The introduction of an advanced role for pharmacy technicians into the New Zealand pharmacy setting

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Abstract

The roles of pharmacists and pharmacy technicians are changing, both within New Zealand and internationally. The move of New Zealand pharmacists into the more clinically focused roles of their overseas colleagues has however been slow, even with evidence that pharmacists are interested in taking on this clinical role. Time, or the lack of it, has been identified as one barrier to this move. The introduction of an advanced checking technician role would potentially address this barrier. This introduction will facilitate a move to the more clinically focused role for pharmacists, allowing them more time to apply their medicine training to the care of patients.

This thesis consists of three parts and explores the potential to change the existing pharmacy technician role. Firstly, a survey was carried out to investigate the opinions of staff around the introduction of a Checking Technician role and explores whether pharmacists and technicians believed that the current technician role could or should change. Secondly, a qualitative study was done to investigate whether technician’s roles change during a period of upheaval and disruption during a crisis. Thirdly, we investigated the introduction of the new technician role and the change in task distribution within a group of staff who volunteered to trial the introduction of the Checking Technician role into their workplaces. The initial survey study identified some facilitators and barriers to the introduction of the new role. Exploring both an extreme and chaotic situation in which roles were forced to change and a planned experiment where people attempted to change their roles, provided further insight into these facilitators and barriers to the introduction of a new checking technician role.

A small study by Braund et.al. (2012) indicated that some New Zealand technicians are interested in taking on more responsibility, and Elvey (2001) showed that they are interested in learning more. Braund also showed, however, that some technicians would prefer not to change, but to continue in their current roles. These studies investigated a general trend by technicians to demonstrate a willingness to learn more and take on more responsibility. The introduction of a Checking Technician role involves the introduction of a specific role with clearly defined training requirements and responsibilities. More information from the technician population and a much larger sample was needed, therefore a survey was developed to obtain opinions from technicians. The pharmacists were also canvased as they would be relinquishing a role that was previously theirs. Identification of any barriers to implementation has an impact on designing a scheme to introduce this new role.
When a devastating earthquake hit Christchurch, a major city in NZ, the associated confusion and destruction meant that pharmacies had to develop different methods of performing many of the tasks necessary to take care of their patients. This crisis situation proved an opportunity to explore how pharmacists and technicians adjusted their roles in an extreme and unplanned situation.

In contrast, the third part of the thesis explores whether and how roles changed when pharmacists volunteered to take part in a pilot project investigating new roles. This change was planned and training was provided. The introduction of the Checking Technician role needs to be understood at a workplace level therefore the evaluation of a pilot study was performed. The pilot study investigated the training required to upskill the technicians, the impact on the workplace (both staff and layout), and the impact on pharmacist time and activities.
Dedication

To my husband cos the advantages outweigh the difficulties.
Acknowledgments

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Publications

Arising from this thesis

*International peer-reviewed journals*


*Conference presentations*

*Oral presentation*

- APSA Dunedin 2013: Would the separation of the clinical check and the mechanical process of dispensing have an impact on public safety? New Zealand pharmacists’ views.

- ISPW Boston 2014: Would an advanced technicians’ role facilitate pharmacists moving to a more clinically focused role? A New Zealand perspective.

- NZHPA Technician SIG, March 2016: Pharmacy Accuracy Checking Technician.

*Poster Presentation*

- APSA Hobart November 2015 (1) Title: Using the technology: the novel use of a smart phone app to assess the potential redistribution of dispensary tasks in preparation for the introduction of a new checking technician role.

- APSA Hobart November 2015 (2) Title: Understanding task distribution from dispensary staff: baseline data for a Pharmacy Accuracy Checking Technician pilot study.

*Other presentations reporting on findings from this thesis*

- LLLP Split Croatia July 2016. Title: Learning to “let it go” – Reluctance to move away from the dispensary during the introduction of an accuracy checking technician in New Zealand.
ISPW Aberdeen July 2016. Title: Increasing the patient focused activities of pharmacists by addressing the “time” barrier.

Ministry publication (data provided from this research)

- Quigley and Watts Public Health Specialists. Title: Evaluation of pharmacy checking technician demonstration pilot site project. December 2015
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Abbreviations

ACT = Accuracy Checking Technician
CBD = Central Business District
CD = Controlled Drugs
CPAMS = Community Pharmacy Anticoagulation Monitoring Service
CPD = Continuing Professional Development
CPC = Comprehensive Pharmaceutical Care
CT = Checking Technician
DHB = District Health Board
GP = General Practitioner
HPCA Act = Health Practitioners Competency Assurance Act
HWNZ = Health Workforce New Zealand
INR = International Normalised Ratio
LTC = Long Term Conditions
MPSO = Medical Practitioner Supply Order
MUR = Medicine Use Review
NZHPA = New Zealand Hospital Pharmacists Association
OTC = Over the Counter
OP = Original Pack
PDA = Pharmacy Defence Association
PHO = Primary Health Organisation
POM = Pharmacist Only Medicine
PSNZ = Pharmaceutical Society of New Zealand
PCNZ = Pharmacy Council of New Zealand

PACT = Pharmacy Accuracy Checking Technicians

SOP = Standard Operating Procedure

UK = United Kingdom

USA = United States of America
Chapter 1: Introduction
1.1 Introduction

In industrialised countries, including New Zealand (NZ), individuals are living longer. This means there is a gradual transformation in the distribution of the different age groups in different countries, with fewer individuals in the younger age groups, and the group aged sixty-five and over is increasing. In NZ the number of individuals aged over sixty-five was almost half a million individuals in 1999, and it is anticipated to reach the one million mark by 2025.¹

This increase in longevity has led to increases in the number of individuals living longer with long-term chronic conditions. This is leading to increased demands on healthcare systems, including doctors’ visits and the number of prescription medicines dispensed. In the United Kingdom (UK), there has been a sixty-two per-cent increase in prescription numbers since 2002, and the number of medications being taken by individuals has increased as demonstrated by United States (US) data showing an increase in the number of prescription items per person for the period 2000 – 2008, particularly driven by the number of patients taking five or more medications.² In NZ the cost to the government for prescription items has increased from $NZ 517 million in 2000 to $777 million in 2012.³

Management of an aging population can be expensive. The costs are not just limited to medication, but there is an increasing number of aged patients who require care for other issues with aging alongside any ‘illness’. Living longer increases the demand for cataract surgeries, hip replacements, etc.⁴ The older patients become, the more likely they are to have multiple medications for multiple conditions.⁵ Increasing the number of medications an individual is taking increases the likelihood of medication side effects and medication interactions, resulting in even more symptoms requiring treatment.⁶

Not all patients are unwell nor will they require many additional health services or experience any medication problems. Many patients can be managed on regular medication that requires a constant supply and change little over the course of a year. The concept of ‘ill elderly’ has been joined by that of ‘well elderly’, these individuals do not take many medications or who’s medication regime is uncomplicated and remains the same as their medications keep their condition well controlled.⁷⁸ Pharmacists are well placed to monitor and ensure a constant supply of medication for a patient who has had no changes to either their condition or treatment. They are also well trained to manage both simple and more complicated cases.

