



## **MMBA 532: BUSINESS RESEARCH PROJECT**

An Activity Based Management study of LTC service provision in community  
pharmacy

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## Abstract

New Zealand has undergone a period of previously unprecedented change to the community pharmacy sector. A new funding model was implemented in 2012 with the goal of rewarding pharmacists for patient contact and clinical input, rather than solely for the number of medicines dispensed. The change has been immensely challenging for pharmacy, as they have coped with funding and service model changes.

The new funding model saw the introduction of the Long Term Conditions (LTC) pharmacy service. The LTC service is designed for people with complex health and medicines management needs and medicine adherence issues. Patients in the LTC service receive more frequent dispensing, along with adherence reminders and increased pharmacist support. The pharmacy receives a monthly fee for this additional work, and is required to complete ongoing and time consuming paperwork.

There is a lack of awareness about the actual cost to pharmacy of providing the LTC service as there is an absence of any studies that have attempted to define the resources needed to deliver the service and the activities that drive these costs. The aim of this report is to define the actual cost to pharmacy of delivering the LTC service through the lens of Activity Based Management (ABM), and define cost drivers using a time driven activity based costing system (TDABC).

## Research Method

Primary data was collected through a semi-structured survey and 18 responses were elicited from participating pharmacies. TDABC was employed to estimate the cost of providing the LTC service.

## Findings

Results indicate that the monthly payment of \$20.80 per LTC patient registered is insufficient to cover ongoing costs. In addition to ongoing monthly costs, pharmacies incur one-off costs to initiate a new patient into the LTC service. One off costs show a positive relationship with ongoing costs and wide variation is observed for costs between pharmacies. The major cost driver was identified as pharmacist time.

## Recommendations

Future studies should examine the processual variations in pharmacies with low-cost and high cost profiles with the aim of providing pharmacists with more efficient options for delivering the service. Greater utilisation of software through automation of patient eligibility and administrative tasks could help free up pharmacist time.

## Acknowledgements

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## Introduction

Community pharmacies in New Zealand are small to medium sized businesses which supply medications and associated health products and provide health-related services to the public (Horsfield, Kelly, Sheridan, Stewart, & Clark, 2014). Considering the prevailing number of pharmacies and their presence in communities of varying demographics, size and location, their extended hours of operation, and their walk-in character, they have an important role in improving access to quality primary health care (Zolezzi, Bye, Harrison, Tsuyuki, & Shaw, 2014).

In New Zealand, a range of community pharmacy services are publicly funded by District Health Boards (DHB) through an agreement with community pharmacies known as the Community Pharmacy Services Agreement (CPSA) (Shirtcliffe, 2014). This national agreement between community pharmacies and their local DHBs', sanctioned in 2012, represents the biggest change to how pharmacy services are funded in more than 70 years (District Health Boards, 2012). It sets out a funding model for pharmacy services based on a patient-centred approach, rather than the previous reimbursement per dispensing model (Zolezzi, Bye, Harrison, Tsuyuki, & Shaw, 2014).

According to Scahill and colleagues, administrators of community pharmacies face two key issues under these changing policy conditions (Scahill, Harrison, Carswell, & Shaw, 2010). First, the delivery of value to key stakeholders is important for health system sustainability. Value is a measurement of the relative quality and cost of a service or product. In health care, value should be measured in terms of patient health outcomes achieved per dollar spent to achieve those outcomes (Henrikus, Waters, Virk , & Shah, 2012). Second, a level of financial sustainability is required when making changes to the way services are delivered in community pharmacy. Shifting from the reimbursement per dispensing model to the current funding model where pharmacy delivers a range of quality assured patient oriented services will require two significant changes. First, workflows will need to be re-engineered and staff trained accordingly. Second, adequate remuneration for services rendered to patients needs to be provided (Scahill, Harrison, Carswell, & Shaw, 2010).

The purpose of this study is to elucidate whether community pharmacy is being remunerated fairly for cognitive services provided to patients who have been identified as having medication adherence difficulties under the Long Term Conditions medication adherence service (LTC). The study aims to employ Activity Based Management (ABM) tools such as Time Driven Activity Based Costing (TDABC) to conduct cost driver analysis and activity analysis of the LTC service in pharmacy (Hansen, Mowen, & Guan, 2009).

The study is of significant importance to stakeholders such as DHB funders and community pharmacy service providers as there is an absence of information about the true cost of providing the LTC service to patients. Accurate cost data inform the allocation of scarce resources, help health service providers understand revenue by service line, and better support clinical teams in driving efficiency and improving outcomes (Donovan, Hopkins, Kimmel, Koberna, & Monty, 2014). No previous studies that have attempted to define the costs of LTC service provision in community pharmacy have been described.

This report is structured in 4 parts.

**Part 1** begins with a literature review which discusses background information about the current CPSA and the LTC service. Once the context for the study has been set, a review of ABM methods such as TDABC is discussed. The literature review concludes with an analysis of the application of TDABC in healthcare settings to elucidate cost drivers and improve patient outcomes.

**Part 2** outlines the research methodology and research design applied to this study.

**Part 3** analyses the results gathered from the semi-structured survey.

**Part 4** concludes with a discussion of key findings, recommendations for management of the LTC service and limitations of the study.

## [Part 1: Literature Review](#)

### [Background to the CPSA- Impetus for change](#)

Under the contractual arrangements with DHB's prior to 2012, community pharmacies had been compensated according to the number of prescriptions they dispense (volume) and the frequency of those dispensings (PHARMAC, 2012). This meant that there had been an incentive for some pharmacies to encourage clinicians to stipulate more frequent dispensings<sup>1</sup> on their scripts under the 'Close Control' Pharmaceutical Schedule Rule<sup>2</sup>. The resulting expenditure growth in pharmacy dispensing costs had become unsustainable, and the linking of funding to volumes had little relationship with patient outcomes (Best Practice Journal, 2012). In 2010 the total cost of dispensing fees was \$320 million, of which \$82 million was spent on dispensing medicines under the Close

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<sup>1</sup> The more frequent dispensing was previously known as "Close Control" and is now known as "Dispensing Frequency". The Pharmaceutical Schedule specifies, for community patients, a default period of supply for each community Pharmaceutical. The Dispensing Frequency Rule defines patient groups or medicines eligible for more frequent dispensing periods for Community Pharmaceuticals; and the conditions that must be met to enable any pharmacy to claim for payment for the additional dispensings made (PHARMAC, 2015).

<sup>2</sup> The Pharmaceutical Schedule is a list of approximately 2000 community pharmaceuticals that are subsidised by the government. It shows the amount of the government subsidy paid to contractors, as well as the manufacturer's price and any access conditions that may apply (PHARMAC, 2015).

Control Pharmaceutical Schedule Rule<sup>1</sup> (Best Practice Journal, 2012). The new CPSA removes the volume and frequency based incentives, and aims to reward patient based clinical care.

The new funding model under the CPSA is designed to be patient-centred and allows pharmacists to better tailor medicines adherence and compliance services to patients, particularly those with multiple co-morbidities and taking many medicines (Best Practice Journal, 2012). It gives an incentive for the pharmacist to spend time providing cognitive services to patients requiring additional support. This includes the opportunity to work with the patient's GP and clinicians in secondary care on reviewing and reconciling medications (Best Practice Journal, 2012).

### [A closer look at the LTC service and its funding](#)

Under the current CPSA patients are classified as either *core* or *LTC* patients. Only those patients who are assessed as having medicine adherence concerns can be considered for the LTC service (Central TAS, 2014). Medication adherence has been recognised as a key factor in reaching successful clinical outcomes for chronic conditions (Marquis, Schneider, Spencer, Bugnon, & Pasquier, 2014). Its promotion is part of the quality standards for pharmaceutical services instituted jointly by the International Pharmaceutical Federation and the World Health Organisation, and community pharmacists have engaged in delivering medication adherence programmes in various countries (Marquis, Schneider, Spencer, Bugnon, & Pasquier, 2014).

Implementing an adherence programme implies an important change in pharmacists' vision of their position within the health system. It requires multidisciplinary collaboration and the development of a shared view of the role that pharmacists and physicians hold with regard to patient adherence and treatment management. This represents a long-term development for which the reorganisation of workloads, adjustments in human resources and the acquisition of novel skills are necessary (Marquis, Schneider, Spencer, Bugnon, & Pasquier, 2014).

The eligibility of a patient to the LTC service is managed through the LTC Service Eligibility Assessment Tool, which sets a nationally consistent set of criteria for entry to the service (Central TAS, 2014). Eligibility to the service is based on a pharmacist-led eligibility assessment which applies a standard set of agreed criteria. The assessment is used to identify factors that contribute to a patient's adherence with their medicine regime and the actions that the pharmacist and the patient will work together to address the adherence issues. Eligible patients will also benefit from the pharmacist working more closely with their prescriber to enhance the patient's medication use and adherence of medicines. Pharmacist recommendations made to prescribers may also improve the clinical or cost effectiveness of treatment (Central TAS, 2014). Registered patients will be encouraged to use one pharmacy for dispensing, but may still receive medications from another pharmacy

(Central TAS, 2014). A patient who was registered in the LTC Service but who no longer meets the eligibility criteria would be de-registered.

All LTC patients registered with a pharmacy receive the following services (Central TAS, 2014):

- Medicines Reconciliation<sup>3</sup>
- Synchronization of medicines<sup>4</sup>
- Medication Reminders
- Ongoing screening and review of compliance/adherence & medicines alignment
- Engagement with the patient's multidisciplinary team members.

