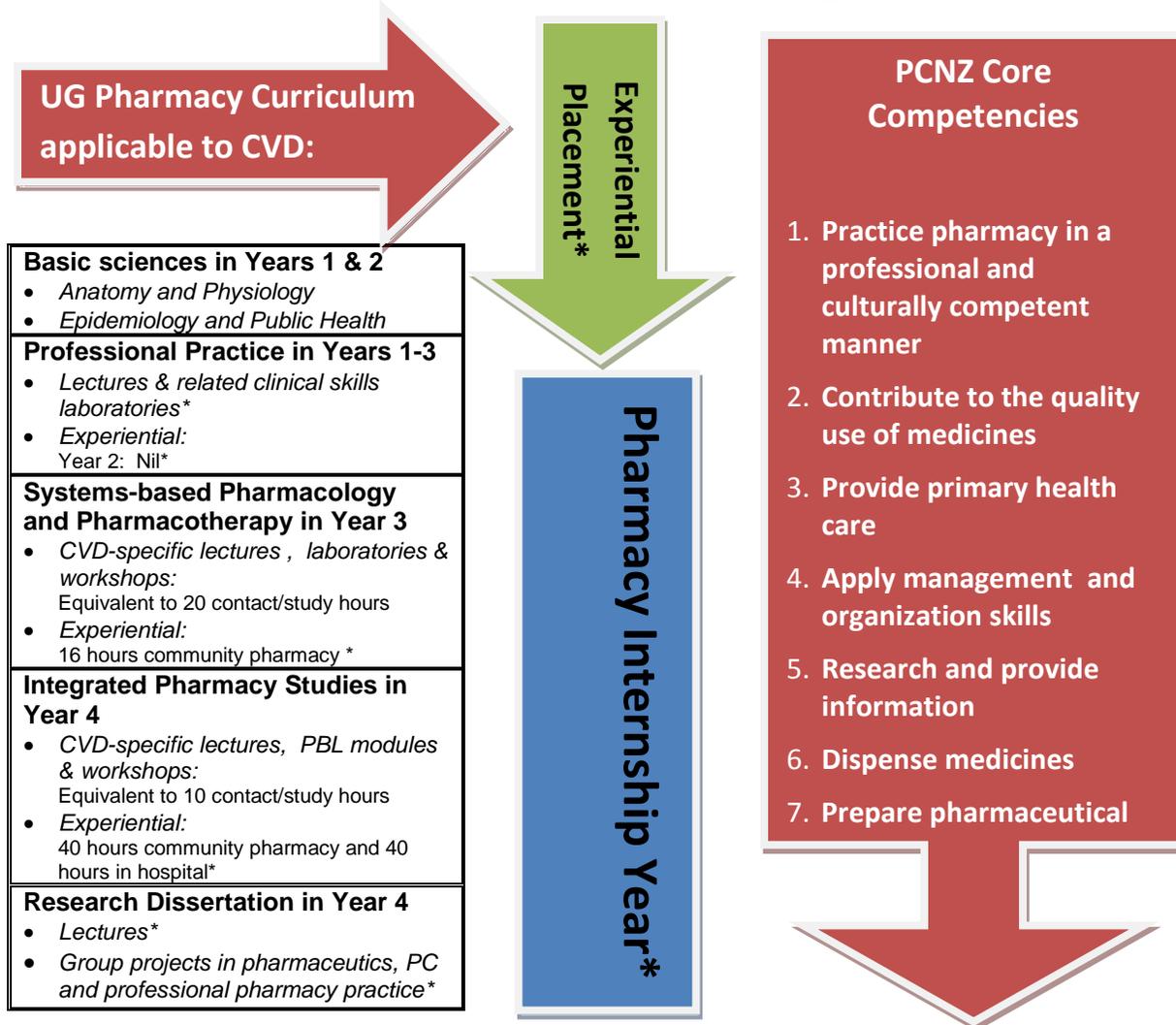
curriculum to foster the provision of patient centred care and to working effectively as members of inter-professional teams. Other countries with a slightly similar undergraduate pharmacy education as the one delivered in NZ - such as Canada - are including key components in their curricula in preparation for the expanded role of pharmacists in the future, such as an integrated approach to teaching pharmacotherapy, management courses that include development of patient care services, incorporation of physical assessment and competencies related to the expanded scope of practice, and extensive clinical training in direct patient care.<sup>55</sup> This level of clinical training is considered essential for graduates to become independent, competent patient care practitioners, who are responsible to both patients and colleagues within inter-professional teams.

#### **6.4.2 Undergraduate education in CVD risk assessment and management**

Following a similar strategy as that outlined in section 6.4.1, weaknesses and strengths in the current undergraduate pharmacy curriculum with regard to CVD risk assessment and management were identified and are illustrated in [Figure 6.4](#). Again, the major weaknesses identified were in the experiential education component for preparing pharmacy students to deliver patient-centred CVD risk assessment and management and in educational opportunities to foster relationships for a future interdisciplinary practice environment to care for patients with CVD and related risk factors. Another weakness specifically related to the training component of CVD risk assessment was the limited utilisation of point-of-care (PoC) technology in clinical skills laboratories, which will be further discussed later in this section.

As per the assessment on the overall undergraduate pharmacy curriculum at the University of Auckland, strengths were identified in the integrated approach to the teaching of CV pharmacotherapy and the strong research component in the last year of the undergraduate programme, as several of the research projects in which the students engage target CVD risk factors, assess outcomes and the pharmacist's role in public health strategies, and introduce quality improvement in the delivery of appropriate CV care.<sup>50</sup>

**Figure 6.4: Alignment of the undergraduate pharmacy curriculum on CVD at the UoA with core competencies for pharmacy graduates<sup>a</sup>**



WHO Core Competencies:	Strengths	Weaknesses
1. Provide patient-centered care to diverse populations	PBL approaches	SBL approaches
2. Work effectively as members of inter-professional teams	IPS	Experiential education
3. Employ evidence-based practice to optimize care and foster quality improvement	Research Dissertation	IPE
4. Utilize informatics in practice		Use of technology
5. Foster a public health perspective of care		

**Legend:** a=as per the competencies for registration with the Pharmacy Council of New Zealand (PCNZ)<sup>17</sup> and WHO core competencies for health professionals<sup>4</sup>. CVD=cardiovascular disease, including risk assessment and management, \*=not CVD specific, but exposes students to patients with CVD risk factors, PBL=problem-based learning, PC=pharmaceutical care, PBL=problem-based learning, SBL=simulation-based learning, IPS=Integrated pharmacy studies, IPE=inter-professional education.

The few studies available which have reviewed the undergraduate pharmacy education curriculum on CVD have focused on assessing outcomes such as students' knowledge (as evidenced by impact on their grades) rather than assessing the students' perceived competency or confidence for undertaking an active role in patient-focused CVD risk assessment and management services on graduation.<sup>7-9</sup> The results of our student survey in regards to their perceptions of the preparation for the provision of CVD risk factor assessment and management services, have corroborated to some degree to the weaknesses and strengths in the pharmacy curriculum in CVD risk assessment and management previously identified. Overall, the surveyed students perceived they had received a solid knowledge foundation in CV risk factors and their management.

Conway *et. al.* described a similar curriculum to the one taught at the University of Auckland, delivering the CVD curriculum utilising active learning strategies, such as self-directed, team-based learning (TBL) over a 7-week period.<sup>7</sup> The integrated CV module resulted in improved student and faculty satisfaction with the course and no adverse effect on student performance. Despite the very similar content and format of the two CVD curricula, the one offered at the University of Auckland is significantly shorter - a total of four weeks delivered in the Pharmacotherapy course in Year 3 and in the IPS course in Year 4.