Interventions on the part of the pharmacist would not only save money from reduction of drug-related problems and hospital admissions, but would improve outcomes for patients. Previous research has shown that pharmacist interventions can have positive impacts on patients: improving patient compliance; improving diabetes scores; reducing blood pressure scores;
and reducing hospital admissions. These studies have shown that these interventions have resulted in cost savings alongside improved health outcomes for the patients. Any increase in the time pharmacists have available to provide medicine education, advice and support to other prescribers will have ongoing benefits for patients.

Pharmacy as a profession has changed significantly over the last two centuries. The early role of the druggist who manufactured the products that the patient would consume, apply or inhale has developed into a more cognitive and clinically focused role. In the past, pharmacists manufactured the medicated products being supplied to the patients, and although there is still a place for the compounding pharmacist, the products given out to the patient today are predominantly proprietary products manufactured in dedicated industrial plants. Tablets and capsules are manufactured by the thousands and packaged for distribution to wholesalers and then on to pharmacies, both hospital and community, as are topical products and injections.

Traditionally pharmacists have been involved in the mechanical side of dispensing, the counting and labelling of dispensed products. The introduction of computerisation, automation and the decrease in pharmacist manufacturing due to the number of proprietary products available has had an impact on pharmacists’ work patterns. One UK study compared earlier work from a variety of similar countries with work patterns in the UK, and demonstrated that in the 1970s community pharmacists spent as much time creating dispensing labels as they did talking about health related matters with customers. This 1993 study showed that although pharmacists twenty years later spent three times as much time on customer communication they had not been able to decrease the amount of time they spent on the mechanical side of dispensing.

The previous manufacturing role of pharmacists has given way to a more clinical focus, with pharmacists providing medicine advice to patients. This clinical role is not limited to only providing information on medicines to patients, as pharmacists also advise prescribers and in some cases prescribe themselves. There is a conspicuous overseas trend towards the increased utilisation of pharmacists’ cognitive skills. Not only are these skills being recognised, they are also being funded. Since the inception of pharmaceutical care in America in the late 1980s, there has been a steady and constant emergence internationally of the cognitive and clinical role of the pharmacist.

Within NZ, not all of the drivers for these advanced clinical roles have come from practising pharmacists directly. The introduction of a new contract in 2012 meant that instead of being paid for the number of prescriptions dispensed, pharmacists are now being funded for a more patient-centred approach. This is in combination with an increasing number of programmes...
that have seen community pharmacists providing more clinically focused services. In the early 1990s there was PRS (Pharmaceutical Review Services’) in the late 1990s there was CPC (Comprehensive Pharmaceutical Care) and in the mid-2000s the introduction of MUR (Medication Use Reviews and Adherence Support). These included an accredited pharmacist providing medication reviews.28 Further levels of service have been proposed and implemented in some areas.20 These initiatives have been funded from the health budget but the main driver for this type of services is the professional pharmacy bodies wanting to move the profession into a more clinical role for pharmacists as has occurred in some overseas countries.29 30 31

Trying to balance the current pharmacist role with the desires to move into more clinical areas has led to tension between these new roles and the involvement of the pharmacist in the traditional aspects of medication dispensing. As demonstrated by Savage, increasing patient contact time may not decrease the time spent on dispensing, resulting in pharmacists becoming even busier.32

Internationally, although the clinical expertise of the pharmacist is being recognised, utilised and remunerated, there are still many situations where the pharmacist is still involved in the mechanical side of the dispensing process. One way to facilitate an increase in clinical activity may be to redistribute some of the tasks previously performed by pharmacists. Lack of time has been identified as a barrier to increasing clinical activities for pharmacists.33 34 35 36 28 The introduction of an advanced technicians’ role has been suggested as one of the possible ways to make more time available for the pharmacists to increase their level of clinical activities.37 38 39 Rutter started a line of research investigating the impact on community pharmacist work patterns with the introduction of the CT in the UK but this never progressed past initial observations and there are few studies that quantify exactly how much time the introduction of a checking technician would provide a pharmacist. (ref Frost 2017)

As early as the 1960s, the concept of increasing the responsibilities of the pharmacy technicians has been articulated.40 The idea that pharmacy technicians could and should take over some of the tasks and some responsibilities that had previously been the domain of pharmacists has been discussed in many countries for some decades.37 41 42 43

This thesis examines the advanced technician role similar to that of the UK Accuracy Checking Technician (ACT).44 This ACT role allows a specially trained technician to perform the final accuracy check of a dispensing after it has been clinically approved by a pharmacist.

This accuracy check is an activity previously exclusive to the pharmacist and this advanced role allows the CT to check a dispensed prescription for release to a patient, but only under
carefully detailed conditions. A standard operating procedure (SOP) would clearly define when a technician can check and release a prescription and also spell out when a prescription must be referred back to a pharmacist.

The introduction of the ACT role in the UK in 2005 did not meet with universal acceptance by practising pharmacists at the time. There was a significant amount of correspondence to the Pharmaceutical Journal with many individuals expressing concern about the issues of safety and with many practising pharmacists expressing concern about the ability of technicians to take on this role.44

Following the UK model, introduction of this advanced technicians’ role in NZ would see the separation of the clinical role of assessing the appropriateness of a medication regime for a patient from the mechanical process of selecting the correct medication and its labelling. This has been proposed as a better way to utilise staff skills and time.37 At this time in NZ a pharmacist is required to check all medicine manufacturing and dispensing and sign items off as ready to be given to a patient. Both pharmacists and technicians accept prescriptions from patients or prescribers, both can input the prescription information into a dispensary computer programme, count out the medication and put the dispensing label on the selected product and either may ensure the completed prescription gets to the patient.

Although the mechanical tasks being completed are the same, a technician is only able to assist in the dispensing or manufacture of prescription medications and must be under the direct supervision of the pharmacist and only the pharmacist is responsible for every step of the process.46 This level of supervision requires pharmacists to be physically present at all times. The technician has a supportive role and this supportive role can also extend beyond just the mechanical side of dispensing to include the administrative and bureaucratic workload within the community pharmacy.47 These restrictions limit both the technician’s activities and those of the pharmacist.