Pharmacies only receive funding for those LTC Service patients registered with their pharmacy. Currently, community pharmacy gets paid \$20.80 per month per registered patient<sup>5</sup> (CentralTAS, 2015). This payment covers only the services provided under the LTC service. Pharmacists receive a separate payment for medicine dispensing.

The level of government funding for community pharmacy services is determined through the annual funding envelope which is the amount of funding that is available from DHBs for each financial year (District Health Boards, 2012). In 2012, the funding envelope was \$370.5 million and the envelope is adjusted upwards every year by either 1.5% or contribution to cost pressure<sup>6</sup> (whichever is lower). The funding envelope is determined on the basis of certain assumptions including population growth, demographic changes and prescription volumes which are monitored over the course of the funding year (District Health Boards, 2012). For the LTC service, the government funds the service based on an assumption that the number of registered patients would not exceed a pre-determined quantity (in 2012 this was 200,000 patients) (District Health Boards, 2012). Thus, the level of funding per patient for the LTC service is planned based on the level of funding available and the number of patients likely to benefit from the service, and not based on what it would likely cost pharmacists to deliver it.

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<sup>3</sup> Medicine reconciliation services means, collection (from all relevant prescribers), comparison and communication of the most accurate list of medicines (Paton, et al., 2011) (Central TAS, 2014).

<sup>4</sup> Medication synchronization involves pharmacists working with patients to coordinate refill of their medications to come due on a single day of the month (DiDonato, Vetter, Liu, May, & Hartwig, 2014)

<sup>5</sup> The monthly fees was \$20 prior to 1<sup>st</sup> July 2015. The increase to \$20.80 is in recognition of contribution to cost pressures (CCP)

<sup>6</sup> Contribution to Cost Pressure or CCP means a percentage set by the Ministry of Health to assist in off-setting sectoral cost pressures including inflation and salary adjustments (District Health Boards, 2012).

### The question of fair recompense

Every health profession seeks recognition and compensation for its unique skills and contributions to the quality of a patient's life (Schommer & Gaither, 2014). Community pharmacists are among the most accessible of healthcare professionals (Eades, Ferguson, & O'Carroll, 2011). Under the current CPSA, pharmacists provide clinical expertise regarding selection, handling, distribution and utilisation of medications and ensure medicines reach their full potential for patients in society. This implies a use of medications that is safe, effective, appropriate, affordable, cost-effective, efficient, and specific to the needs of a given patient (Schommer & Gaither, 2014).

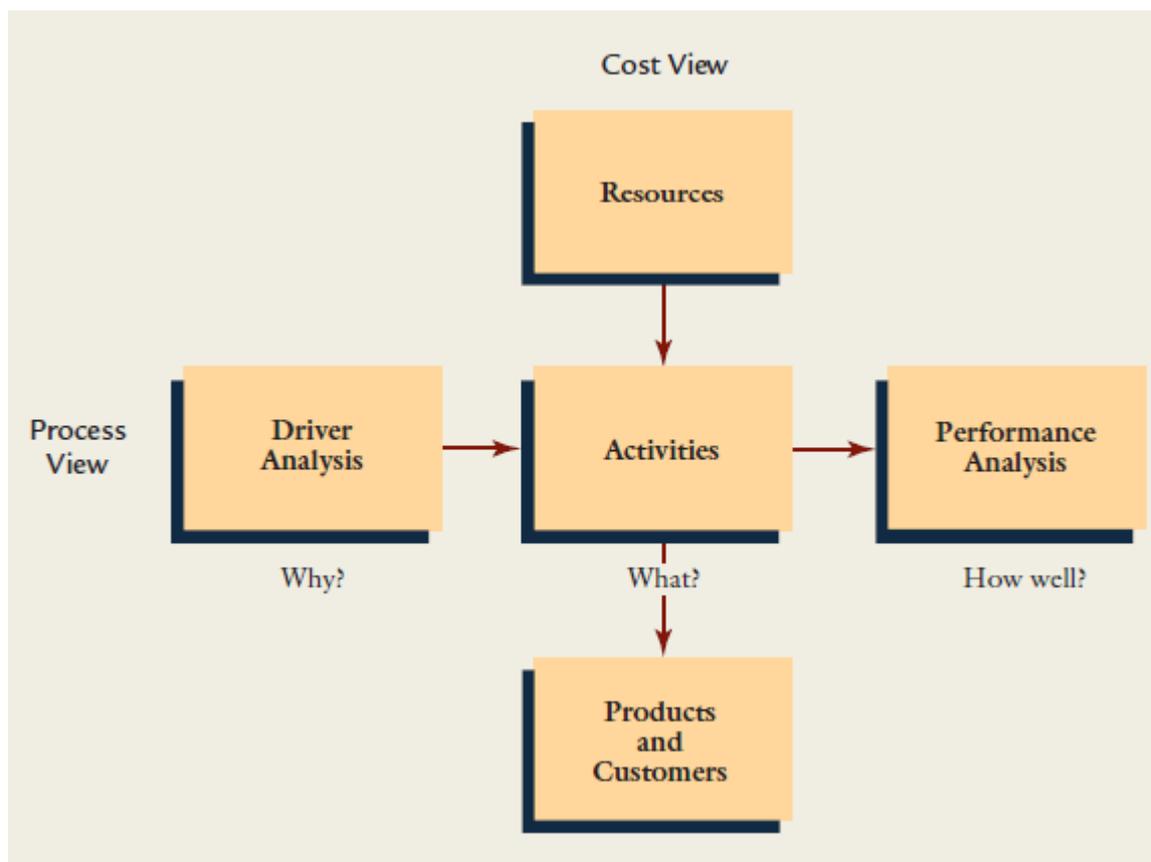
Community pharmacy owners in New Zealand are doubtful about the viability of CPSA, as there are many uncertainties in the funding arrangements (Sharma & Dousti, 2015). The concerns include; a lack of clear guidelines around the service expectations and funding for services, over-burdening pharmacists with administrative work and the compliance support work (Sharma & Dousti, 2015). In order for community pharmacists to find ways to improve value delivered to patients, they not only must know what it currently costs to do things, but they must also evaluate why and how they do things. There may be process differences between pharmacies delivering the services, which may translate to differences in cost and outcomes for patients based on the quality of services provided. Without information on the activities and processes that drive costs in pharmacy delivering the LTC service, funders and providers of health related services are unable to quantify any shortfalls in funding.

The current study aims to shed light on these issues by employing cost accounting techniques to enable stakeholders in community pharmacy to understand what it costs to provide the LTC service to registered patients. Stakeholders may use this information to better understand the drivers of costs with the aim of standardising, streamlining and/or supplementing current processes.

Policy makers refer to cost as the disbursements made to health care providers for delivering care (Kaplan & Porter, 2011). For providers, however, cost refers to the amounts they pay for staff, equipment, supplies, and facilities to deliver patient care (McLaughlin, et al., 2014). Cost, as used in the context of this study, is the cash or noncash assets sacrificed for goods and services that are expected to bring a current or future benefit to the organisation (Hansen, Mowen, & Guan, 2009, p. 24). Information on costs and drivers will better enable community pharmacists to evaluate the services they provide to patients, examine the cost of care, reduce wasteful activities and the costs associated with them, and improve quality of care for patients (Donovan, Hopkins, Kimmel, Koberna, & Monty, 2014).

## Activity Based Management

Activity-based management (ABM) focuses on the management of activities with the objective of improving the value received by the customer and the income received by the organisation in providing this value (Hansen, Mowen, & Guan, 2009, p. 35). ABM draws on Activity Based Costing (ABC) as a major source of information. Activity-based costing (ABC) is a costing approach that assigns resource costs to a cost object based on activities performed for the cost object. A diagram that outlines the ABM model is illustrated in **Figure 1**.



**Figure 1** (above): The vertical dimension traces the cost of overhead resources to activities and then to the cost objects. This is the activity-based costing dimension (referred to as the *cost view*). It serves as an important input to the control dimension, which is called the *process view*. The process view identifies factors that cause an activity's cost (explains why costs are incurred), assesses what work is done (identifies activities), and evaluates the work performed and the results achieved (how well the activity is performed). Activities play a prominent role in assigning costs to other cost objects and are essential elements of an activity-based management system. **Figure 1** excerpt from (Hansen, Mowen, & Guan, 2009)

## **Suitability of ABC as a predictor of cost**

In conventional cost accounting systems used in healthcare settings such as pharmacy, direct costs are allocated directly to patients or the funding entity (Udpa, 1996). Indirect costs such as overheads, however, are accumulated and divided by the total number of patient days to give the cost per day

of maintaining operations. This can lead to distortions in estimating costs as some patients, such as the high needs LTC patients, may require more direct resources such as pharmacist time than core patients who require minimal pharmacist oversight. Hence, the conventional cost allocation systems provide inadequate transparency to guide health providers' efforts to enhance processes and control costs (Kaplan, 2014).

Since ABC provides greater visibility into organizational processes and their cost drivers, it may allow managers to eliminate costs related to non-value added activities and improve the efficiencies of existing processes (Demeerec, Stouthuysena, & Roodhooft, 2009). Some authors, however, have noted possible disadvantages with the use of ABC to determine costs. Lievens and colleagues, for example, argue that a potential drawback of ABC systems lies in the time and resource consumption associated with the development and management of these systems (Lievens, Bogaert, & Kesteloot, 2003). Kaplan and Anderson state that the high time and cost to estimate an ABC model and to sustain it – through re-interviews and re-surveys – has been a key barrier to widespread ABC system adoption (Kaplan & Anderson, 2004). Supporting this notion, Everaert and colleagues assert that several managers, including those in healthcare, who have tried to implement ABC in their organizations, have abandoned the attempt in the face of rising costs and employee irritation (Everaert, Bruggeman, & De Creus, 2008).