Teaching physical assessment skills is considered an integral component of many pharmacy curricula in the US. In a survey of US pharmacy colleges and schools, 96% indicated that physical assessment skills are taught within their curricula, and 45% of those programmes taught physical assessment as a stand-alone course.<sup>56</sup> As the role of pharmacists is becoming more directly involved in therapy management, the importance of teaching physical assessment skills to students has been emphasised.<sup>10, 57-59</sup> The results of our survey indicate that the majority of the students (89%) reported having performed health assessments related to CV risk factors as part of their undergraduate education and training.

Interestingly, 85% of the BPharm III and 97% of the BPharm IV students reported to have been trained in calculating absolute CV risk, which may be indicative that BPharm IV students may be more confident in their knowledge in this area. When specifically asked about the individual health assessments performed during their undergraduate studies, blood pressure measurement training was reported by only 75% of students and blood cholesterol measurement training was reported by only 37% of students and there were no significant differences in the responses between BPharm III and BPharm IV students regarding their skills in performing these tests. These differences in the students' perceived knowledge and skills necessary for building CVD risk assessment competency are indicative of the fact that although students had a solid understanding of the concepts behind CVD risk factors and risk assessment, that is the ability to interpret data resulting from a health assessment and to use it to calculate CVD risk, they did not perceive that they had received comprehensive skills development in performing CVD risk factor assessments essential for calculating absolute CV risk.

One possible explanation for this is that the methods used to teach CVD and related risk factors is primarily problem-based learning (PBL) strategies, such as case studies discussed in workshops. Although using PBL strategies has been identified as a strength in our analysis of the overall undergraduate pharmacy curriculum at the University of Auckland, when focusing specifically in the CVD risk assessment and management curriculum, the use of simulated based learning (SBL) strategies may be more appropriate for teaching patient assessment skills. For example, Sherman *et. al.* reported the use of a simulation stethoscope in a physical-assessment learning experience.<sup>59</sup> The authors reported that this SBL strategy increased pharmacy students' knowledge in performing pulmonary and CV assessment techniques.

Other authors have also reported positive results when using similar SBL strategies to increase student competence in blood pressure assessment.<sup>57</sup> Bond and Cone reported on the incorporation of pharmaceutical care laboratories into the curriculum for each of the first six semesters of a PharmD programme at the University of New Mexico in the US - which included a series of simulated scenarios in laboratory activities in which students demonstrated the skills learnt on simulated patients – resulting in

increased student confidence particularly in measuring blood pressure, using PoC machines and performing CV physical assessments.<sup>60</sup> It has been reported that relying only on case-based learning with limited experiential education or practices for skill instruction could produce inconsistencies in building competency and is less likely to lead to skill proficiency.<sup>57</sup>

Another possible explanation is that pharmacy students at the University of Auckland are not introduced to physical assessment experiences or CVD-related pharmacy practice laboratories until the third year of their undergraduate education. Teaching physical assessment skills should be added to a series of pharmacy practice laboratory courses earlier in the undergraduate curriculum – even as early as the first year – so that these skills are more consistently reinforced in the later academic years and during their experiential education. Sherman *et. al.* reported on adding a physical assessment skills component to a third year entry-level Doctor of Pharmacy (PharmD) curriculum at the University of Mississippi in the US.<sup>59</sup> In this study, students reported more confidence in performing these skills after the physical assessment session on blood pressure measurement and also indicated that more time should be invested in teaching physical assessment skills at this point in their curriculum. Based on these results, the authors suggested that a series of pharmacy practice laboratory courses in the first, second and third years of their PharmD curriculum as a longitudinal exposure to physical assessment skills throughout the curriculum could be beneficial in building proficiency.

The limited use of PoC technology in teaching CVD risk factor assessment is a significant weakness in the undergraduate curriculum at the University of Auckland. Tests that can be employed outside of a traditional laboratory setting or “at bedside” are typically referred to as PoC. As technologies have improved, more and more PoC tests have become available to assist with medical decision-making in the community pharmacy setting. Such tests range from PoC diagnostic tests (such as pregnancy tests) to monitoring disease markers such as blood glucose and cholesterol.

In our survey, approximately one quarter of students indicated they had received limited training in measuring the majority of important CVD risk factors – and less than

half indicated that they had received any training in blood cholesterol measurements. One means by which pharmacy students may improve their CVD risk factor assessment skills may be through the incorporation of PoC technology in pharmacy practice laboratories. In a recently reported survey of US colleges, the PoC testing curricular content delivered by the majority of the surveyed colleges focused on tests used to monitor/manage patients with previously diagnosed conditions.<sup>61</sup> Instruction on blood glucose (90%) and lipid/cholesterol (80%) testing were the PoC tests most commonly included in curricula. Both of these were reported in much lower percentages by students in our survey.

As indicated in the WHO set of core competencies of future health care practitioners, pharmacists in general will need to become more patient-centred, which means that they are under pressure to gain proficiency in assessing patients, to make decisions regarding treatment, to assist patients and their prescribers to monitor chronic medical conditions, and to identify new problems early in the course of disease. We have reported in our previous reviews of the evidence throughout Chapters 2 to 4 that through their early intervention, pharmacists can help improve patient outcomes and decrease healthcare utilisation. Unfortunately, as we have also reported in Chapters 3 and 5, time constraints placed on pharmacists in community practice make the sustainability of many patient-care programs impractical. A key to accomplishing this is the incorporation of POC technology into their routine practice. However, pharmacists can only fulfill this role if they have the proper knowledge regarding the use and limitations of these tools. Pharmacy schools need to take a critical look at their curriculum to ensure that students are properly equipped to engage in contemporary practice on graduation.

Another important finding that resulted from this survey is the overall lower percentage of students who indicated that they had learned how to implement CV risk assessment services in various pharmacy practice settings (54%), or to have counseled or educated patients on CV risk (68%). These results are again indicative that the undergraduate pharmacy curriculum at the University of Auckland exposes students to limited opportunities to apply the knowledge gained in CVD risk assessment and

management. Experiential education, SBL approaches and the introduction of inter-professional education, may contribute to providing these pharmacy students with the opportunity to practise these skills.

SBL approaches may be more effective in having students practise their counseling skills on CV risk factors, for example the use of standardised patients, has been reported as providing students with the opportunity to better communicate with and understand the psychosocial needs of patients.<sup>40,62</sup> Also, CVD risk assessment and management may be an ideal area to introduce inter-professional education strategies in the undergraduate curricula. As previously discussed, inter-disciplinary teaching and learning in Māori Health has already been introduced at the University of Auckland with reported successful outcomes.<sup>18</sup> This initiative may be used as a platform to build on a CVD risk assessment and management inter-disciplinary education programme.