In New Zealand, there is a shortage of doctors, and this is predicted to worsen over the coming years. The initial shortage of doctors is compounded by the age structure of the current workforce, as many General Practitioners (GPs) are over 50 years of age and approaching retirement.48 49 With so many of the GPs exiting the workforce at the same time, the current shortages are going to be exacerbated. One suggested solution to this shortage is to hand over some or part of the roles that have traditionally been held by doctors to other health professionals. This has already occurred as a result of the revamp of the maternity services in the late 1990’s and the withdrawal of many GPs from this role, and the increase in the level and extent of care provided by midwives. With the change to the structure and funding of maternity care, many GPs ceased providing such care and referred their pregnant patients to
midwifery services. Now the midwives provide the care and take responsibility for their professional decisions, as had been the case up to the 1970s.\textsuperscript{50} Pregnant patients are looked after by a midwife and referred to extra specialised care if needed. When this programme was initially started in the 1980s, midwives did not have the ability to prescribe medications, and this increase in skills and responsibility was added later in 1990.\textsuperscript{51}

Reassignment and/or re-distribution of professional roles and responsibilities is seen as a way to ensure that the standard of health care provided does not decrease, and there is some suggestion that better utilisation of all skills available may lead to an increase in the standard of care\textsuperscript{52}. Although there is evidence to reflect this shift in redistribution of professional roles and utilising all health care providers to the maximum, there are still perceived barriers to wholesale implementation.

Time, or the lack of it, has been identified as one of the barriers to the wholesale uptake of clinical services by the community pharmacist.\textsuperscript{28} This lack of time is created by the need for the pharmacist to be involved in a wide variety of tasks in the pharmacy, redistribution of tasks to support staff may go some way to addressing this barrier.

In New Zealand support staff have played a role in the pharmacy setting for nearly as long as there have been pharmacists.\textsuperscript{42} They have assisted in the manufacture and packaging of products and maintaining accurate records. These tasks have taken place under the direct supervision and oversight of the pharmacist. The pharmacist, however, holds the ultimate responsibility for both the final product and the advice given to the patient. Technicians are a trained and recognised group of support staff currently employed in NZ pharmacy dispensaries. Technicians complete an approved course which allows them to assemble prescriptions prior to these being checked by a pharmacist. Technicians can also perform other stock control and administrative tasks.

There is very little published material on the subject of technicians’ roles in community pharmacy setting, but UK research has shown that community pharmacists spend more time communicating with patients when there are dispensary technicians among the dispensary staff.\textsuperscript{24} Much of the available literature around the pharmacy technician role internationally comes from hospital settings, where technicians have been taking on advanced and non-traditional roles in the UK, the USA and Canada.\textsuperscript{53 54 55} The latest version of the Community Pharmacy Services Contract (CPSC)(Oct 2012) has seen a change in the focus of the funding model within NZ.\textsuperscript{27} This contract provides remuneration to the community pharmacies for the government funded medications and services provided to patients. The latest contract (CPSC) has seen a shift away from the ‘fee for service’ focus of the previous version of the contract, which reimbursed pharmacies for the number of prescriptions dispensed. The original model
saw a pharmacy paid for the cost of the medication plus a dispensing fee for each item. This meant the more prescriptions a pharmacy dispensed the more income it could make. There was no provision in this older version of the contract for in-depth discussion with patients about their medication.

The current version of the CPSC (2016) reimburses pharmacies for identifying and spending time talking to the patients who are on long term medication. This new model reimburses pharmacists for identifying patients who need assistance with managing medications, including compliance packaging services, or frequent dispensing to aid adherence. Also included are anticoagulation monitoring, and some previously provided services such as methadone and clozapine dispensing. The contract recognises the advantages of pharmacist immunisation programmes, but these are currently not government funded and are paid for by the patients directly. This patient-focused funding model makes it timely to investigate ways of ensuring that pharmacists have the time they need to perform these additional services.

1.2 New Zealand’s Health System – an Overview

The NZ health system is primarily funded by the government through taxation, to ensure that all eligible individuals have access to appropriate healthcare options; this covers access to both hospital and community care, access to general practitioners and specialists, to surgical procedures and medication when appropriate. The options and the level of availability are governed by various departments and committees, and are constantly being reviewed and updated.

Pharmacy services in NZ are also provided by this government funded system. This system dictates the medications that are funded and the level of funding that will be given for a particular medication. This funding model covers the different pharmacy settings.

In NZ there are two major pharmacy settings; the hospital pharmacy and the community pharmacy. A hospital pharmacy is located inside a hospital complex and provides a variety of services to the hospital wards and to individual patients. These services include supplying medications to both wards and individuals, the manufacture of specialised products and the provision of detailed pharmaceutical information to other medical staff and patients. All services and medications administered to patients located within the hospital are provided free of charge.

The community setting provides a combination of services, including the supply of prescription medicines, the majority of which are funded by the government (for which patients pay a small co-payment charge) but also unfunded ones for which individual patients pay the entire cost themselves. Alongside the prescription medicines service, community pharmacies supply
Over-the-Counter (OTC) medication which can be purchased by the patient. Many of these products can legally only be sold by a pharmacy, and some can only be sold by a pharmacist. The community pharmacy may also sell cosmetics, gifts and natural products, vitamins and minerals, and dietary supplements (although they do not sell grocery items). This makes the community pharmacy a combination of professional services and a retail outlet, a business that has some of its income dependent on the number of items it sells.

1.2.1 What is a pharmacy?

In NZ, a pharmacy is defined in the Medicines Act 2003 as "a place where pharmacy practice is carried on" and pharmacy practice is defined as:-

"Includes without limitation the following

a) the compounding and dispensing of prescription medicines, restricted medicines, or pharmacy only medicines:

b) the supply of a medicine by a pharmacist to suit the needs to a particular person;

c) the sale of prescription medicines, restricted medicines, or pharmacy only medicines."\(^{56}\)

The premises of a NZ pharmacy needs to be registered and have a current licence, a dispensing contract (National Pharmacy Service Agreement) with the local District Health Board (DHB), and is required to have a registered pharmacist on the premises at all times.\(^{57}\) The pharmacist is responsible for the safety of both the staff and public. The pharmacist code of ethics sees the pharmacist taking responsibility for the decisions made, and the information provided by both themselves and the other staff in the pharmacy.

1.2.2 Staff outline

In the two different settings (hospital and community), the staffing composition are slightly different. In both the hospital and the community setting, the dispensary staff consists of a mixture of pharmacists and support staff including trainee pharmacists (pharmacy interns), qualified technicians, and technicians in training. In the community setting, the pharmacists and technicians exist alongside a third group, retail assistants, who are not present in the hospital setting.

In some community pharmacies where there is only a small number of staff, the technician and the retail assistant may be the same person.
The number of both pharmacists and support staff can vary between one sole-charge pharmacist to twenty pharmacists plus support staff, depending on the size and location of the workplace.

1.2.3 What is a pharmacist?

A pharmacist is defined as "a health practitioner who is, or is deemed to be, registered with the Pharmacy Council established by the Health Practitioner’s Competency Assurance Act 2003 as a practitioner of pharmacy." (Medicines Act 1981.2. Interpretation)

A pharmacist is responsible for the supervision of the staff in the pharmacy, and if there is more than one pharmacist working at any one time, there will be a charge pharmacist who has overall responsibility for all the pharmaceutical services provided in the pharmacy. Each individual pharmacist, however, is still individually responsible for their own work.