To circumvent some drawbacks with the ABC system, Kaplan and Anderson have developed and described a simplified approach to ABC, called time driven activity based costing (TDABC) (Kaplan & Anderson, 2004). In the revised approach, managers directly estimate the resource demands imposed by each transaction, product, or customer rather than assign resource costs first to activities and then to products or customers. A TDABC model can be estimated and installed quickly and inexpensively as estimates of only two parameters are required: (1) the unit cost of supplying capacity and (2) the time required to perform a transaction or an activity (Demeerec, Stouthuysena, & Roodhooft, 2009). It is relatively easy for managers to update their TDABC models to reflect changes in operating conditions. For example, to add more activities to a department, managers don't have to re-interview personnel; they can simply estimate the unit time required for each new activity (Kaplan & Anderson, 2004).

### **The use of TDABC systems in healthcare**

Kaplan and Porter attribute a large part of the rapid escalation in health care costs to the fact that providers have a scant understanding of how much it costs to deliver patient care (Kaplan & Porter, 2011). This shortfall in understanding and associated knowledge of cost and its drivers results in an

inability of health providers to effectively improve resource utilization, reduce delays, and eliminate activities that don't improve outcomes. Kaplan and Porter present TDABC as an effective and efficient tool for health professionals to accurately measure costs (Kaplan & Porter, 2011).

Recently, TDABC has gained popularity in health economics as an accurate costing methodology that provides clinicians and staff with valid, actionable process and cost data to redesign care effectively (Henrikus, Waters, Virk, & Shah, 2012). TDABC estimates, from the provider's perspective, the cost of each resource used for treating a patient's medical condition and combines it with the time each resource uses for each activity during a patient's care (McLaughlin, et al., 2014). All of these activities can then be added together to measure the total cost of an entire service or care episode.

There have been numerous studies that have attempted to better define costs of delivering healthcare using TDABC (Donovan, Hopkins, Kimmel, Koberna, & Monty, 2014) (Demeerec, Stouthuysena, & Roodhooft, 2009) (Henrikus, Waters, Virk, & Shah, 2012). For example, the Cleveland Clinic<sup>7</sup> reported that the use of TDABC system resulted in significant enhancements to the clinical and administrative processes for the cost objects studied, and reductions in expenses related to direct administrative and support processes for these cost objects (Donovan, Hopkins, Kimmel, Koberna, & Monty, 2014). Cleveland clinic claims that these administrative and support processes represent 6 to 7 percent of the total cost of an episode of care for patients undergoing a specific surgical procedure (Donovan, Hopkins, Kimmel, Koberna, & Monty, 2014).

## Conclusion

The literature review furnishes background information about the current CPSA and the LTC service. The CPSA aims to be more patient-centric and utilises the professional capacity of community pharmacists. Despite the intent of the CPSA to provide community pharmacists with a greater role in providing patients with enhanced services, an indication of its reasonableness and fairness, in terms of remuneration for services provided, has not been explored. Such examination hasn't taken place even though community pharmacy has signalled a shortfall in funding.

A review of the literature indicates ABM methods, such as TDABC, have been successfully employed in healthcare settings to determine costs and improve processes. The current study aims to employ the TDABC system to the community pharmacy LTC service with the objective of better understanding the activities and cost drivers that underlie the service. It is hoped that the study will

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<sup>7</sup> The Cleveland Clinic is a non for profit multispecialty academic hospital located in Cleveland, Ohio (Cleveland Clinic, 2015)

lay foundation for further research that could study the cost drivers of other government funded programs in pharmacy with the intent of defining cost drivers and improving processes to deliver more cost-effective outcomes based care for patients.

This study aims to define the actual cost to pharmacy of delivering the LTC service through the lens of Activity Based Management (ABM) and define the processes and activities that drive these costs using a time driven activity based costing system (TDABC). A review of the literature indicates ABM methods, such as TDABC, have been successfully employed in healthcare settings to determine costs and improve processes.

At the conclusion of this study, it is hoped that stakeholders in community pharmacy will better understand what it costs to provide the LTC service to patients.

## Part 2: Research Methodology

The research methodology outlines the methods by which data that support the objectives of the paper were collected, organised and analysed.

### Research Design (Data collection)

Data for this study was collected through a semi-structured survey. The survey responses informed a TDABC analysis of the cost of providing the LTC service in pharmacy.

To carry out a TDABC analysis, the hourly cost rate of each resource that contributes to a specific patient's care is multiplied by the amount of time each resource spends contributing to that patient's care (Henrikus, Waters, Virk , & Shah, 2012). The total cost of all contributing resources can then be summed in order to calculate the cost of providing the service to the patient. This is the basic approach that the study undertook to calculate the costs of delivering the LTC service.

It should be noted that the long term conditions that pharmacists provide support and services for include a wide range of ailments<sup>8</sup>. Collecting and analysing data for all these various ailments would be inefficient, as there are different patient needs for each ailment, and thus a different contribution of the pharmacist resource for a specific condition. To overcome this, the study focuses on one LTC condition, namely, diabetes. Diabetes was chosen as it is an important health target area for the Ministry of Health (Ministry of Health, 2014). Diabetes is a common chronic disease with significant

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<sup>8</sup> These include diabetes, cardiovascular disease, cancer, asthma and dementia (Central TAS, 2014)

morbidity, mortality and cost, and the prevalence continues to increase rapidly worldwide (Coppell , et al., 2013).

There are various means of collecting the time each resource in pharmacy spends in supporting and servicing a diabetes patient. Interviews, questionnaires, surveys, and observation are common means of gathering primary data for an activity based costing system (Hansen, Mowen, & Guan, 2009). The intent of this study is to employ as many pharmacy sites as possible (minimum 9) to enable a significant sample size to be established and reduce variability between pharmacies. To that end, the data gathering methodology that the research employed is a standardised and semi-structured questionnaire. Through this means, the study aimed to employ a greater number of pharmacy sites, rather than be constrained for resources through direct observation or interviews at multiple sites spanning New Zealand.

### Survey Design

The survey consisted of three sections, namely, participant profile, LTC cost profile and pharmacy profile. A copy of the survey sheet is available in **Appendix 1**.

### **Participant Profile**

The participant profile was open-ended and gathered information about the number of years the respondent has been a practicing pharmacist. As this is an anonymous survey, no participant names were elicited. The survey was restricted to registered pharmacists.

### **LTC cost profile**

This section is designed to gauge how long the pharmacist spends delivering the LTC service to a typical diabetes patient in each calendar month. This included the pharmacists' time in the absence of the patient in the pharmacy and/or with the patient's extended care team including their GP or specialist prescriber. Values were measured in minutes. The section also collected information about the number of LTC patients registered with the pharmacy. This part of the survey was open ended and approximate time values were acceptable.

The design of the survey questions in this section incorporated the guidelines developed by the DHBs to assist pharmacists to deliver the LTC service (Central TAS, 2014).

Servicing a diabetic LTC patient involves three separate workflows which comprise a number of activities:

1. Setting up a diabetic as an LTC patient
  - Discussing the service and gaining patient consent

- Assessing the patient using pharmacy data (patient history)
  - Contacting the patients other health providers
  - Preparing an initial Medicines Management Plan (MMP)
  - Discussing the MMP with the patient and gaining agreement to work together to improve their adherence
2. Starting up the service for the LTC patient
- Explaining current medicines to the patient
  - Medicines Synchronisation
  - Medicines Reconciliation
  - Setting up a reminder service
3. Ongoing monthly support for the LTC patient
- Medicines Synchronisation
  - Medicines Reconciliation
  - Reminders
  - Interaction with multidisciplinary team, including information sharing
  - Recording interaction with the patient
  - Review of the MMP

Survey respondents were asked to enter the approximate time taken (in minutes) to complete the activities above and indicate the staff member who mainly carries out these activities (i.e. pharmacist or technician). Respondents were given the opportunity to define any additional activities they perform when servicing the patient and the time taken to do so. Direct costs were elicited in a separate question.

The LTC cost profile questions were assessed by a registered pharmacist from the Pharmacy Guild of New Zealand<sup>9</sup> (PGNZ) to ensure they accurately represented the workflows in pharmacy.

### Pharmacy Profile

This section collected information that identified the size, location and demographic profile of the pharmacy.

This includes information about the:

- Number of prescription items dispensed each week (open ended)

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<sup>9</sup> The Pharmacy Guild of New Zealand is a national membership organisation representing roughly 70% of community pharmacy owners (Pharmacy Guild of New Zealand (Inc.), 2015)

- Geographic location of the pharmacy (coded multiple choice question)
- Region in which the pharmacy is located (coded multiple choice question)
- Setting of the pharmacy<sup>10</sup> (coded multiple choice question)
- Number of hours the pharmacy operates each week (open ended)

This information is useful as it enables the researcher to be informed about the context within which the pharmacy operates and if there are any external factors that could influence cost of delivering the LTC service. Take for example a pharmacy located in a region with a high incidence of diabetes as compared to a region where diabetes has a low prevalence. One would expect the pharmacy in the area with a higher burden of diabetes to have more patients enrolled who have the ailment as compared to the pharmacy in an area with a lower burden of the ailment. One may assume the pharmacy serving a higher number of patients may spend different levels of time per patient as compared to the pharmacy that does not service as many patients. The pharmacy servicing a higher proportion of diabetes patients may have established processes to ensure that the diabetes patient is receiving the required levels of service in an efficient way. This presents the researcher with an opportunity to distinguish any differences in activities and the resources driving costs in both types of pharmacies.