Perhaps the greatest challenge in this regard is in exposing students to suitable experiential placements with innovative practice models for students to apply the skills learnt in the classroom. Experiential education settings are where the greatest interface between pharmacy practice and pharmacy education exist. This interface is particularly important to the integration of CVD risk assessment services in community pharmacies. Without real-world examples of the application of CVD risk assessment concepts in the context of pharmaceutical care, graduates may find it difficult to adopt this model in the future. At the same time, however, it is important to ensure that the gaps depicted above do not get too wide, thereby creating a disconnect, which may lead to dissatisfaction or frustration. Many PharmD graduates have reported to be disillusioned when they attempted to enter the workforce due to the disparity between their educational training and job specifications.<sup>63</sup>

In the absence of any increased opportunities for experience within practice before the pre-registration year, vocational placements (or even part-time work) have been suggested as an additional opportunity for students to develop professional skills, whereby theoretical knowledge can be applied.<sup>31</sup> An example of such a vocational model for pharmacy education has been established at the University of Waterloo School of Pharmacy in Canada. In this programme, students must complete four

pharmacy co-op work terms. Co-op is a well established educational model that promotes continuous learning through the integration of classroom and applied work-based learning. It is a learner-centred model where the onus is on the student to direct their own learning and make a valuable contribution.<sup>64,65</sup>

The results of the students' agreement with the capability statements also corroborated the above findings – that is, pharmacy students at the University of Auckland perceived that their undergraduate education provided them with a stronger knowledge-base than skills in relation to CVD risk assessment and management. The highest percentages of agreement (above 70%) were reported for capability statements relating to the use of the *NZ Cardiovascular Risk Assessment and Management Guidelines* and the lowest percentages of agreement (below 60%) were reported for capability statements relating to the clinical application of CVD-risk assessment knowledge (such as counseling and screening patients, or responding to questions related to CV medications).

Similar reports of undergraduate pharmacy curricula suggest that still in many countries pharmaceutical sciences continue to dominate the first two or three years of undergraduate programmes.<sup>13,16,23,27,28,41</sup> Surveys have identified several disadvantages to this educational approach as reported by students and by educators, including the use of surface learning techniques to accumulate scientific knowledge and insufficient exposure to pharmacy practice, particularly during the early years of the undergraduate curriculum.<sup>31,66,67</sup> A survey of academics in the UK also suggested that while educators are generally supportive of a move away from didactic teaching and inclined to use more practical experiences for students to solidify knowledge, lack of resources was identified as a significant barrier.<sup>68</sup> The findings from the present study add weight to the argument in the pharmacy education literature, that as pharmacists take on more clinical roles within their profession, as would be the case for the provision of CVD risk assessment and management, schools of pharmacy should receive some clinical training funding in order to facilitate pharmacy undergraduate skill development in this emerging area of clinical pharmacy practice.<sup>31,69</sup>

A number of limitations need to be addressed in regards to this study. Firstly, there were limited resources available online to undertake a comprehensive assessment of the undergraduate curriculum related to the CVD risk assessment and management taught at the University of Otago. Therefore, even though the curriculum of the two schools of pharmacy in NZ was compared, teaching and learning practices on this subject may need further exploration to confirm the findings of this review. The fact that students at the University of Otago were not surveyed, also poses a limitation to the findings of this study.

## 6.5 Conclusions

The assessment of the current undergraduate pharmacy curriculum at the University of Auckland, based on an extensive literature review of the knowledge, skills and expected competencies required to meet the needs of future pharmacists, identified significant weaknesses particularly in the experiential education component for preparing pharmacy students to deliver patient-centred care, and in educational opportunities to foster relationships for a future inter-disciplinary practice environment. Due to the increasing focus on clinical roles of pharmacists, the results of this review strongly suggest that the pharmacy degree at the University of Auckland should change in order to address the future needs of the profession. Countries with a similar pharmacy education model as the one described for NZ are moving towards a five-year integrated undergraduate programme. This move could address many of the important weaknesses identified in the current curriculum particularly by integrating work-based practice through an academic-based experiential education programme within the degree.<sup>55,69</sup>

Other pathways for improvement in the undergraduate pharmacy curriculum at the University of Auckland that can further facilitate the evolution of pharmacy education in NZ to adequately prepare pharmacy graduates for future patient-centred roles include:

1. Decrease traditional ways of teaching, particularly when teaching skills that will need the application of knowledge. This can be achieved by enhancing the current inquiry/case-based pharmacotherapy course with SBL strategies. In

addition, SBL methodologies need to be incorporated throughout the entire curriculum, even as early as the first year of undergraduate education, and possibly by constructing a spiral curriculum incorporating both vertical and horizontal integration of course content, and by reducing the emphasis on technical performance. Repetition is essential in the development of practice skills and acquisition of clinical competency. This re-structuring process has been successfully implemented in other countries.<sup>67</sup>

2. Increased effective collaboration between pharmacy educators and the profession will be necessary to improve experiential education, develop new patient-centred practice models, and increase student clinical practice skills. A broad-based, inclusive planning process involving all pharmacy organisations and associations will be necessary to address the profession's vast re-training needs. In this regard, pharmacy faculty and clinical practitioners must make the commitment to provide the expertise and cooperation necessary to develop efficacious education and training programmes that can enhance clinical practice abilities, particularly of community pharmacists. The *Research Dissertation* course may offer a unique venue for student involvement in developing and testing innovative practice models in collaboration with practitioners committed to the patient-centred philosophy of practice. Academia can help to innovate, but any sustainable change in pharmacy practice must ultimately be driven and maintained by the practice community.

Similarly, an evaluation of the current undergraduate pharmacy curriculum at the University of Auckland, specifically in CVD risk assessment and management, based on both a review of the literature and on the results of the undergraduate students' survey regarding their perceived knowledge, skills and expected competencies in this area of practice, strongly suggests that there is limited emphasis in the curriculum in building students' patient assessment skills - an essential component for students to be able to calculate and interpret CVD risk. Although similar recommendations to those outlined above for the incorporation of changes to the overall pharmacy curricula are also applicable to the CVD risk assessment and management specific component, a few

additional recommendations are outlined below that may benefit the future incorporation of CVD risk assessment services in community pharmacies:

1. Incorporation of inter-professional learning strategies in the area of CVD risk assessment and management in the undergraduate curriculum. This medical area may be ideal for pharmacy educators to strengthen the students' abilities to collaborate with other health care professionals in preventative health, and understand each of their roles when working in a team environment. The *Māori Health Week* inter-disciplinary education programme may be used either as evidence of the beneficial effects on students' knowledge and satisfaction, or as a platform to build on more inter-professional education initiatives. Collaborative interdisciplinary clerkships, courses directed by other departments - such as nursing, nutrition, medicine and educational psychology - as well as incorporation of inter-disciplinary experiential education opportunities, are other innovative ways in which CVD risk and similar prevention principles can be taught to students who will in the future provide care to patients in inter-disciplinary working environments.
2. Increased use of technology, not only for pedagogical purposes, but also to enhance student skills in patient assessment and monitoring, particularly those which are most frequently encountered in community pharmacy practice, such as those in relation with CV risk factors. The curriculum must evolve to prepare graduates not only to use of technology to access information to facilitate their work, but also to improve the quality of care provided and help patients in accessing care. In addition, health information technology has the potential to significantly transform the tools with which pharmacists provide care. Graduates must have the skills to manage technology tools to effectively access, interpret, and use patient information. Incorporation of PoC machines to be used in pharmacy practice laboratories during the CV modules is recommended.
3. Introduction of management courses in the undergraduate curriculum can also provide pharmacy students with a solid understanding of how they could implement and run a CVD risk assessment service in community pharmacy

settings. It is important to start teaching pharmacy students that a patient care service business is managed differently to a medication dispensing business. A pharmaceutical care practice in the community pharmacy setting can be successful if it is built with a distinct separation between its dispensing business and its patient care business.<sup>69</sup> The *Research Dissertation* course is a suitable platform to foster this kind of entrepreneurship in pharmacy students.

4. The School of Pharmacy at the University of Auckland may need to consider whether it is necessary to continue to provide either a specialist postgraduate education programme to credential pharmacists for advanced or specialist practice in CVD risk assessment and management, or to increase opportunities and pathways within the undergraduate degree programme to specialise students during their undergraduate education. Although the University of Auckland currently offers a post-graduate course on Cardiovascular Pharmacotherapy, this structure could be reconsidered in the light of changes to pharmacy practice and pressures on undergraduate curricula to include education in advanced areas, such as CVD risk assessment and management.