Pharmacists work under a clearly defined scope of practice and are required to be registered with the New Zealand Pharmacy Council (NZPC), and can be subject to discipline if found guilty of breaches of legislation or accepted practice.

To register with the NZPC an individual must have completed the required qualification. For NZ qualified pharmacists, this is a four-year course at an approved tertiary institution, followed by a practical year as an intern pharmacist in either a hospital or community setting.

All pharmacists must carry public liability insurance in the event of complaints or errors. In NZ this is generally provided by the Pharmacy Defence Association (PDA) which provides information, legal advice and legal representation if needed.

Pharmacists are responsible for the sale of the medications classified as Pharmacist Only Medications (POM). Pharmacists counsel patients so they can decide if a POM is appropriate or if a patient should be referred to a prescriber or an Emergency Department at a hospital.

1.2.4 What is a technician?

Technicians are trained support staff in the pharmacy dispensary. In NZ, the early role of a pharmacy technician was restricted to data entry into the dispensary computer system, counting or pouring proprietary products or bureaucratic or administrative tasks under the supervision of a pharmacist. In 2008, the training framework was broadened to include some compounding processes, but these still need to be conducted under the supervision of a pharmacist. The roles undertaken by technicians encompass dispensary tasks, but also administrative and stock control as outlined by Braund 2009.47
To work in a dispensary, a pharmacy technician is required to complete an approved training course or be enrolled in an approved training course and working towards completing the training programme. The approved qualification is the National Certificate in Pharmacy (Technician), and the certificate consists of five levels. Each level comprises several modules covering material appropriate to the tasks performed in the pharmacy. These modules include: working and communicating professionally in the pharmacy, providing pharmacy services and advice, retail operations in the pharmacy, providing OTC advice on health related products 1 and 2, body systems and how medicines work, stock and inventory management, non-aesthetic compounding and pharmacy practice topics relevant to workplace requirements. Completing this qualification can be achieved by in-house training, or a correspondence course in conjunction with employment in a pharmacy. This course is offered by the Open Polytechnic of New Zealand, the Bay of Plenty Polytechnic, and Academy New Zealand.

1.2.5 Supply of prescription medicines

In NZ a prescription written by a NZ registered prescriber is required to obtain a supply of medicines classified as prescription medicines. These medications must be supplied by a registered community or hospital pharmacy. There are very few exceptions to this rule, but legislation allows wholesalers to hold supplies, doctors and other prescribers may have small supplies for emergencies, medical representatives may have sample size packs for distribution to prescribers and pharmacists may provide an ‘emergency supply’.

The emergency supply exemption allows a pharmacist to supply a prescription medication without a prescription. The pharmacist is limited to a maximum of three days’ medication and only if the patient has had the medication prescribed before by a NZ registered prescriber.

1.2.6 The dispensing process

Dispensing has been defined in Mosby’s Medical Dictionary as:-

“to prepare and issue drugs or drug mixtures from a pharmaceutical outlet or department.”

The process starts with a prescription or a medication request. In the community setting, a prescription is brought into the pharmacy by a patient or is transmitted to the pharmacy by fax, while in a hospital setting, a medication request is transmitted by fax or electronically from the ward. This is followed by data entry into the dispensary computer systems and generation of labels to be attached to the desired products. Then follows the selection and counting of the appropriate strength and quantity of product from a stock bottle or store, placing the corresponding label on the product and arranging the completed product for the pharmacist to perform the final accuracy check. This involves reconciling the prescription or medicine request with the dispensed product and its label.
Medications may be dispensed in monthly lots, with repeat supplies to be collected later as required or as the entire quantity ordered on the prescription (up to a three month supply, with up to a six month supply for oral contraceptives). The amount supplied may depend on the funding restrictions surrounding a medication, or a prescriber may have safety concerns and may request that the quantity supplied to the patient may be restricted to small amounts at any one time.

1.2.7 Technician roles

Within New Zealand

In NZ, a pharmacy technician is limited to assisting in the dispensary under the supervision of the pharmacist. Technicians assist in the dispensing and assembly of prescription items. The individual tasks performed can vary between the two environments, hospital and community. Technicians in both pharmacy settings can be involved in the dispensing process alongside stock control management, and other administrative and bureaucratic functions. Community technicians may also be involved in the sales of OTC medicines.

Many tasks can be common to both environments, but in the hospital setting the technicians may not see a patient at all, whereas in the community setting technicians may collect the prescription from the patients as well as giving the medicines to the patient.

Both groups of technicians can be included in the compounding of extemporaneous products, such as simple ones in community and more complex or sterile products in the hospital.

In the last few years there have been examples of increased roles for technicians in NZ. Technicians are becoming more involved in medication compounding, stock control and health team communication. Roles have been developed to facilitate technicians taking on specific tasks in the more clinical areas of warfarin counselling, medicine reconciliation at patient discharge from hospital and post myocardial infarction medication counselling prior to hospital discharge, but these latter roles do not facilitate more pharmacist time with patients, they delegate a small amount of the pharmacist counselling role to the technician.

Overseas roles

Technician training and roles varies considerably between countries and this is even more noticeable between developed and developing countries. In some developing countries technicians can perform the same roles as pharmacists with respect to dispensing and checking prescriptions. Some countries do not have the equivalent role of the NZ pharmacy technician, but other countries have the basic dispensing technician's role, and some have advanced roles for technicians as well. The following examples have been included as the
work environment and the level of responsibility were similar to the NZ environment, in which the technicians operate under the supervision of the pharmacist for much of the time. The Danish pharmaconomist role was not included in these examples as the role is closer to that of a pharmacist (containing a clinical component) than the mechanical role of a dispensing technician. This role entails significant training for the individual to operate independently of the pharmacist but is not seen as a pharmacist. This role involves a clinical component not seen with the advanced checking role described in this thesis.

Below are some examples of situations similar to NZ, but where the technicians can be responsible for a final accuracy check.

**United Kingdom**

In the UK technicians may sell over the counter medicines, and customers may seek advice and information on the use of medicines or general health issues. The pharmacy technician must know when to refer the customer to the pharmacist or another health care professional.

After completing the additional required training, an accredited checking technician (ACT) able to release a prescription to be given out to the patient. They are able to carry out the final accuracy check of dispensed items that have been clinically approved by a registered pharmacist. They are restricted to checking the prescription items dispensed by other dispensary staff that are then released to be passed on to the patient; they are not permitted to check their own work.

**United States**

The title used in the USA of Tech-check-tech is generally defined as the checking of a pharmacy technician’s order-filling accuracy by another technician instead of the pharmacist. The technicians were initially used in conjunction with some form of automation and are often limited to hospitals and institutions. The technicians are utilised to perform the checks on canister refills used in robotic dispensing. This role was later moved out into the community pharmacy setting and expanded to the final accuracy check of dispensed items.