### Data Analysis and TDABC

The information derived from the survey questions served as the basis to assign resource costs to individual activities. The cost of the resource<sup>11</sup> time was approximated via the capacity cost rate. Capacity cost rate is the annual total cost of the resource (including salary/benefits) divided by the available time the resource has (Kaplan, Introduction to Time-Driven Activity-Based Costing in Health Care, 2014). The capacity cost rate is then multiplied by the total time the resource spends servicing the LTC patient per month. This cost is then added to any monthly consumable allocation to arrive at the cost per patient per month. The cost per patient per month at one site will then be compared against the other survey sites to deduce an average cost per LTC patient.

**Table 1** illustrates how the data collected from the survey informed approximations for the cost of providing services to LTC patients. The numbers and values quoted in the table are theoretical and are included for explanatory purposes only.

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<sup>10</sup> This would involve finding out if the pharmacy is located at a mall, by a medical centre or on a main street.

<sup>11</sup> Resources include employees and all other assets used in servicing the patient (including software and occupancy costs). Occupancy costs include rent, rates and electricity.



## Part 3: Results

### Demographic profile of respondents

18 pharmacies responded to the survey. **Table 2** shows the respondent pharmacies by geographic location, **Table 3** outlines the respondent pharmacies by region and **Table 4** summarises the respondent pharmacies by setting.

**Table 2:** Responding pharmacies by geographical location

<b>Geographical Location</b>	<b>Count of Survey Site</b>	<b>%</b>
Major City	5	28%
Provincial city	5	28%
Town/Rural	8	44%
Grand Total	18	100%

**Table 3:** Responding pharmacies by region

<b>Region</b>	<b>Count of Survey Site</b>	<b>%</b>
Auckland	2	11%
Bay of plenty	1	6%
Canterbury	4	22%
Hawkes bay	1	6%
Nelson	2	11%
Taranaki	2	11%
Waikato	2	11%
Wellington	4	22%
Grand Total	18	100%

**Table 4:** Responding pharmacies by setting

<b>Pharmacy Setting</b>	<b>Count of Survey Site</b>	<b>%</b>
Main street	8	44%
Mall	1	6%
Medical centre	9	50%
Grand Total	18	100%

### TDABC analysis

TDABC analysis was carried out by identifying the capacity of each resource and allocating the cost of this capacity over the cost object based on the time required to perform the activity to service an LTC patient (Monroy, Nasiri, & Peláez, 2012). The cost of resource capacity is referred to as the capacity cost rate (Kaplan & Anderson, 2004). **Table 5** shows the capacity cost rates that were used in the analysis.

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**Table 5: Capacity cost rates used in the TDABC analysis**

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<b>Labour rates</b>		
<b>Geographical Location</b>	Pharmacist (per minute)	Technician (per minute)
Major City	\$0.58	\$0.37
Provincial city	\$0.62	\$0.37
Town/Rural	\$0.62	\$0.36

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<b>Software Rates</b>	
Per week (average)	\$84.60

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<b>Occupancy Rates (per week- average)</b>	
Auckland Mall	\$2,115.38
Auckland Medical Centre	\$1,500.00
Auckland Street	\$1,384.62
City Mall	\$1,461.54
City Medial Centre	\$1,384.62
City Street/Town	\$1,153.85
Rural	\$692.31

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**Table 5:** Capacity cost rates for labour were determined through a PGNZ remuneration survey (Pharmacy Guild of New Zealand (Inc), 2014). Software rates were determined through personal communication with software vendors. Capacity cost rate for occupancy costs was determined through a benchmarking survey by Moore Stephen Markhams (Moore Stephens Markhams, 2014). Per minute cost rate for software and occupancy was calculated based on the operating hours of the pharmacy per week.

The cost of service was calculated as described in **Table 1**. The capacity cost rate per resource was multiplied by the time the resource was used in servicing the LTC patient. These resource costs were then added to any direct costs that were incurred to give the total one-off and ongoing cost of servicing a patient.

### [Analysis of survey responses](#)

#### **Statistical analysis and margin of error**

A summary of statistical analysis on the survey data is presented in **Table 6**. The margin of error for a sample of 18 respondents out of a population of 970<sup>12</sup> pharmacies and a confidence interval of 95% was determined by a sample size calculator developed by Raosoft (Raosoft Inc, 2004). The margin of

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<sup>12</sup> Number of community pharmacies in New Zealand as at 1<sup>st</sup> October 2015 (population size) determined from a database owned by PGNZ

error (assuming normal distribution) is 23%. This means that the researcher is 95% confident that the values presented in **Table 6** lie between an interval of  $\pm 23\%$  around the average value (Silver, 1992). To enable a more representative sample with a confidence level of 95% and a margin of error of 5%, 276 respondents would be required.

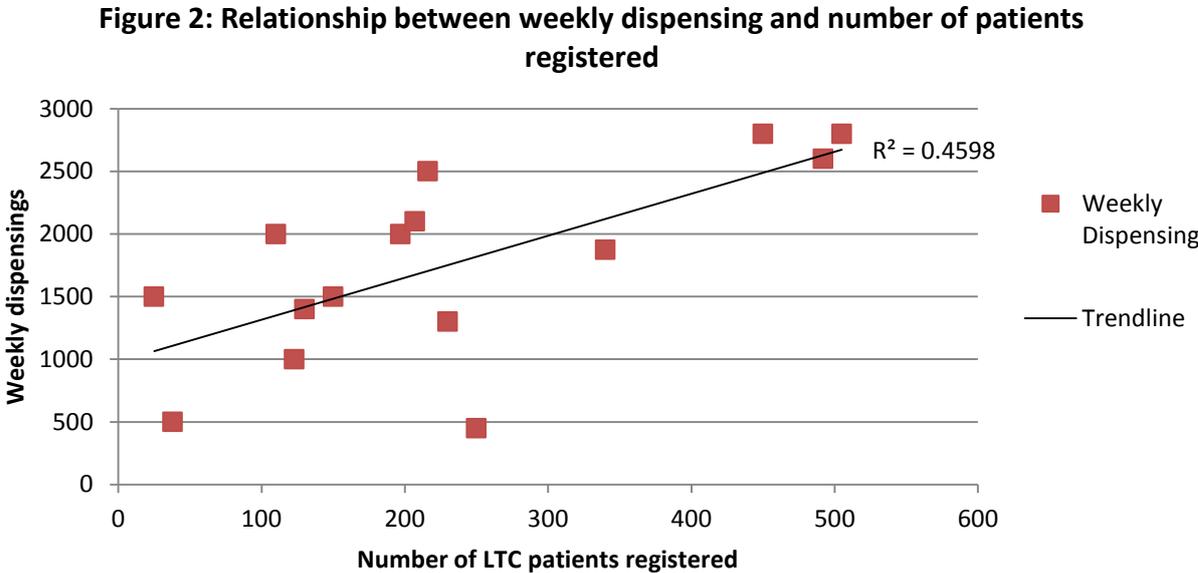
**Table 6:** A summary of statistical analysis on survey responses.

Survey Responses	Site	Average (Mean)	Minimum	Lower Quartile	Median	Upper Quartile	Maximum	Standard Deviation
Years Practiced		21	3	10	22	30	40	12
Number of LTC patients Registered		357	25	128	202	273	505	149
Weekly Dispensings		1943	450	1400	2000	2500	4200	934
Hours of Operation		52	40	46	49	52	84	10
One off set up costs		\$76.56 ± \$17.61	\$4.24	\$55.69	\$77.49	\$99.31	\$132.92	30.9
Ongoing monthly costs		\$50.13 ± \$11.53	\$10.67	\$25.52	\$41.93	\$79.40	\$102.68	31.0

**Table 6** shows statistical analysis of the survey responses received from 18 pharmacy sites. In addition to ongoing monthly costs, pharmacies incur a one-off set up cost to initiate the patient for the LTC service. Assuming a margin of error of 23%; the average one off set up costs lie between \$58.95 and \$94.17. Average monthly costs lie between \$38.60 and \$61.66. Results indicate that, on average, pharmacies are underpaid for the service by about \$29 per month. In addition, pharmacies incur about \$76 on average as a one-off cost. This means a pharmacy would have to service an LTC patient for 4 months before fully recovering one-off costs. Interestingly, minimum values suggest that some pharmacies are able to service the patient well below the \$20.80 threshold. While the small sample size may mean that this could be due to respondent or sampling bias, further study into pharmacies with a low cost profile could yield insights into the low cost results. High dispersion (standard deviation) around the average is observed for the number of LTC patients registered and the number of weekly dispensings.