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## 6.7 Appendices

### **Appendix 6.1: Competence standards for the pharmacist scope of practice**

Competency Standard	Description
<p><b>1. Practise pharmacy in a professional and culturally competent manner</b></p>	<p>Cultural competence is the ability to interact respectfully and effectively with persons from a background that is different from one's own. It goes beyond an awareness of or sensitivity to another culture to include the ability to use that knowledge in cross-cultural situations, and includes the development and implementation of processes, procedures and practices that support the delivery of culturally competent (appropriate) services.</p> <p>Clinical competence, as expected of a pharmacist, is the application of knowledge and skills to ensure the safe and quality use of medicines to optimise health outcomes.</p> <p>Ethical conduct, as described in the Pharmacy Council Code of Ethics, is the expression of those principles and values that underpin the pharmacy profession.</p>
<p><b>2. Contribute to the quality use of medicines</b></p>	<p>This competence standard covers the role of the pharmacist in promoting the quality use of medicines within an environment of professional pharmaceutical care. The pharmacist's role includes selecting, recommending, monitoring and evaluating medicine therapy as part of a health care team. Rational medicine use refers to the evidence-based selection, monitoring and evaluation of medicine therapy in order to optimise health outcomes.</p>
<p><b>3. Provide primary health care</b></p>	<p>This competence standard concerns the role of the pharmacist in encouraging and assisting people to take responsibility for their own health. Primary health incorporates holistic care of patients including attention to lifestyle, diet, health promotion, illness prevention, referral and the supply of non-prescription medicines, therapies, diagnostic and therapeutic aids. This involves the pharmacist in treatment, referral and education of the public.</p>
<p><b>4. Apply management and organisation skills</b></p>	<p>This competence encompasses the pharmacist's ability to deal with contingencies in the workplace as well as routine work.</p>
<p><b>5. Research and provide information</b></p>	<p>This competence standard covers the role of the pharmacist in providing health-related information to other health professionals, patients and the public. The pharmacist's role includes finding, interpreting, evaluating, compiling, summarising, generating and disseminating information, for the purpose of optimising medicine related health outcomes.</p> <p>The research component of this standard applies to both applied and practice-based research covering medicines and all areas within pharmacy and health.</p>
<p><b>6. Dispense medicines</b></p>	<p>This competence standard covers the supply of prescription medicines and "pharmacist -only" medicines, including extemporaneously compounded products. The dispensing process includes all actions and responsibilities of the pharmacist from receipt of a prescription, medicine order or patient request through to counselling the patient about the use of the medicine.</p>
<p><b>7. Prepare pharmaceutical products</b></p>	<p>This competence standard covers the preparation of pharmaceutical products in community and hospital pharmacies.</p>



- Reviewed and used the NZ Cardiovascular Risk Assessment and Management Guidelines to provide evidence-based recommendations.
- Counseled and educated patients and/or caregivers on cardiovascular risk.
- Identified patients needed to be referred for appropriate follow-up after a CV risk assessment.
- Identified the role of the pharmacist in CVD risk assessment and management and learned how to collaborate, cooperate, and communicate with other health care professionals.
- Learned how to implement CV risk assessment services in various pharmacy practice settings.
- Other (*please specify*): \_\_\_\_\_

5. Please indicate (circle) your level of agreement or disagreement with the following statements in regards to your undergraduate training in CVD risk assessment and management:

Rating: 1 = strongly agree; 2 = agree; 3 = neutral; 4 = disagree; 5 = strongly disagree.

<b>Student's opinion regarding:</b>	<b>Rating (circle)</b>
My undergraduate training in pharmacy has provided me with the <u>knowledge base</u> required to screen patients for CVD.	1 2 3 4 5
My undergraduate training in pharmacy has provided me with the patient assessment <u>skills</u> necessary to screen patients for CVD.	1 2 3 4 5
I am aware of the recommendations provided by the NZ Cardiovascular Risk Assessment and Management Guidelines.	1 2 3 4 5
I feel confident on using the CV risk tables provided in the guidelines and recognizing individuals at risk of CVD.	1 2 3 4 5
I feel confident counseling patients on CVD prevention strategies.	1 2 3 4 5
I feel confident in responding to questions regarding cardiovascular medications.	1 2 3 4 5
The undergraduate training received has prepared me adequately to deliver CV risk assessment services for patients in the community.	1 2 3 4 5
Overall, I feel pharmacists are adequately trained to assess patient's cardiovascular disease risk.	1 2 3 4 5

**THANK YOU FOR COMPLETING THE SURVEY!**

## **Appendix 6.3: Participant Information Sheet**



### **School of Pharmacy**

Private Bag 92019, Auckland, New Zealand

Telephone: 64 9 923 3778, Fax: 64 9 367-7192 or extension 82692

**Study on: *Pharmacy students' perceptions on their training in cardiovascular disease risk assessment and management***

#### **PARTICIPANT INFORMATION SHEET AND CONSENT FORM**

You are invited to take part in a research study being carried out by Monica Zolezzi, a PhD candidate at the School of Pharmacy, University of Auckland, under the supervision of Professor John Shaw, to find out the views of undergraduate and post-graduate students in regards to their education and training in cardiovascular (CV) risk assessment and management; as well as their opinions in regards to the level of confidence in the provision of CV risk assessment services provided by pharmacists.

CV risk assessment is important in improving health outcomes for the general population. It involves screening for risk factors such as blood pressure as well as measuring and interpreting data such as lipid levels, family history, etc. to work out the potential risk of future CV illness for an individual. Traditionally, such screening has been seen as the role of general practitioners but increasingly initial screening and assessment is being conducted by other groups such as public health nurses. Because of their accessibility within the community, pharmacists have also been proposed to undertake such roles and overseas a number a community pharmacy based services have been introduced. Patients identified at risk are referred to their general practitioner for further investigation and treatment if necessary. These services are intended to enhance collaboration between pharmacists and general practitioners.

The study involves a short survey to seek your views on how your pharmacy education has prepared you for such a role for pharmacists. We envisage it taking about 10 minutes to complete. Taking part in the study is voluntary (your choice). If you choose not to participate, this will not affect you in any way in regards to the pharmacy education you are currently pursuing. If you agree to participate, please complete the attached survey to the best of your ability and as completely as possible.

Research assistants (and NOT the principal investigators) are the only ones involved in handing the questionnaires to all participants. Please return the questionnaire directly to the research assistants. If you are contacted via email, please note that the principal investigators will NOT know the source of the emails. Research assistants involved in the transcription of the survey data into the result template will be asked to sign a confidentiality agreement.

Once the information is pooled and analysed it will be presented in a report for the student's research dissertation, and for wider dissemination in research journals. No participant will be identified in any reports from the study. Anonymous data will be stored in a secure place for six years and then destroyed. You are free to discuss your participation in this study with the project supervisor Professor John Shaw (contact details below). If you have any concerns of an ethical nature you can contact the Chair of The University of Auckland Human Participants Ethics Committee at (09) 373-7599 ext 87830.

**Study supervisor:** Professor John Shaw, School of Pharmacy, The University of Auckland.  
Ph: (09) 373-7599 ext 83778, Email: [j.shaw@auckland.ac.nz](mailto:j.shaw@auckland.ac.nz)

The researchers appreciate your participation in this study as your feedback in regards to your pharmacy education in CVD risk assessment and management is extremely valuable. Please note that in order to maintain confidentiality, we will not ask you to sign a separate consent form. Therefore, **completion of the questionnaire will be regarded as CONSENT TO PARTICIPATE in this research study.** Please also note that once completed and submitted, you will not be able to withdraw the questionnaire as it is anonymous and therefore not identifiable.