This role does not have a universal training programme but technicians can be trained on site in a specific institution. This means that moving to a new site involves more training.
Ireland

The position of a pharmaceutical assistant was developed to be able fill in for the pharmacist in their absence. “No offence is committed under section 26 where a registered pharmaceutical assistant acts on behalf of a registered pharmacist during the temporary absence of the registered pharmacist.” The pharmaceutical assistant must be registered and work a minimum of 15 hours per week in the pharmacy before being eligible to cover for a pharmacist. Pharmaceutical assistant training in Ireland was phased out in the 1980s. The training for this position has now stopped and pharmaceutical assistants are becoming rarer as more retire or move on to different careers.

1.2.8 Competency and Registration

The emphasis on competency on the part of staff is a common theme present in much of the health literature, with the need to protect the public and reduce the risk of mistakes driving changes internationally. This has been demonstrated in part by the increasing requirement for approved training programmes for all staff who handle medicine inquiries and sales, whether they are prescription or Over-the-Counter medicines, and whether they are pharmacists, technicians or retail staff. Approved training programmes, alongside registration is seen as an essential process to establish and maintain competence, and ensure the appropriate level of care.

Pharmacy Technicians’ Registration

Accuracy and safety are important considerations in all countries. Ensuring accuracy requires quality training and assessment. Safety can be facilitated by a registration process that requires individuals to take responsibility and to be held accountable for their own work.

Internationally, initially only pharmacists have been required to be registered, but it is becoming the norm to require technicians to go through this same process. This process includes the development of an approved training programme and the requirement to register with a governing body, and for individuals to take responsibility for their own work.

Registration in the New Zealand setting

As mentioned earlier, in NZ technicians have an accredited training programme, however are not (at this stage) required to be registered.

Currently, technicians have the ability to register with the Pharmaceutical Society of New Zealand Inc. (PSNZ) for support and training material, but there is no requirement to be
registered with the New Zealand Pharmacy Council (the registering and disciplinary body for pharmacists) to be able to work as a technician.

Registration may not be required but formal training is, and it is a legal requirement to have completed the approved training or to be studying and working towards completion. It is a legal requirement that if individuals are working in the dispensary they must be a qualified technician or a technician in training.\textsuperscript{46}

The New Zealand Certificate in Pharmacy (Technician) is the approved technician training course available, and is offered as either a class taught programme or distance taught for those currently employed in a pharmacy.

\textbf{Overseas examples of the training and registration of technicians}

In Australia, there is no requirement for technician registration and training although it is strongly recommended.\textsuperscript{64} There are national training programmes for pharmacy staff, consisting of a series of levels, one to five. Levels one to three provide the basic skills to work as a pharmacy assistant, while levels four and five provided by several institutions are the training required to work in the dispensary. Level five has a focus on management roles, with level four providing the training for general dispensing practices. Voluntary membership of the Australian Pharmaceutical Society is available.\textsuperscript{66}

In the UK (Scotland and England), approved technician training courses are available and registration with the General Pharmaceutical Council became mandatory from July 2009.\textsuperscript{67} This means that technicians have to complete the approved training and be actively involved in Continued Professional Development (CPD) and need to submit evidence to prove competence every time they re-register. They can be held responsible for any errors they make and must also have public liability insurance. Those individuals performing the advanced role of an ACT have additional requirements to maintain their registration.\textsuperscript{67}

In Ireland, there are training programmes in place for technicians and suggestions that pharmacy technicians should be registered have been voiced, but this could be some time away.

It is now a requirement for Canadian technicians to be registered. Only registered individuals can call themselves pharmacy technicians. The enrolment of the first regulated technician happened in December 2010. The requirement for registration has been rolled out across the country and varies between provinces. Registration was initially on a voluntary basis and it was not expected that all current technicians would take up the opportunity. There have been approved and accredited training courses for pharmacy technicians available in most
provinces for some time, including a transition process for current technicians. By 2017, all current technicians will have to complete a registration process if they wish to continue to be called technicians, and depending on the province, this will apply in some provinces from the end of 2015.

In the USA, the Institute of Certification of Pharmacy Technicians offers the Certified Pharmacy Technician (CPhT) qualification, and once technicians are certified, after successfully completing the required exam, are required to recertify every two years. There are minimum schooling requirements nationally for anyone wishing to be trained or be employed as a technician. Requirements for the training can vary from state to state but the CPhT is available across the country. There also exists specialist training in-house for specific tasks, e.g. nuclear medicine and compounding production, and specialised hospital training options. At the time of writing registration or certification is required in all but seven of the individual states.

1.2.9 Liability in New Zealand

Liability for errors in NZ is clearly defined. Pharmacists hold the final responsibility for ensuring that a prescription is correctly dispensed and pharmacists are required to have public liability insurance in the eventuality that a dispensing error occurs as this could result in disciplinary action. This insurance cover, held by the pharmacist, also covers the technicians who work under their supervision.

It is generally accepted that as long as technicians do not work outside their scope of practice and are operating within the standard operating procedures of the pharmacy then they will be covered by the pharmacists’ insurance should an error occur. If they overstep their scope or work outside the accepted guidelines they could find themselves personally liable for any costs awarded against them or potentially open to damages awarded as part of a civil lawsuit.

There have been disciplinary cases in which the technician has come in for criticism due to their involvement in a dispensing error, but at the time of writing there were no cases where the technician has been censured.

Checking technicians (PACT) have their own liability insurance as they are taking responsibility for the final accuracy of the items they check. This only covers the accuracy side of the dispensing, if there is a clinical problem with a prescription this would come under the pharmacists’ liability as this is their responsibility to assess the clinical appropriateness of a prescription. (More details are included in Chapter Four)
1.3 Aims and Structure of Thesis

The aim of this thesis is to investigate the potential to change the roles of pharmacists and pharmacy technicians and the possible introduction of an advanced checking technician role. This thesis explores re-professionalisation within the pharmacy environment, the reallocation of some of the tasks that are currently the sole responsibility of pharmacists to specially trained technicians. The first section (Chapter two) of this thesis explores the thoughts and opinions of both pharmacists and technicians as to whether this change is possible, whether dispensary roles could or should change. The second section (Chapter three) investigates what happens to technicians’ roles during a time of crisis. The third section (Chapter four) investigates the planned introduction of a checking technician role into workplaces where staff had volunteered to trial this.
Chapter 2: Opinion survey of pharmacists and technicians regarding the introduction of a checking technician role
2.1 Introduction

The aim of this study was to determine the attitudes of NZ pharmacists and pharmacy technicians with respect to the possible expansion of the pharmacy technicians’ role into that of a checking technician (CT) in the NZ pharmacy setting. There is little information about the attitudes and opinions of practising pharmacists and pharmacy technicians in NZ who would be affected by this proposed change in roles. There is some information on pharmacist perceptions of their roles but almost none on technician opinions.