Patients who have chronic conditions and are registered under the LTC service usually receive frequent repeat dispensings of medicine (Central TAS, 2014). One would expect a pharmacy with a higher number of LTC patients registered to have greater number of weekly dispensings relative to a pharmacy that has very few LTC patients registered. To test the data, the number of weekly

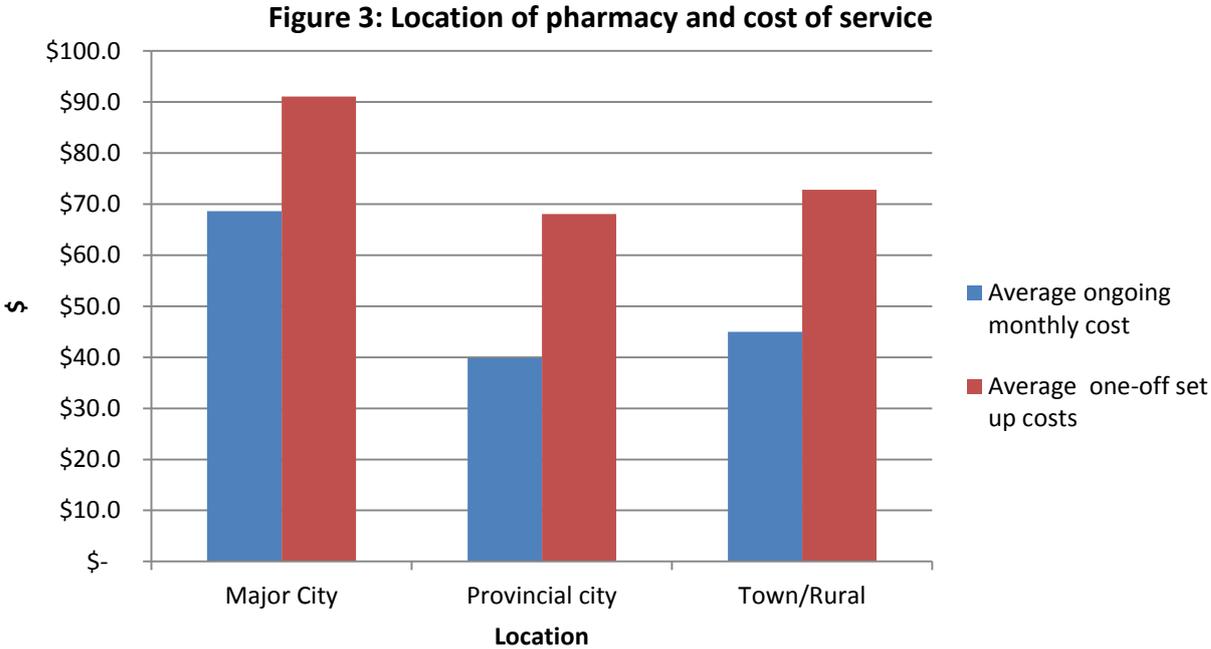
dispensings was plotted against the number of LTC patients registered. The result of this analysis, shown in **Figure 2**, shows a positive association between the two variables as expected.



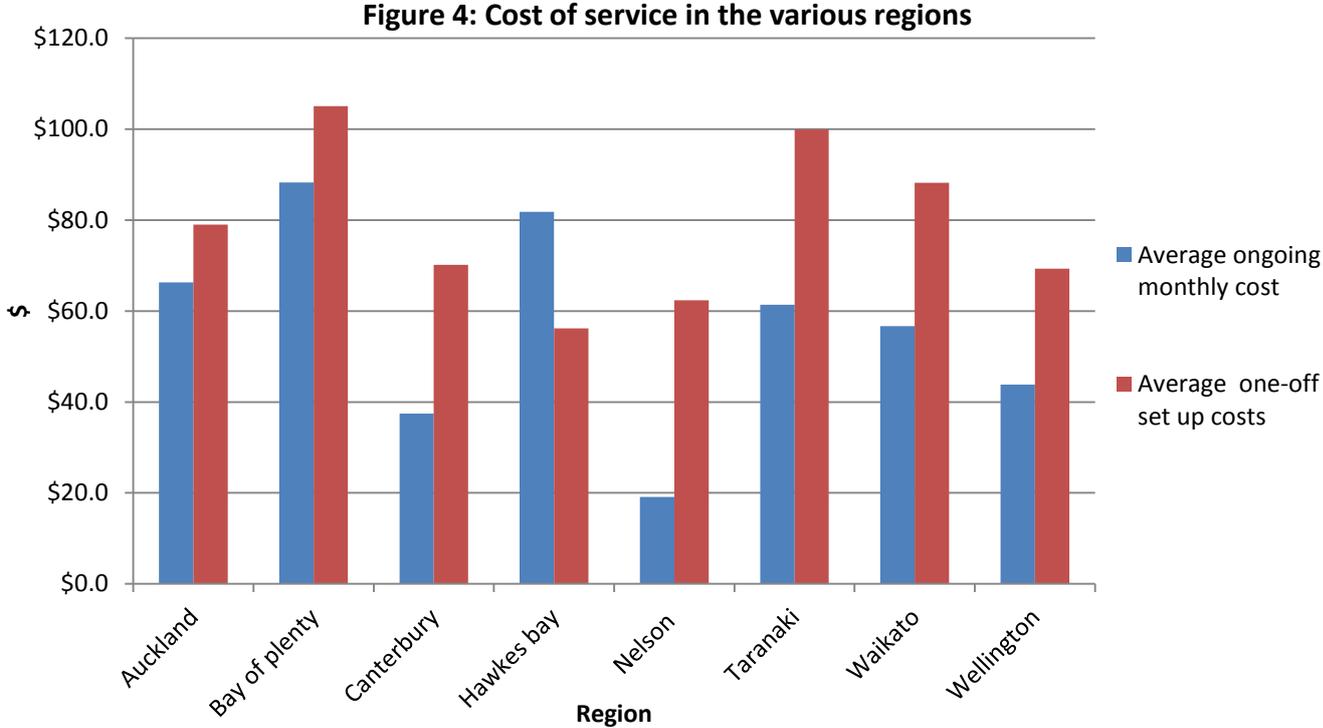
**Figure 2** shows a positive relationship between weekly dispensings and the number of LTC patients registered.

**Cost profile by Demographic**

The cost of providing the LTC service can be further examined through the average one-off and ongoing costs in the various demographic areas. **Figure 3** shows the survey responses for cost of providing the service at different locations. **Figure 4** outlines the responses for cost of providing the service in the various regions. **Figure 5** illustrates the responses for the cost of providing the service at different settings.

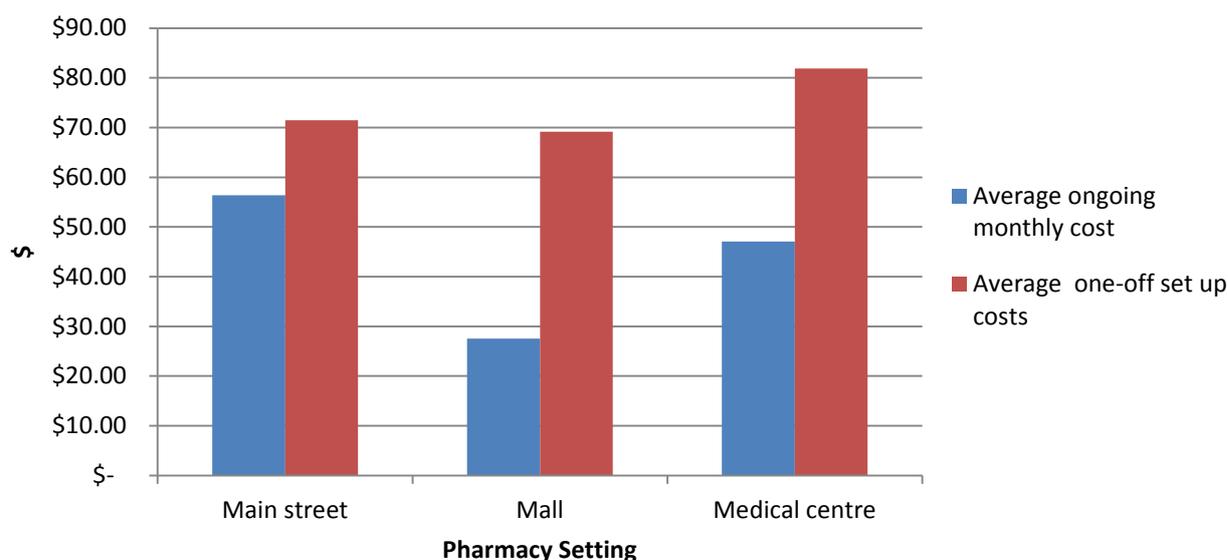


**Figure 3** shows major cities, on average, attract higher ongoing and one-off set up costs as compared to other locations. This result may be attributable to higher costs for occupancy costs in such locations. Provincial cities seem to have the lowest ongoing and one-off costs. These areas may attract less rental rates than major cities and are usually operational for a longer time than pharmacies in rural locations (thus being able to have less capacity cost rates for cost drivers such as rent).



**Figure 4:** Highest ongoing and one-off costs seem to centre on the Bay of Plenty. One may assume that these costs could be the result of higher cost drivers such as occupancy costs or staff costs. While Nelson shows the lowest average ongoing costs, the Hawkes bay region presents the lowest one-off set up costs. These results indicate that costs levels may not be directly attributable to any one region. Without a larger sample size and information about demographic factors that could contribute to service costs (such as a population with greater health needs), conclusions about cost profiles in regions may not be accurate.

**Figure 5: Cost of service at various pharmacy settings**



**Figure 5:** Mall setting shows the lowest one-off and ongoing costs. However, there was only one respondent from such a setting. Conclusions about setting versus costs may thus be influenced by sampling bias. However, one may theorise that lower cost in malls may be attributable to their longer operating hours (thus having lower capacity cost rates for occupancy). A greater sample size would yield more reliable results for costs at such settings.