**APPROVED BY THE UNIVERSITY OF AUCKLAND HUMAN PARTICIPANTS ETHICS COMMITTEE ON October 28, 2011 for 3 years, from 01 November 2011 to 01 November 2014. Reference Number 7642.**

## 6.8 Acknowledgements for Chapter 6

The research presented in this Chapter is the result of the valuable contributions of the following individuals:

- *Reem Jan, post-graduate pharmacy student at the School of Pharmacy, the University of Auckland for her work administering the questionnaire, collecting and sorting out the data in preparation for analysis.*
- *Louise Curley, former post-graduate pharmacy student at the School of Pharmacy, the University of Auckland for her work administering the questionnaire, collecting and sorting out the data in preparation for analysis.*
- *David Odynak, research analyst at the Population Research Laboratory, Department of Sociology, the University of Alberta for setting up the computer-assisted data entry and assistance in analysing the questionnaire data.*
- *Lynne Bye, Senior Tutor at the School of Pharmacy, the University of Auckland, for providing information on the Pharmacy Practice undergraduate pharmacy curriculum.*
- *Nataly Martini, Senior Lecturer at the School of Pharmacy, the University of Auckland, for providing information on the Pharmacotherapy undergraduate pharmacy curriculum.*
- *Jeff Harrison, Senior Lecturer at the School of Pharmacy, the University of Auckland, for providing information on the Cardiovascular Pharmacotherapy post-graduate curriculum.*
- *Janie Sheridan, Associate Professor at the School of Pharmacy, the University of Auckland, for providing information on the Quality and Safety Interdisciplinary Education project at the Faculty of Medical and Health Sciences, the University of Auckland.*

## CHAPTER 7:

### CONCLUSIONS AND RECOMMENDATIONS

#### 7.1 What is already known about cardiovascular disease risk assessment and management

Chronic conditions, such as cardiovascular disease (CVD) and diabetes, currently account for more than half of the global disease burden and are a primary challenge for 21<sup>st</sup> century healthcare systems.<sup>1,2</sup> In many industrialised countries, national health care strategies highlight the need to focus on health promotion and prevention programmes to decrease the burden associated with the development of these chronic conditions. Given its enormous economic and clinical impact, it is not surprising that a significant amount of research continues to be directed towards CVD risk reduction. CVD and risk factor management is one of the most common reasons for New Zealanders to visit their general practitioners (GPs).<sup>3</sup> As a result, timely assessment of cardiovascular risk factors in the general population is a fundamental approach in primary health care. Despite the availability of national guidelines, audits of general practice in New Zealand (NZ) have indicated treatment gaps and low levels of documenting CVD risk factors, even following the introduction of electronic screening and decision support tools.<sup>4-8</sup>

Barriers to accessing general practice services may result in low coverage in the most disadvantaged subgroups of the population, which may lead to an exacerbation of health disparities due to unequal access to CVD risk assessment services. There are also limitations in the frequency of access to health care professionals able not only to appropriately assess risk factors, but also to initiate or alter medication therapy in an attempt to reach treatment targets for cardiovascular risk reduction. GPs are often the first access to treatment initiation for cardiovascular risk factors, but their time constraints pose a limitation to the extent and effectiveness of the follow up required by these patients.

Although nurse practitioners and, more recently in some countries, pharmacists, are able to prescribe medications, there is very little information in the literature as to the impact of having these additional advanced care providers being able to introduce or change treatments, or on their ability to decrease the research-practice gap that exists when managing the therapy of individuals with cardiovascular risk factors. Because the management of CVD is complex and demands remedial strategies that are costly, limited and often implemented late in the progression of the disease, multidisciplinary preventive approaches have been recommended to improve the early detection and modification of risk factors to attenuate the development and progression of CVD and its associated complications.<sup>9-10</sup>

The contribution of community pharmacists to public health is becoming increasingly recognised worldwide.<sup>11</sup> The high profile and unique accessibility of pharmacists in the community, coupled with their frequent contact with a wide range of people, both well and sick, means that community pharmacists are well-positioned to provide preventive health advice, health promotion interventions, refer people for adequate, evidence-based treatments, collaboratively monitor and assess therapy with other health care providers, and positively influence treatment outcomes. Therefore, pharmacy practice research is needed to identify practical ways in which pharmacists can successfully employ cardiovascular risk reduction strategies that are feasible and sustainable in the current health care system and practice environment to reduce the evidence-practice gap in cardiovascular risk assessment and management that has been reported in NZ.

As such, the main research question that was asked at the initiation of this thesis: *“What strategic interventions can NZ community pharmacists adopt to facilitate the provision of cardiovascular risk assessment and management services within the constraints of the current health care system and their practice environment?”* has been tested through five separate, but related studies - using both quantitative and qualitative methodologies. Although each chapter also provides conclusions and recommendations, these were based on the specific findings resulting from the specific study (ies) presented in each chapter. In this final chapter, all of the conclusions

outlined in Chapters three to six of this thesis are drawn together and set them in context to provide recommendations for action and future research, practice and policy.

## **7.2 What this research adds**

### **7.2.1 Literature review**

In Chapter 2, various national health strategies and general practice funded programmes were described, all of which are aimed at facilitating a more robust integration of community pharmacy services to target preventative health initiatives that can decrease inequities in access to the primary health care sector, particularly those that can target chronic diseases of priority in NZ, such as CVD. From all of the national health strategies and pharmacy-related vision/strategic direction documents reviewed in detail during the duration of this research, there are common themes that can be articulated with regard to the future direction for community pharmacy practice in NZ. These themes point to services that:

- are patient-centred
- have targeted health outcomes
- assure patient safety
- assure quality
- are sustainable
- are collaborative and integrated within healthcare teams
- support the continuing professional development of pharmacists
- facilitate pharmacists' practice to their full scope

Much of the past research into pharmacist involvement in CVD risk reduction has been focused on pharmacists working in secondary care settings. However, since the majority of pharmacists in NZ practise in community pharmacies; and, indeed, most patients who need CVD risk reduction live in communities they serve, the focus of the literature review for this PhD research programme was to identify CVD research conducted in community settings.

The literature review demonstrated that CVD research has been occurring in community pharmacy settings worldwide for over 30 years. Despite the large number of studies, often demonstrating clinically significant benefits of pharmacist care, these positive results have not been able to generate sustainable change in community pharmacy practice.<sup>12</sup> Although this poor uptake is likely to be multifactorial, it has been suggested that it may be influenced by the fact that the vast majority of these trials have been observational and thus their results are unable to generate the high levels of evidence needed to support implementation of sustainable healthcare policy that can in turn influence practice change.<sup>13</sup>

The systematic review undertaken and described in Chapter 4 provided the highest level of evidence that pharmacists, either alone or as an integral part of a multidisciplinary team, play a key role in improving lipid parameters in patients with dyslipidaemia across a variety of settings.<sup>14</sup> This systematic review has been published and has therefore already contributed to building up the evidence in support of pharmacist-led CVD assessment and management. Similar systematic reviews provide additional evidence that the integration of pharmacists in primary health care and team-based community initiatives should be considered as a viable solution for the early detection and improved management of risk factors which will contribute in decreasing the burden associated with CVD and its complications.<sup>15-18</sup>

Another important finding in the pharmacy practice research literature is that the majority of community pharmacy interventions described in the articles reviewed were complex and time-intensive.<sup>12</sup> Given the current realities of community pharmacy practice in NZ, few community pharmacists would be able to devote the necessary time to individualise patient services while still managing the rest of their daily duties and responsibilities as they are currently performed. This issue of time commitment has frequently been ignored by investigators who often overlook an assessment of feasibility and sustainability of the studied interventions in their research. Considering that 'time intensiveness' appears to be a major barrier to the implementation of research findings into real world practice, further research is needed to develop effective strategies that can be implemented in today's community pharmacy practice environment.