As discussed in Chapter One, the introduction of this advanced role has been identified as a way to maximise the available skills of the pharmacy staff. This would involve the reallocation of roles from the pharmacist to the technician as has occurred in the UK. Many staff in NZ are aware of the UK checking technician role and some NZ pharmacists have worked alongside them in the UK. Gauging the level of support for the introduction of this new role and any potential concerns would assist with future implementation.

Therefore the opinion of both groups with respect to the ability of technicians to take on an advanced role was explored. Also reported on are pharmacists’ opinions regarding the benefit of this change leading to an increased clinical role, alongside their perception of the impact on safety of handing over the mechanical side of dispensing to support staff and allowing specially trained technicians to take on an expanded checking role. Utilising a written survey this study compares the responses between technicians and pharmacists, between staff in hospital and community settings and between those pharmacists who had previous experience working with a checking technician and those who had not.

2.3 Methodology

To ascertain the opinions surrounding the introduction of an advanced technician role it was decided that a survey would be the tool of choice as a large number of respondents could be canvassed easily and quickly (see advantages below). The survey was initially designed to use closed end questions and quantitative analysis to gauge the strength of opinions from the respondents. This can, however, limit the depth of information obtained, so participants were also given the opportunity to provide free text comments. This turned a strictly quantitative work into a more mixed methods study that treated the comments in a qualitative manner.

2.3.1 The research approach

Although not designed as a mixed methods study, both quantitative and qualitative methods were utilised to analyse the data obtained.
Mixed methods methodology is frequently used in social science research. It incorporates both qualitative and quantitative methods as a way of collecting information and reporting results.

“Mixed methods research is an approach to inquiry involving collecting both quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks. The core assumption of this form of inquiry is that the combination of qualitative and quantitative approaches provides a more complete understanding of a research problem than either approach alone.”

2.3.2 Philosophical approach

There are many terms used to define the philosophical approach the researchers may apply to a study. These have been defined in the past as paradigms, worldviews, ontologies, broadly conceived research methodologies and epistemologies. In this work the phrase epistemology has been used to demonstrate the impact a researcher’s beliefs can have on their approach to their research.

The convergent parallel design was utilised in this study to incorporate both these qualitative and quantitative methods. The purpose of convergent parallel design is “to obtain different but complementary data on the same topic” to best understand the research problem. The aim of using this design is to bring together the strengths and non-overlapping weaknesses of quantitative methods (large sample size, trends, and generalisations) with those of qualitative methods (small sample, detailed and in-depth).

Both strands of the data (quantitative and qualitative) are collected at the same time and in this study, using the same questionnaire. The survey used open ended questions for the qualitative arm and Likert-scale and yes/no questions for the quantitative arm.

The analysis and interpretation of each arm are performed separately. The results are then merged, compared and related to each other and interpreted together to establish relationships between the two sets of data. Interpretation is looking for points of convergence, divergence, contradictions and relationships.
2.3.3 Advantages and disadvantages of surveys

Surveys can be a convenient way to gain information where there is none, but can also be used to provide feedback from a specific group of people and/or learn about their opinions. There are both advantages and disadvantages of surveys.

Advantages

- They can be designed as simple to use and quick for the participants to complete.
- The research is based on real world observations (empirical data).
- The breadth of coverage of many people or events means that it is more likely than some other approaches to obtain data based on a representative sample, and can therefore be generalizable to a population.
- Surveys can produce a large amount of data in a short time for fairly low cost. Researchers can therefore set a finite timespan on a project which can assist with planning and delivering end results.
- If participants can complete the questionnaire without the presence of an interviewer, they may be more willing to share information and be candid in their responses.
Chapter Two: Opinion survey of pharmacists and technicians regarding the introduction of a CT role

Disadvantages

- The significance/implications of the data can be neglected if the researcher focuses on the range of coverage to the exclusion of an adequate account of the implications of those data for relevant issues problems or theories.
- The data that are produced are likely to lack details or depth of the topic being investigated.
- If there is no interviewer present, respondents cannot be probed further if their responses are unclear or raise additional questions.
- Securing a high response rate to a survey can be hard to achieve, particularly when being carried out by post, but it is also difficult when being carried out face-to-face or by telephone.
- A written questionnaire is not appropriate for low literacy audiences.

2.3.4 Survey type
Surveys can be administered in person by a researcher using a telephone or face-to-face or self-administered (i.e. completed by the respondent without the researcher present). As mentioned above this has the advantage of potentially obtaining more honest answers from participants. The absence of an interviewer removes any potential influence from the interviewer by their sheer presence alone or an attempt by the respondent to adhere to social norms. This can be beneficial to the quality of the data.

2.3.5 Focus groups
Focus groups can be used at different phases of a project as they can be helpful in establishing background information and opinions that may be useful in the questionnaire design.74

In designing a questionnaire it is necessary to identify what you want to ask and to whom you want to ask it, meaning focus group participants should be representative of the final wider population that will be surveyed. Therefore, to ensure that as wide a variety of viewpoints as possible were obtained some purposeful sampling was utilised to recruit both young and more experienced pharmacists and technicians to the focus groups.

2.3.6 Survey design considerations
The quality of the questions in a survey will affect the quality of the data produced, therefore questions must be written in such a way that they produce reliable and valid information. Reliability is necessary to ensure that the questions mean the same thing to each respondent so as to provide the same results. Validity is necessary to ensure that the questions collect the data that is required. This can be achieved by the use of closed ended and open ended questions. These different question types require different types of analysis as described later.
in this chapter. The use of yes/no and Likert-scale type questions are examples of closed ended questions. These are questions that provide the respondent with a set of response alternatives from which they can choose an answer. This is quick for the respondent and relatively simple to analyse.

Open ended questions ask the respondent to answer in their own words. This is often in the form of free text where the respondent has the opportunity to comment and provide more detailed information and provide unanticipated ideas or responses.

After careful development of an initial version of a questionnaire it should be tested on a small number of participants to ensure that the questions are easy to follow and will generate the information required.

Feedback provided from this process should be utilised to make improvements to the questionnaire before sending it out to the wider population. The following methods section outlines how this was done.

2.3.7 Likert scales

Likert scales are a very commonly used method of data collection in surveys as they are quick, efficient and inexpensive. The responses are a single number and are easily quantifiable and can be analysed via mathematical statistical packages such as IBM SPSS. They do not require a respondent to provide an absolute yes or no answer but allow for an indication of a level of agreement from the participants. This includes being able to give a neutral or undecided response.

Scales are given labelled points to aid the respondent in indicating their level of belief, agreement or confidence (e.g. very uncomfortable, uncomfortable, neutral, comfortable and very comfortable). Unfortunately the distance between these points is not consistent as it can be interpreted differently by different respondents, therefore it only gives an indication of the true attitudes of the respondents.