### Determinants of cost drivers

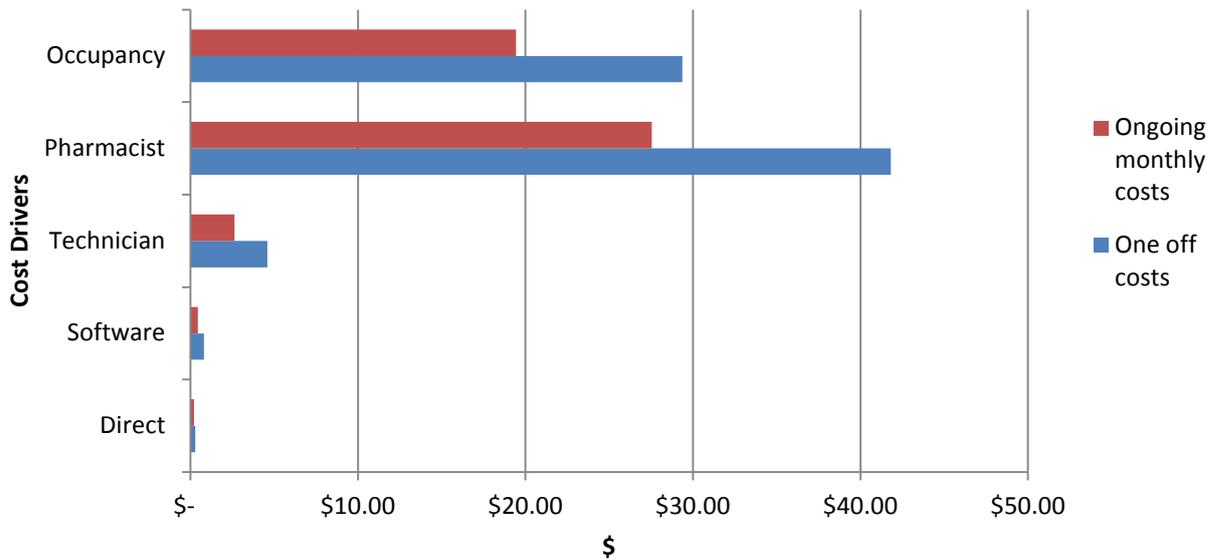
Having established an estimate of the cost of providing the service through TDABC, the drivers and determinants of cost were analysed. The purpose of the analysis is to determine which variable contributes most significantly to costs. With this information, stakeholders in community pharmacy may consider determinants of cost with the objective of managing them closely.

The variables analysed were:

1. Resource cost drivers (**Figure 6**)
2. One off costs in relation to ongoing costs (**Figure 7**)
3. Weekly dispensings versus cost of service (**Figure 8**)
4. LTC registrations versus cost of service (**Figure 9**)
5. Level of pharmacist experience versus cost of service (**Figure 10**)

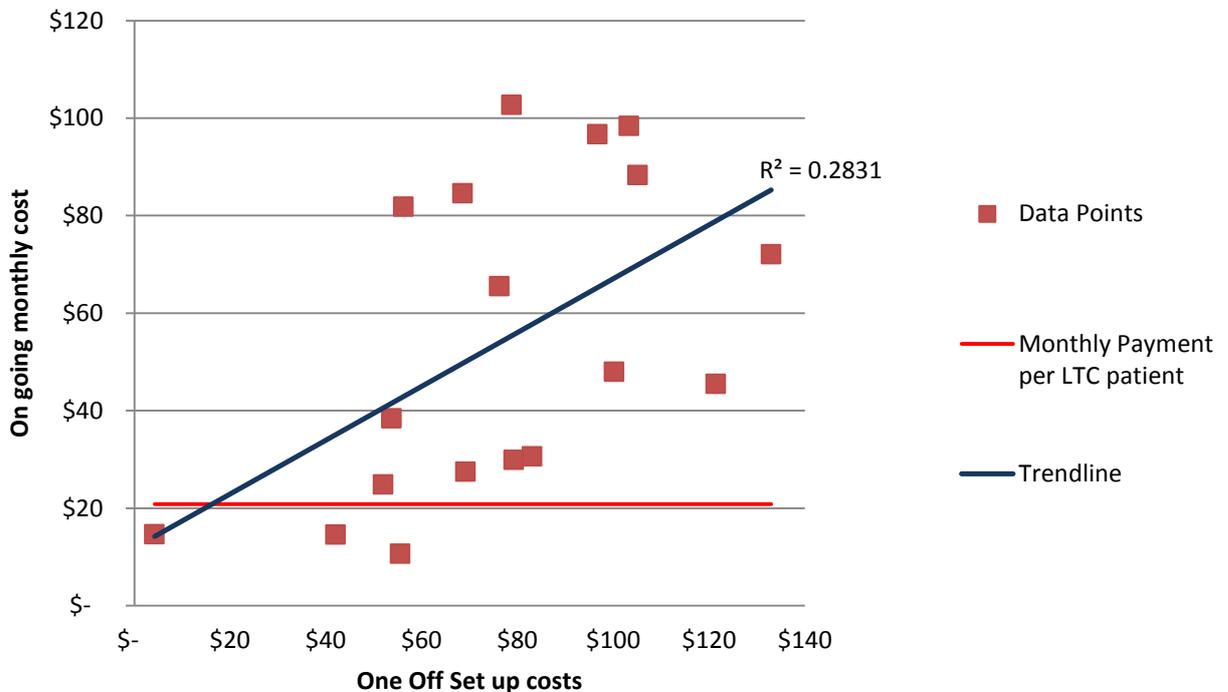
In addition to the above, a multiple regression analysis was carried out on weekly dispensings, LTC registrations and level of pharmacist experience to determine which variable has the strongest relationship to on-going and one-off costs.

**Figure 6: Comparison of cost drivers (average values)**



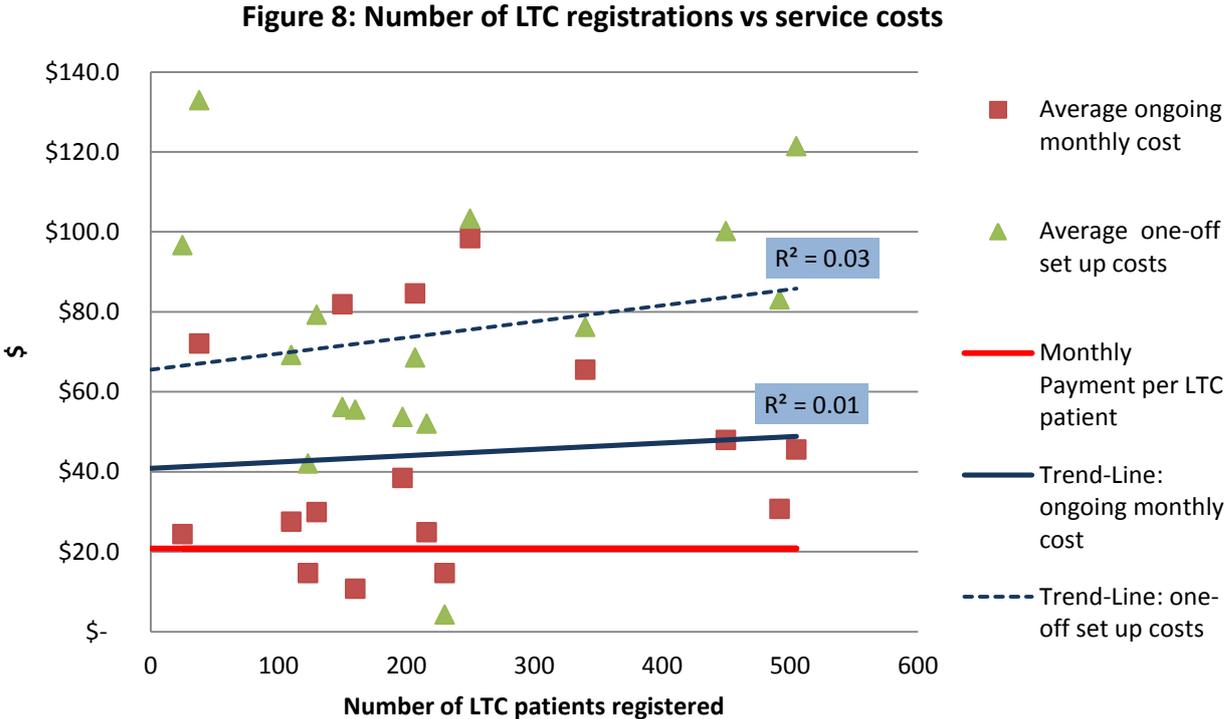
**Figure 6** plots cost drivers against the ongoing monthly costs and one off costs. It is observed that labour costs for the pharmacist is the major factor in driving costs. Direct and software costs contributed the least towards cost. Cost savings could thus focus on streamlining or improving the process for patient pharmacist contact and consultation. A greater focus on software support tools for servicing LTC patients may improve efficiency and allow pharmacists to free up time when the pharmacy is facing increased workloads.

**Figure 7: Relationship between one off and on-going costs**



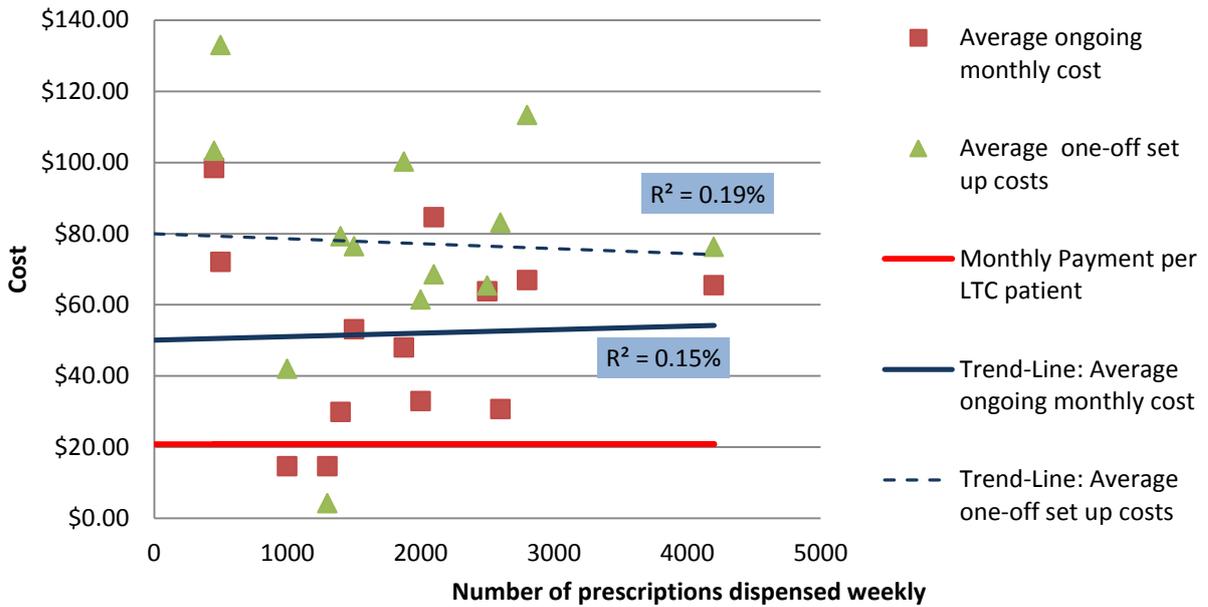
**Figure 7:** One off costs were plotted against on-going costs to determine relationship. The regression trend line suggests that there is a relative degree of positive linear relationship between one-off costs and ongoing costs.