With regard to CVD risk assessment and management, it is clear from the literature that the role of community pharmacists in NZ remains largely unknown. Future local research is necessary to corroborate the international evidence and gain local stakeholder support for the full integration of pharmacists in the primary care sector. This PhD research will complement the scant NZ research available on this topic to date and facilitate future research into the potential role of pharmacists in public health initiatives, particularly in cardiovascular risk assessment and management.

### **7.2.2 Health/disease screening and medication monitoring/management services in New Zealand community pharmacies**

Worldwide literature highlights that dramatic changes will need to be implemented to meet the future health care needs of the population.<sup>1,2</sup> Expanding access to primary care particularly to the underserved; reforming compensation to promote value of services; supporting clinicians' efforts to reengineer care; and engaging patients in making better choices and managing their health conditions, have all been identified as key areas where national health strategies need to focus on. In NZ, significant value for general practice, district health boards (DHBs) and primary health organisations (PHOs) could be anticipated if community pharmacists were more integrated within primary care and able to deliver patient-centred services to a wider segment of the population.<sup>18</sup>

Integrating pharmaceutical care services, such as health/disease screening (HDS) and medication monitoring/management (MM) services within general practice would ensure that patients are better informed about their medications, more likely to be adherent, and more likely to achieve the health targets expected by the DHBs.<sup>19</sup> By engaging with community pharmacy, PHOs will be seen not only to contribute to population health outcomes, but also to the development of a robust multi-disciplinary workforce and primary care infrastructure which is an expectation of primary care policy.<sup>20</sup>

Therefore, the extent of pharmacist involvement in HDS and MM (that is, services over and above those related to the traditional medication dispensing and medicines information and/or counseling) in NZ was investigated through a nationwide postal

survey which was presented in Chapter 3. This survey represented the most thorough investigation of the type of extended pharmacy services that are provided in NZ community pharmacies in the published literature to date. Key findings resulting from this survey included:

- The majority of NZ community pharmacies are providing some form of enhanced services to the public; although they are mostly in an early adoption phase. The most frequently offered HDS-type services offered were related to CVD risk factors, such as measurement of body mass index, blood pressure, and blood glucose. However, screening for other CVD risk factors such as dyslipidaemia or absolute CVD risk assessment were reported in less than 10% of those offering HDS services.
- All MM-type services related to chronic disease management (such as diabetes, hypertension, asthma, anticoagulation and osteoporosis) were reported to be provided in less than 10% of respondent pharmacies. Also, with the exception of weight management, the most frequent MM services offered were not consistent with the most frequent types of HDS services provided (such as blood pressure and glucose testing). *Medicines Review* and *Home Visits* were also reported in less than 10% of those offering MM services.
- Enhanced pharmacy services in NZ community pharmacies were reported to be mostly provided on a “*fee-for-service*” type of reimbursement model, in which the customer is the primary payer, particularly for HDS services. Provision of some MM services was reported to have additional reimbursement models.
- Community pharmacy characteristics significantly associated with the provision of enhanced services included: those located in urban centres (particularly those in the city centre), non-independent type pharmacies, and those which had collaborative practice agreements with general practice. Other pharmacy characteristics such as pharmacies located adjacent to medical centres and those with higher number of employees showed a positive association with the

provision of enhanced services, but statistical analysis found these associations not significant.

- The only respondent pharmacists' characteristic that showed a positive association with the provision of enhanced services was age. Middle-aged pharmacists (between 41-60 years of age) were more likely to be providing enhanced services than younger pharmacists (between 21-40 years of age) or older pharmacists (those older than 60). No significant associations between years of experience, advanced qualifications or hours spent in continuing education programs and provision of enhanced pharmacy services were found.
- Over three-quarters of the pharmacists surveyed were in agreement that community pharmacies should provide enhanced services. Those already providing these services showed greater agreement with this statement than those who were not providing HDS and/or MM services. Lack of compensation and time were the two most commonly reported barriers reported for the provision of enhanced services.

### **7.2.3 Consumers', GPs' and pharmacists' views on the role of the pharmacist in CVD risk assessment and management**

The increasing involvement of pharmacists in public health will require changes in the behaviour of key stakeholders towards this role expansion, not only on the part of pharmacists, but also from GPs and the public. Although the pharmacy literature is rich with studies that explore attitudes to community pharmacists' role expansion from the perspectives of GPs, public health care consumers and pharmacists themselves, only a limited number of studies have explored the views of these key stakeholders specifically in regard to CVD risk assessment and management services provided in community pharmacies, and none of these were NZ-based, except for an unpublished Master's dissertation thesis.<sup>21</sup> The present research has addressed this gap, utilising a qualitative approach in a set of three related studies examining the views of the key players involved.

The pharmacy consumers' interviews revealed some degree of support for pharmacists in the provision of CVD prevention strategies, provided these were offered in either a complementary or a collaborative model, working closely with a GP within a referring process or protocol, but not independently. Reservations in regard to the pharmacists' competency and skills in CVD risk assessment and management were strongly suggestive of lack of trust on the part of the public. Further work is needed to resolve some of the training and privacy concerns expressed by consumers. It is also possible that a lack of patient understanding and demand could play a role in affecting pharmacists' interest or motivation to offer CVD risk assessment and management services.

The GP interviews revealed overall more barriers than benefits in regards to community pharmacists offering CVD risk assessment and management services. GPs indicated that if such services are to be implemented, comprehensive training for pharmacists needs to be established so that the services offered at a community pharmacy are provided to the same quality and standard as those offered in general practice. In addition, GPs also voiced strong opinions regarding the potential for competition with community pharmacists for services traditionally provided by general practice. Despite this strong opposition, most GPs agreed with the concept that pharmacist involvement may translate into improved access to primary care services and wider opportunistic screening for those at greater risk, but were emphatic that these needed to be undertaken in a collaborative manner. It is possible that despite the available literature, most GPs have never experienced working with pharmacists in this role. Community pharmacists need to show leadership and improve their working relationships with local GPs, initially by opening the door to discussion points where both parties can share priorities, plans and patient needs in regards to CVD risk assessment; and then investing in generating evidence-based practice models in support of these discussions.

The pharmacists' interviews revealed that this group does recognise the benefits of offering a comprehensive CVD risk assessment service to their patients and the population as a whole; however, they also demonstrated a worrisome paucity in

implementing these services, and an inability to implement changes in their practices or to sustain them if implemented. The main barrier stated by pharmacists was the lack of a suitable remuneration model for community pharmacy cognitive services.

The most important commonly perceived benefit of improving access to cardiovascular preventative care is encouraging and must be further strengthened by fostering a team approach to the promotion of cardiovascular health and further exploring collaborative initiatives between GPs and community pharmacists in the prevention and management of CVD.

#### **7.2.4 Pharmacist education in CVD risk assessment and management**

In order to have a fully functional, competent workforce capable of developing, implementing or improving existing patient-focused programmes in community pharmacies, strong and robust educational systems must be in place to prepare and support both current and future pharmacists in the provision of these services. NZ community pharmacists who participated in the research studies reported in this thesis identified lack of training as an important barrier in the implementation of direct-patient services, and in particular, the provision of CVD risk factor assessment and management.