Although widely used in surveys to gather information, there are some limitations in the utilisation of a Likert scale. Care must be taken with the order of the questions being asked as a previous question can influence response to subsequent questions. It has also been suggested that many respondents will not use the upper or lower extremes of the scale.

There is no perfect number for the range of a Likert scale and it is suggested by some authors that giving no indication on the scale (effectively a single line along which they can indicate their level of agreement) rather than discrete points allows more flexibility for the respondent.
A visual analogue scale is an example of this type of option, but these can be more complicated to analyse.

**2.3.8 Free text comments**

The provision of open ended questions or allowing for written comments to survey questions, as noted previously, allows for additional input from the respondents. It provides an opportunity to express more than just the limited options provided by the fixed range of a Likert scale, thereby providing the researcher with a greater depth and breadth of data.

Identification of the comments for analysis is followed by identification of themes or codes. This is often both deductive and inductive. Deductive analysis confirms information for the researcher and allows the researcher to look at all the respondents' answers to a question. Inductive analysis explores the data, to identify and assess relationships and identify themes or codes that the researcher had not anticipated.

The coding of data and the allied identification of themes is a subjective process. Themes or codes are usually attached to “chunks” of words that may vary in size, from individual words to whole paragraphs. This process is also negotiable and it is quite possible that a researcher may re-code (change) a theme or code for a particular section of words as the process develops.

Working through a body of text or an interview transcription and identifying individual themes or codes can be planned beforehand and a “tree” utilised to map out major themes and subthemes. Coding trees evolve during a project and are used to provide hierarchy to themes. The tree starts with the anticipated themes based on the questions asked and on the expected responses. These are then applied to a sample of the data and the tree will often be modified as new unanticipated themes emerge. Further additional themes or subthemes may be added as the remainder of the data is analysed. Once the themes and subthemes have been identified it is then possible to look for patterns or relationships between the different themes.

**2.3.9 Using Cohen's d**

In a situation where there is a large number of responses to a survey, and the comparative analysis indicates a statistically significant difference between two groups involved in the survey, it can be beneficial to employ an assessment of the effect size to give an indication of how big or small the difference that has been identified.

Cohen's d is a measure of effect size. Simply put it indicates the amount of difference between two groups of interest in standard deviation units. It is given for two reasons:
1. It is used as a counterpoint to significance tests where it gives an indication of how big or small a significant difference is. This difference can then be compared to Cohen's estimates of what is typical of a small, medium, or large effect.

Cohen's d: 0.3 = small, 0.5 = medium, 0.7 = large (big)

2. To provide a common metric on which to compare effects for meta-analysis or when outcome variables may be measured on different scales.

A Cohen's d of .50 would suggest the difference between the responses is associated with a half of one standard deviation variation between groups.

This calculation can be utilised in conjunction with t-tests.

2.4 Methods

2.4.1 Ethical Approval

Ethical Approval was given by the School of Pharmacy under delegated authority from the University of Otago Human Ethics Committee, number D11/289.

The decision was made to use a self-administered questionnaire to obtain information on the opinions of pharmacy technicians and pharmacists. This survey type is a common method of collecting data and information and many within the population were well used to this format.

2.4.2 Survey design process

The survey was developed in stages;

- Question development utilising focus groups
- Testing on non-pharmacy staff
- Testing on pharmacy staff

2.4.3 Focus groups

Focus groups were utilised in this study as part of the development of the survey tool.

Focus group participant selection

It was originally anticipated that the focus groups would be convened consisting of firstly small groups of hospital and community staff. It was also necessary to consider how the demographics of the groups might affect the discussion. Here the intention was to investigate differences in responses between two groups therefore two separate focus groups, one for each group (pharmacists and technicians), was essential.
A small group of hospital and community pharmacists and secondly a small group of hospital and community technicians were planned. These two different groups would consist of three pharmacists and two technicians from each work environment. These groups would meet separately to allow a free and open discussion of the topics being considered.

A convenience sample was utilised to obtain participants who would be representative of the target audience, these participants were obtained in the home city of the researcher. As there is only one hospital in this city all the hospital pharmacists and technicians came from the same workplace. Purposeful sampling was applied to the community setting as there was only a small number of workplaces to choose from. Community pharmacy staff were recruited from businesses with a variety of sizes and a variety of staff numbers. Efforts were made to recruit individuals with a variety of staff work experiences, e.g. length of pharmacy employment.

The ensuing focus groups consisted of one group of hospital technicians, one group of hospital pharmacists (only two pharmacists who chose to participate and were available at the scheduled time) and one group of community pharmacists (which consisted of two pharmacists from different workplaces each with more than 10 years’ experience, one a pharmacy owner and the other a pharmacy manager). Two community pharmacy technicians from two different pharmacies were interviewed separately due to difficulties in scheduling an appointment for both at the same time.

Content and format of focus group discussion

Each meeting opened with a short presentation and a semi-structured set of questions were used to facilitate the discussion. Patti Napier, the PhD student, chaired the meetings. The discussions were recorded and the recordings reviewed later and the key themes identified. Notes were made of the points raised and the recordings were then erased.

The researcher explored:

1) what the participants knew about the CT role.
2) how acceptable the role of a CT was to participants.
3) perceived barriers to the introduction of the CT role.
4) attitudes towards the introduction of the CT role
5) attitudes towards mandatory registration for technicians.

2.4.4 Survey development

Based on the findings from the focus groups, two surveys were developed, one for the pharmacists and one for the technicians. The questions in these two surveys were essentially
identical with a small variation in wording tailored to each group. The surveys covered the same themes e.g. general demographics (age, gender etc.), knowledge and awareness of the CT role, perceptions of technicians' abilities to perform this role, how and whether this new role would fit in the current workplace and opinions on the need for registration for technicians.

Two respondent group-specific questions were included in each survey. The technicians’ survey included questions on their opinion of taking on an increased level of responsibility and their feelings towards the possibility of undertaking more training. The pharmacists’ survey included a question regarding any previous experience working with a CT and explored their opinions on the impact the CT roles’ introduction might have on the pharmacists’ roles.

A variety of formats were incorporated within the surveys. There was a mixture of Likert scale questions, closed yes/no questions and open ended questions with provision for comments. A five point Likert scale was chosen for this survey due to the difficulties in analysing a visual analogue version (as noted in the methodology section above).

### 2.4.5 Survey testing

The preliminary version of the survey was developed and to ensure that the wording and intent of the questions was unambiguous these were checked by two non-pharmacy staff. This version was then altered according to feedback and the second version was piloted on two pharmacists and two technicians. They were asked to complete the survey and to provide feedback on the content and the wording of the questions.

There were no major issues identified with the survey at this point and comments on layout were very positive. At the suggestion of one of the technicians a few minor changes to wording and formatting were carried out and the final version of the survey printed.
2.4.6 Questions from survey – comparison

The table below illustrates the questions included in the survey; there were additional questions exclusive to the different groups. Technicians had a specific question about their willingness to take on extra training and the extra level of responsibility for this advanced role.