Perhaps, pharmacists who invest time and effort into servicing the patient also invest time and effort for the on-going care of the patient. Further analysis could focus on high cost and low cost pharmacies to determine where process differences lie with the aim of improving efficiencies. Such analysis should ensure effectiveness in terms of clinical outcomes for the patient and patient safety are not compromised. **Figure 6** also shows that a majority (83.3%) of pharmacy respondent costs lie above the red horizontal line (which denotes the current \$20.80 monthly payment per registered patient). This further illustrates that the current funding for this LTC service falls below the costs incurred by 5/6<sup>th</sup> of the survey sample.



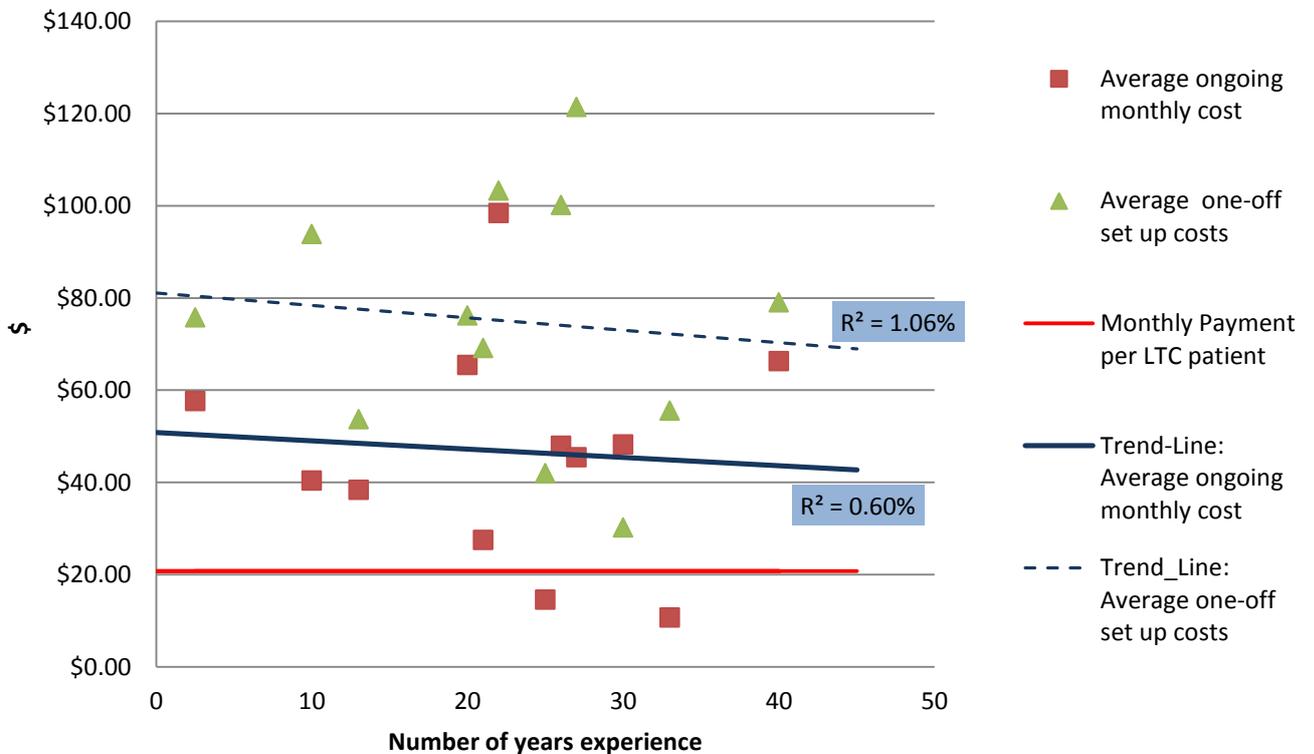
**Figure 8:** Number of LTC registrations plotted against the average ongoing and average one-off costs to determine relationship. The regression trendline suggests a weak positive relationship between the variables. This result indicates that costs may not be solely attributable to the number of LTC patients registered.

**Figure 9: Weekly dispensing vs cost of service**



**Figure 9:** Weekly dispensing plotted against the average ongoing and average one-off costs to determine relationship. The regression trendline suggests a weak positive relationship between the variables. This result indicates that costs may not be only attributable to the number of LTC patients registered.

**Figure 10: Pharmacist experience vs cost of service**



**Figure 9:** Number of years pharmacist experience plotted against the average ongoing and average one-off costs to determine relationship. The regression trend line suggests a weak negative relationship between the

variables. This result indicates that costs may not be absolutely attributable to the number of years of pharmacist experience.

**Multiple regression analysis**

There are multiple factors that could contribute to the cost of servicing a patient and this report has conducted regression analysis on independent variables<sup>13</sup> to determine whether there is any significant relationship between costs and the variables studied. A multiple regression analysis can be used to identify relationships between a variable such as cost and multiple independent variables to determine the factor that is most significant (Silver, 1992). To that end, a multiple regression analysis was undertaken between costs (on-going and one-off), number of LTC registrations, weekly dispensings and pharmacist experience. Through the analysis, one may determine which factor has the most impact on the cost of service.

Multiple regression analysis was conducted using the LINEST (line statistics) function in Microsoft Excel 2010 (Microsoft, 2015). The results of the analysis are outlined in **Table 7**.

<b>Table 7: Results of LINEST multiple regression analysis</b>	
<b>One Off set up costs</b>	
Slope: Years practiced as a Pharmacist	-0.67
Slope: Number of LTC patients Registered	0.07
Slope: Weekly Dispensings	-0.01
Average one off set up cost (Y-intercept)	\$90
Standard Deviation	28.5
<b>Ongoing monthly costs</b>	
Slope: Years practiced as a Pharmacist	-0.41
Slope: Number of LTC patients Registered	0.03
Slope: Weekly Dispensings	-0.01
Average one off set up cost (Y-intercept)	\$59.5
Standard Deviation	24.4

**Table 7** shows that pharmacist experience is the most significant factor in determining both one-off and ongoing monthly costs. Every additional year of pharmacist experience lowers one off costs and ongoing monthly costs by \$0.67 and \$0.41 respectively. It is also noted that on average, every additional LTC patient registered increases cost for one off costs and ongoing costs by \$0.07 and \$0.03 respectively. The multiple regressions show that the one off cost per patient is \$90 with deviation of 28.49. For ongoing costs it is \$59.50 per month with deviation of 24.4. This result is consistent with the average values for cost (with margin of error) outlined in **Table 6**. This result further consolidates the finding that the cost of providing the service exceeds the remuneration provided to pharmacies by the DHBs.

<sup>13</sup> The independent variables are Number of LTC patients registered, weekly dispensings and pharmacist experience

Caution should be exercised when drawing conclusions from the multiple regression results in **Table 7** due to the small sample size. Conceptually, one may surmise that experienced pharmacists have broader clinical understanding and have familiarity with patients presenting at their pharmacy. Although it may not be accurate to exclaim that greater pharmacist experience reduces LTC service costs, it gives stakeholders the opportunity to further examine processual variations between beginner and experienced pharmacists that may explain differences in efficiencies. In a similar fashion, the results presented here enable stakeholders to understand the cost drivers that add to costs for every additional LTC patient registered. One may assume that such an observation arises due to the administrative tasks that need to be completed for every registered LTC patient. This observation is at odds with the notion that greater specialisation (due to increased number of patients) would lead to lower costs. It should be noted, however, that LTC patients present at the pharmacy at random times. It could be that patients may present at times when the pharmacy is busy, thereby increasing the opportunity cost of servicing the patient.

#### **Part 4: Discussion and conclusion**

The purpose of this report is to inform stakeholders in community pharmacy about the costs of providing the LTC service. No other studies have attempted to define these costs. Stakeholders may use this information to better understand the drivers of costs with the aim of standardising, streamlining and/or supplementing current processes. The report collected primary data through a semi-structured survey instrument and 18 responses were elicited from participating pharmacies. TDABC was employed to estimate the cost of providing the LTC service.

The objective of the discussion is to:

- Outline key findings and suggest recommendations
- Address research constraints
- Consider the suitability of TDABC as a costing tool in the context of this study

#### **Key Findings and recommendations**

##### **Cost of delivering the service**

Results suggest that the monthly payment of \$20.80 per diabetes LTC patient registered is insufficient to cover ongoing costs. In addition to ongoing costs, pharmacies incur one-off costs to initiate a new patient into the LTC service. One-off costs and ongoing costs seem to have a positive

co-relation. The average ongoing costs were estimated as \$50 per month with a lower quartile of \$25.50 and an upper quartile of \$79. Assuming an LTC patient is registered for a year, pharmacies incur between \$306 - \$948 per annum as ongoing costs. Average one off costs were estimated at \$77 with a lower quartile of \$56 and an upper quartile of \$99. A majority of annual costs can be assigned to ongoing costs which show considerable variation between pharmacies. Further work in this area should focus on understanding process variations in these low-cost and high cost areas which contribute to differences in costs.