The assessment of the current undergraduate pharmacy curriculum in NZ, and more specifically at the University of Auckland, based on an extensive literature review of the knowledge, skills and expected competencies required by pharmacists to meet the future needs of the population, identified several weaknesses - particularly in the experiential education component of the curricula - for preparing pharmacy students to deliver patient-centred care, and in educational opportunities that foster professional relationships for a future inter-disciplinary practice environment.

Similarly, an assessment of the specific undergraduate pharmacy curriculum in CVD risk assessment and management at the University of Auckland, based on both a review of the literature and on the results of the undergraduate students' survey in regard to their perceived knowledge; skills and expected competencies in this area of

practice; are suggestive that there is limited emphasis in the curriculum on patient assessment skills, an essential competency for students to be able to assess and manage CVD risk factors.

## **7.3 Conclusions and Recommendations**

### **7.3.1 Fostering collaborative practice to improve access to primary cardiovascular health care services**

The pharmacy profession in NZ is under pressure from the increasing health care needs of the public to become more patient-focused and increase its involvement in more direct primary care services. HDS programmes and MM services evaluated in various countries have demonstrated that community pharmacists are well-positioned to assess individuals' CVD risk, manage cardiovascular risk factors, and refer high-risk individuals.

However, the majority of published pharmacist interventions in CVD assessment and management require close collaboration with GPs and/or frequent and intensive patient follow-up. Unfortunately, the practice environment for most pharmacists in NZ is not conducive to either. Although there has been a recent increase in the number of pharmacists working directly within medical practices and PHOs, the majority of registered pharmacists in NZ still work in chain/retail or independent community pharmacy settings which are largely not conducive to collaborative practice.

In addition, although the consumer interviews indicated that pharmacy could play a greater role in helping to tackle health inequalities, published studies add little to our understanding of the effectiveness of community pharmacies in engaging 'hard to reach' higher-risk individuals in assessments of their cardiovascular health. Although pharmacy-based CVD screening programmes are widely utilised to identify individuals at risk of chronic diseases, a more targeted approach, such as case finding, may be a better strategy for community pharmacy-based programmes, as they are likely to benefit those at greatest need from the pharmacist intervention.<sup>22</sup> Therefore, the issue of

whether services should be 'open access' and available on a walk-in basis to all, versus a more targeted approach, needs further exploration.

➤ **Recommendations**

- a. *Collaborative practices between community pharmacists and other primary care providers in CVD risk assessment and management may decrease the treatment and access gaps identified and have a positive effect on the cardiovascular health outcomes in the population. There is a clear indication from the results of this research that key pharmacy stakeholders in NZ, including pharmacists, pharmacy professional organisations, and schools of pharmacy must display leadership and collaborate with other primary health care stakeholders to build inter-professional teams that can facilitate the implementation of CVD risk assessment services in NZ community pharmacies and a full integration of pharmacists into the primary health care team.*
- b. *Undergraduate academic programmes in NZ need to become more proactive in assisting pharmacists-to-be to understand why practice change is the way of the future, and provide comprehensive educational and support programmes to ensure they receive the training required for a successful transition from a product-oriented professional to a patient-centred practitioner. Previous education and training models emphasising technical skills over the application of knowledge should no longer be applied to pharmacy education. Rather, it should place priority in addressing the mismatches between the provision of patient-centred services reported by community pharmacies and the priority health disorders in NZ, such as CVD.*
- c. *Collectively, pharmacists need to leverage their recognised expertise in medications with key policy-makers, strategists and health professionals who are working to ensure better health, better care, and lower health care costs in this era of health care reform and quality assurance. Practice change in community pharmacy means more than just getting out from behind the prescription counter. It means joining the team (or forming one), understanding the future needs of the*

*population, improving skills to address those needs, and keeping sight of the goal of improved health.*

### **7.3.2 Advocating practice change through the implementation of patient-centred cardiovascular risk assessment services**

Despite the large number of studies demonstrating clinically significant benefits of pharmacist care in CVD risk factor management, these positive results have not generated sustainable change in community pharmacy practice. Practice change in NZ community pharmacy has been particularly slow over the past decade and many patient-centred services have not been sustained; or gained solid acceptance or support from the major stakeholders and/or policymakers.

The majority of community pharmacies in NZ continue to offer predominantly product-oriented services, following a business model, and have been generally unable to run an integrated or a parallel self-sustained patient-focused service. This has been particularly apparent in the provision of CVD risk assessment services. Challenges within the current practice environment, including pharmacist lack of time and inadequate remuneration models based on technical dispensing activities, are possible reasons for the paucity in translating and sustaining pharmacy practice research results into real-world settings.

#### **➤ Recommendations**

- a. This PhD research has shown that improved access to these services was viewed as a facilitator by GPs, consumers and pharmacists themselves; this perceived common facilitator should therefore be explored further through action research (i.e. knowledge translation). Research projects which aim at demonstrating that the emerging role for pharmacists can help to address unmet patient care needs in the NZ primary care healthcare system are necessary. CVD risk assessment and management is an area where such demonstration projects are called for.*
- b. The advent of the new Community Pharmacy Services Agreement (CPSA) recently approved by the Ministry of Health in October of 2012 - which will be*

*implemented throughout NZ over the next three years - represents a major opportunity for community pharmacists and managers to move away from a solely prescription volume-based remuneration model and to re-orientate community pharmacy services to be more patient-centred, as it supports the provision of cognitive services particularly those expected to promote a collaborative and integrative approach to enhance patient outcomes. Under the new CPSA, pharmacists have the opportunity to address this perceived funding barrier to develop and implement a sustainable CVD risk assessment service in NZ community pharmacies. Because poor rates of implementation of new practice models in community pharmacy has previously been reported, even when funding was available, pro-actively advocating for the introduction of this new funding model through innovative practice research is required.*

- c. The NZ Cardiovascular Risk Assessment and Management guidelines provide evidence-based recommendations for selecting people for risk assessment, measuring risk factors, identifying level of absolute risk, employing appropriate interventions, and ensuring follow-up and monitoring. The guidelines also recommend that cardiovascular risk assessments should be provided by health professionals at the primary care level, who have adequate training and who are supported by appropriate infrastructure and systems for follow-up and quality improvement. Further research is needed to understand pharmacists' knowledge of these guidelines and of how to apply this knowledge in their practices. Active participation of community pharmacists in the guideline content, review and dissemination is likely to improve awareness on the pharmacist knowledge and confidence on their role in CVD risk reduction programmes. Pharmacist-specific guidelines for the management of individual risk factors have also been developed in other countries and have shown very positive results in the implementation and dissemination of the evidence-based CVD risk management strategies recommended in the guidelines; as well as being an effective tool in developing a sense of responsibility by pharmacists towards achieving cardiovascular risk intervention outcomes.*

*d. Community pharmacy managers need to be engaged in designing a patient care service business model that is managed separately, but parallel to the medication dispensing business. Without separating the two businesses, patients can become confused about products and services offered and the pharmacist may be inclined to abandon the patient care service practice to address demands of the dispensing business. Community pharmacy managers need to be active participants in, and supportive of, practice change. They must find alternative and creative plans that promote the clinical role of pharmacists without compromising the dispensary; for example by expanding the role of pharmacy technicians to oversee the pharmacy-dispensing needs. Some investment will also be necessary to ensure pharmacists have access to patient records and separate consultation areas for the provision of CVD risk assessment and management services.*

### **7.3.3 Re-aligning the undergraduate pharmacy education with the future expected roles for pharmacists**

In order to have a fully functional, competent workforce capable of engaging, developing, implementing or improving existing patient-focused services in community pharmacies, strong and robust educational systems must be in place to prepare and continuously support both current and future pharmacists in the provision of these services. Although an important funding opportunity for pharmacists to move away from their traditional roles and be remunerated for direct patient care services, the new CPSA also calls into question whether capacity exists in NZ to support the provision of these clinical services by community pharmacists.

This opportunity may have important implications for pharmacy undergraduate education, particularly in relation to the professional development component of the degree. Schools of pharmacy will have to ensure the development of professional pharmacists who are capable, confident, and responsible for taking on a direct role in the delivery of care. This will require more intense and goal-directed educational interventions throughout the entire duration of the undergraduate education to be able

to change the culture of pharmacy and ingrain the pharmacists' sense of responsibility in patient care outcomes. In addition, a greater emphasis on developing the necessary skills for engaging in successful patient interactions during initial qualification and pre-registration will also be necessary. The assessment of the current undergraduate pharmacy curriculum at the University of Auckland, specifically in CVD risk assessment and management, strongly suggests that there is limited emphasis in the curriculum in building students' patient assessment skills, an essential competency for students to be able to calculate and interpret CVD risk.

➤ **Recommendations**

- a. *Due to the increasing focus on the clinical roles of pharmacists, the undergraduate pharmacy degree must change in order to address the future needs of the profession. Concurrent with international trends in the formative education of pharmacists, NZ should consider a move towards a five year integrated undergraduate pharmacy programme. This move could address many of the important weaknesses identified in the current curriculum, particularly by integrating work-based practice through an academic based experiential education programme within the degree.*
- b. *The School of Pharmacy at the University of Auckland needs to consider whether it is necessary to continue providing either a specialist postgraduate education programme to credential pharmacists for advanced practice in CVD risk assessment and management, or to increase opportunities and pathways within the undergraduate degree program to allow students to specialise during their undergraduate education. The latter can be achieved by strengthening the health assessment curriculum during the undergraduate program; for example, with the use of standardised patients who have been reported to be of value for teaching CVD risk assessment skills.*
- c. *Inter-disciplinary undergraduate education in CVD risk assessment and management should be considered by the schools of Medicine, Pharmacy and Nursing as a suitable vehicle to foster the development of collaborative practices*

*that fully integrate pharmacists into the primary care team. An inter-disciplinary approach to teaching the NZ CVD Risk Assessment and Management guidelines and how to apply the recommendations within, may further clarify the individual roles of these health professionals within primary care, particularly in regards to CVD risk assessment and management.*

#### **7.3.4 Funding knowledge translation research that improves patient access to cardiovascular preventative care services in community pharmacies**

The results of the studies presented in this thesis, together with the strengths and limitations of the methods utilised, have revealed several areas which may need further clarification and exploration through additional scientific research.

##### ➤ **Recommendations**

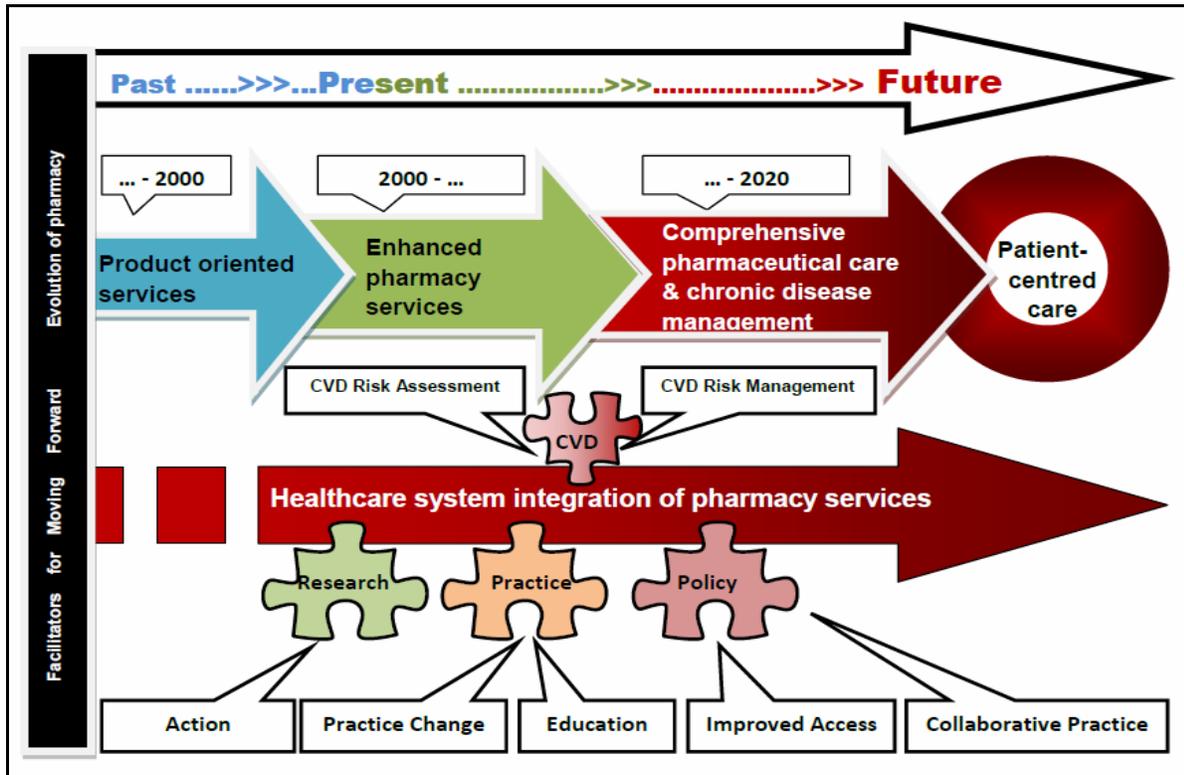
- a. *Considering that the new CPSA funding model has only recently been introduced, a follow up national survey to re-assess the extent of screening and medication monitoring services provided in NZ community pharmacies should be considered to assess if this funding opportunity has increased the delivery of patient-centred services. The results of the national survey reported in this thesis can be used as baseline data.*
- b. *Pharmacy professional organisations and academia must join in providing adequate guidance and support to community pharmacists willing to embrace practice change under the new CPSA funding umbrella. It is recommended that academia be more closely involved in research that promotes patient-centred practice and in setting up role models that demonstrate value for money of pharmacy services. A similar model to that of the recently completed project “Community pharmacist-led anticoagulation management service”<sup>23</sup>, led by the Pharmaceutical Society of NZ in collaboration with academic pharmacists at the University of Auckland, could be used as an example of such an endeavour for making pharmacist-led CVD risk assessment services in community pharmacies viable.*

*c. A web-based tool to facilitate risk assessment and management in primary care (Predict®) has been developed in NZ and used extensively in general practice. The programme is integrated into the patient management system to allow systematic cardiovascular risk assessment and provide - within seconds - evidence-based patient-tailored decision support according to the NZ guidelines for the management of cardiovascular risk. A demonstration project to show how community pharmacists can provide an appropriate venue to increase access to CVD risk assessments (particularly for the underserved or difficult to reach population) using Predict® is timely.*

#### **7.4 Final remarks**

This thesis not only investigated the role of community pharmacists in CVD risk assessment and management services in NZ, but it has also reviewed the evolution of community pharmacy practice over the past ten years. As illustrated in [\*Figure 7.1\*](#), the move from product-oriented services to patient-centred care in NZ has been slow and overall inadequately supported by research, practice or policy. Investing in the facilitators that emerged from this research will likely expedite this much needed move. Integration of pharmacists in CVD prevention strategies may be just one piece of the puzzle in moving pharmacists towards patient-centred care, but it is a move that is not only timely but much needed if community pharmacists are to meet the future needs of the population they serve.

**Figure 7.1: The evolution of community pharmacy in New Zealand: Past, present and future**



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