### **Pharmacist experience and cost**

Pharmacist experience was the variable with the greatest effect on one-off and ongoing costs. Experienced pharmacists seem to be able to service patients in a more cost-effective manner. This is not surprising given experienced pharmacists have had greater exposure with patients who have high health needs. Further studies could examine process differences that experienced and beginner pharmacists employ with the aim of defining standard operating procedures or clear guidelines for delivering the service.

### **Cost Drivers**

Labour cost rates for the pharmacist was the major driver of costs. Direct patient contact, liaison with the extended care team, medicines planning and administrative tasks require significant labour capacity. Stakeholders could consider additional software support that could automate patient eligibility and assist with administrative activities. Software has the least capacity cost rate and could thus be further utilised to streamline the LTC service and free up pharmacist time.

### **Research constraints**

The determinations of this report should be considered in light of its limitations, which may offer several opportunities for further research. These limitations are outlined below.

- A major constraint of this study was the small sample size contributing a 23% margin of error. Future studies should consider employing at least 276 respondent sites to limit the margin of error to 5% (with a confidence level of 95%).
- Labour costs and overheads such as occupancy and software costs were estimated through secondary data sources. Further research could consider gathering pharmacy specific data for these costs to ensure greater precision.
- LTC cost profile was estimated for diabetic patients only. Patients presenting with multiple chronic conditions or mental health issues may require more time with the pharmacist and require greater cost to service. Similarly, patients with better control of their condition may require less pharmacist support and require less cost to service. Future work could examine

the cost of providing the LTC service across a range of LTC eligible ailments. This would give stakeholders the opportunity to identify the LTC conditions that require greater pharmacist contact and support thereby adjusting remuneration to reflect the resources required by pharmacists to deliver care.

### Suitability of TDABC as determinant for costs

As discussed in the literature review, TDABC has been employed successfully in various healthcare settings. While the TDABC technique has been lauded for its strengths<sup>14</sup> in estimating costs due to its ease of implementation, it also has its limitations (Kowsari, 2013). The limitations of the TDABC technique in the context of this study are discussed below. Recommendations for alleviating limitations of the technique are also addressed.

### Limitations of the TDABC technique

Inaccuracies in time estimations by survey respondents mean that there could be basic errors in the calculation of cost. Furthermore, the LTC service is variable in that some patients may take a few minutes to service while others may take much longer<sup>15</sup>. Variability in cost drivers also arises when there are tasks that either the pharmacist or the pharmacy technician can undertake depending on availability. These variabilities could be mitigated through time-in-motion studies where time estimates are gathered through direct observation. Multiple time observations would need to be gathered for survey sites to reduce variability. While this method is timely to research and implement, it should provide more reliable estimates for the time required for cost resources using TDABC.

### Conclusion

This study demonstrates suitability of the TDABC methodology to estimate costs in healthcare settings such as community pharmacy. The findings of this study suggest that community pharmacy is underpaid for services provided to registered LTC patients. There is significant deviation in costs of delivering the service which opens an opportunity for closer assessment of activities that drive these variations. Greater utilisation of software through automation of patient eligibility and administrative tasks could help free up pharmacist time. It is hoped that this study will lay foundation for further research that could study the cost drivers of other government funded programs in community pharmacy with the intent of defining cost drivers and improving processes to deliver more cost-effective outcomes based care for patients.

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<sup>14</sup> The strengths of TDABC have been addressed in the literature review

<sup>15</sup> Variability could stem from LTC patients having different level of health needs and varying levels of health literacy.

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## Appendix 1: Copy of survey questions



### An Activity Based Management study of LTC service provision in community pharmacy

**Researcher:** Utsav Sharma, Victoria School of Management, Victoria University of Wellington

#### Survey Sheet

September 2015

Participant Profile (To be completed by a registered Pharmacist)

Question 1: How many years have you practised as a Community Pharmacist?

#### Long Term Conditions (LTC) specific questions

Question 2: What is the total number of LTC patients registered with your pharmacy?

The following questions are designed to gauge how long you spend delivering the LTC service to a typical **Diabetes patient in each calendar month**. Please consider all of your time spent in servicing the patient. This would include your time when the patient is not in the pharmacy and time you spend with the patient, their family and their extended care team including their GP or specialist. Please enter approximate values in minutes to the questions below. Please also indicate the position of the staff member who mainly carries out these activities.

Question 3: Setting up a diabetic as an LTC patient

- Discussing the service and gaining consent

Time taken: \_\_\_\_\_ Completed by: Pharmacist / Technician (Please circle the option that best applies)

- Assessing the patient using pharmacy data (patient history)

Time taken: \_\_\_\_\_ Completed by: Pharmacist / Technician

- Contacting the patient's other health providers (e.g. GP)

Time taken: \_\_\_\_\_ Completed by: Pharmacist / Technician

- Preparing an initial Medicines Management Plan (MMP)

Time taken: \_\_\_\_\_ Completed by: Pharmacist / Technician

- Discussing the MMP with the patient and gaining agreement to work together to improve their adherence

Time taken: \_\_\_\_\_ Completed by: Pharmacist / Technician

- Anything else that you do to set up the patient for the LTC service?

Please describe:

Time taken: \_\_\_\_\_ Completed by: Pharmacist / Technician

Question 4: Starting up the service for the LTC patient

- Explaining current medicines to the patient

Time taken: \_\_\_\_\_ Completed by: Pharmacist / Technician

- Medicines Synchronisation

Time taken: \_\_\_\_\_ Completed by: Pharmacist / Technician

- Medicines Reconciliation

Time taken: \_\_\_\_\_ Completed by: Pharmacist / Technician

- Setting up a reminder service (eg phone calls, txt messages, emails, stickers)

Time taken: \_\_\_\_\_ Completed by: Pharmacist / Technician

Question 5: Ongoing monthly support for the LTC patient

- Medicines Synchronisation

Time taken: \_\_\_\_\_ Completed by: Pharmacist / Technician

On average how often? (eg once in 3 months, once a year?)

\_\_\_\_\_

- Medicines Reconciliation

Time taken: \_\_\_\_\_ Completed by: Pharmacist / Technician

On average how often?

\_\_\_\_\_

- Reminders

Average time taken per month: \_\_\_\_\_ Completed by: Pharmacist / Technician

- Interaction with the multidisciplinary team including information sharing

Average time taken per month: \_\_\_\_\_ Completed by: Pharmacist / Technician

- Recording your interaction with the patient when dispensing medicines or providing reminders and interventions

Average time taken per month: \_\_\_\_\_

Completed by: Pharmacist / Technician

- Review of the MMP

Average time taken per month: \_\_\_\_\_

Completed by: Pharmacist / Technician

Question 6: Are there any other actions or activities you provide as part of delivering the LTC service? If so, please describe the activity, the approximate time taken to complete the activity the frequency of the activity, and the position of the staff member who mainly performs the activity. The frequency describes how often you carry out the activity for the LTC patient. For example, the frequency could be annual for review of the patient and their MMP or quarterly for arranging prescriptions with the GP.

Activity	Time Spent (minutes)	Frequency	Completed by (Pharmacist/Technician)

Question 7: Are there any other costs you incur for a typical LTC diabetes patient that need to be covered by the LTC service fee? If so, please list these item(s) and the approximate value here. These would include direct costs not chargeable to the patient. Examples of direct costs are printed handouts and reminder stickers. (Please do not include things that are on charged to the patient like blister packs).

Item Description	Value (\$)	Frequency

Thank you for your responses to the LTC questions.

Please could you answer the following questions so we can understand your pharmacy better?

#### Pharmacy Profile

Question 8: Which one of the following best describes the geographical location of this pharmacy? (Please tick the option that best applies)

- Major City (e.g. Auckland, Wellington, Christchurch)

- Provincial City (urban area with a population over 30,000 people e.g. Hamilton, Dunedin, Nelson, New Plymouth, Napier, Gisborne etc.)
- Provincial Town (town with a population between 1,000 and 30,000 people e.g. Levin, Gore)
- Rural (non-urban areas such as rural centres with population under 1,000 people)

Question 9: Which describes the setting of this pharmacy? (Tick as many as apply)

- Within a medical centre
- By a medical centre
- Within a mall
- By a hospital
- On a main street shopping strip
- Other (please specify) .....

Question 10: Which DHB is the pharmacy located in (Please tick):

- Auckland (Greater Auckland area including ADHB, WDHB and CMDHB)
- Bay of Plenty
- Canterbury (Including SCDHB)
- Hawke's Bay
- Lakes
- Mid-Central
- Nelson Marlborough
- Northland
- Southern
- Taranaki

- Tairāwhiti
- Waikato
- Wairarapa
- Wellington (Including HVDHB and CCDHB)
- West Coast
- Whanganui

Question 11: On average, how many prescriptions does the pharmacy dispense each week?

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Question 12: How many hours is your pharmacy open each week?

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Thank you for your participation in the survey. All information contained within the survey is confidential and anonymous. At the end of the research project, the hard copies of respondent surveys will be destroyed.

If you would like a summary of the research findings please enter your email here:

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If you have any questions or would like to receive further information about the research project and/or this survey , please contact Utsav Sharma at [sharmautsa@myvuw.ac.nz](mailto:sharmautsa@myvuw.ac.nz) or phone 04 802 8218