Table 2-1. Comparison of questions included in the different versions of the surveys sent out to pharmacists and technicians.

<table>
<thead>
<tr>
<th>Question number technician</th>
<th>Question number pharmacist</th>
<th>Question description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>gender</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>age</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Years of experience</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
<td>Workplace setting</td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Total number of technicians</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>Number of full time technicians</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>Number of part time technicians</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>Awareness of CT role</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
<td>Knowledge of CT role</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
<td>Previously worked with CT</td>
</tr>
<tr>
<td>10</td>
<td>11</td>
<td>Some technicians can accurately check a prescription</td>
</tr>
<tr>
<td>11</td>
<td>12</td>
<td>At current training level</td>
</tr>
<tr>
<td>12</td>
<td>13</td>
<td>After extra training</td>
</tr>
<tr>
<td>13</td>
<td>21</td>
<td>Technicians would be competent extra training</td>
</tr>
<tr>
<td>14</td>
<td>14</td>
<td>Interested in undertaking extra training</td>
</tr>
<tr>
<td>15</td>
<td>15</td>
<td>Interest in taking on extra responsibility</td>
</tr>
<tr>
<td>16</td>
<td>14</td>
<td>Appropriate for CT to check a repeat</td>
</tr>
<tr>
<td>17</td>
<td>15</td>
<td>Appropriate for CT to check a medication tray</td>
</tr>
<tr>
<td>18</td>
<td>16</td>
<td>Appropriate for CT to check a new three month prescription</td>
</tr>
<tr>
<td>19</td>
<td>17</td>
<td>Examples of other possible scenarios comments</td>
</tr>
<tr>
<td>20</td>
<td>18</td>
<td>Procedures should include only checking others work</td>
</tr>
<tr>
<td>21</td>
<td>19</td>
<td>Procedures should include clinical check</td>
</tr>
<tr>
<td>22</td>
<td>20</td>
<td>Procedures should include SOP</td>
</tr>
<tr>
<td>23</td>
<td>22</td>
<td>Appropriateness of separation of roles y/n</td>
</tr>
<tr>
<td>24</td>
<td>23</td>
<td>Appropriateness of separation of roles-Likert scale</td>
</tr>
<tr>
<td>25</td>
<td>24</td>
<td>Because - comments</td>
</tr>
<tr>
<td>26</td>
<td>25</td>
<td>Impact on pharmacists y/n</td>
</tr>
<tr>
<td>27</td>
<td>26</td>
<td>Impact on pharmacists-Likert scale</td>
</tr>
<tr>
<td>28</td>
<td>27</td>
<td>Because - comments</td>
</tr>
<tr>
<td>29</td>
<td>28</td>
<td>Would CT fit into current workflow</td>
</tr>
<tr>
<td>30</td>
<td>29</td>
<td>Would you employ a CT</td>
</tr>
<tr>
<td>31</td>
<td>30</td>
<td>Registration should occur now for all technicians</td>
</tr>
<tr>
<td>32</td>
<td>31</td>
<td>Registration should occur for CT only</td>
</tr>
</tbody>
</table>
The pharmacists had an additional question about previous experience working with a CT, the impact of the separation of the clinical from the mechanical aspects of dispensing, and the impact of the new role on pharmacists and potential employment of a CT.

(T1 = technicians’ question 1, P2 = pharmacists’ question 2. This coding is used in the comparison section of the results.)

2.4.7 Survey distribution

Contact details considerations

The pharmacists’ survey was sent out to all those pharmacists currently registered with the New Zealand Pharmacy Council (NZPC) who had indicated their willingness to participate in research. The NZPC database of contact details for these registered pharmacists was utilised to produce mailing details for the distribution of the pharmacists’ surveys.

There is no register or database in NZ for pharmacy technicians as there is no requirement to belong to any one organisational body, therefore there is no readily available list of currently employed technicians. This meant that there was no contact list that could be utilised for the mail-out of the technicians’ surveys.

The hospital pharmacy technicians group were approached to obtain contact details for their members. During this initial contact it was pointed out that not all hospital technicians belong to the group. Some technicians are members of the PSNZ and consideration was given to approaching this organisation for contact details. Although community and hospital technicians can be members of these bodies it was obvious that not all technicians were, therefore a direct approach via both hospital and community pharmacies was seen as a better way to make contact with a larger number of potential respondents.

The total number of technicians employed in pharmacies was not known at the time of the survey but it was realistic to assume that there must be in the region of two thousand technicians employed in pharmacies around the country. There are just over nine hundred pharmacies in NZ, including both community and hospital settings, larger pharmacies employ more than one technician and smaller pharmacies may have only one. Therefore, using the assumption of an average of two technicians per site results in approximately two thousand employees. Only approximately three hundred technicians were identified through technicians groups. This reinforced the decision to mail out the surveys to the pharmacies, both community and hospital, rather than individual technicians associated with these groups.
All pharmacies are required to be licensed with the Ministry of Health. The list was obtained from the Ministry of Health for all licensed pharmacies for 2011 and the surveys for the technicians were mailed out to all hospital and community pharmacies on the list.

**Mail out**

All surveys were printed and mailed out with an information sheet about the study (see Appendices 1 & 2) and a prepaid return envelope addressed to the researcher. One copy of the survey was included in the pharmacist survey package as it went to their home address. Copies for technicians were mailed to pharmacies rather than individuals. As there could be more than one technician in many workplaces two copies of the technician survey were included. Where there were more than two technicians in a workplace who wanted to complete the survey, participants were asked to copy the survey.

All return envelopes were given a unique tracking number that corresponded to the recipients’ address. These tracking numbers were utilised to ensure that the respondents were representative of all regions around the country.

**Exclusion criteria**

During preparation for this mail out a serious earthquake occurred in Christchurch (one of the major cities in the South Island) and it was decided to exclude pharmacies from this area from the study. It was anticipated that the response rate from these pharmacies would be low due to the need for staff to address the after-effects of the quake. It was felt that the pharmacy staff had enough to cope with and did not need the distraction of a survey.

Additionally, we anticipated that the responses from this group could potentially be different from the overall population because of the earthquake.

**To maximise response rate**

To maximise the response contact was made with several pharmacy bodies or committees. The Pharmacy Guild was contacted and a short article about the study published in their monthly newsletter. Alongside this publicity the Guild also encouraged its members to support this research. A short article was included in the hospital pharmacy email newsletter, the national technicians’ network was also contacted and emails were sent to all its members, the Pharmacy Council included an encouragement notice in its newsletter that goes out to all registered pharmacists.

Respondents were also given the opportunity to take part in two draws for a $50.00 Pressie card, one for the pharmacists and one for the technicians.
2.4.8 Analysis

Data entry

The data from the returned surveys were anonymised and entered into two Microsoft Excel spreadsheets, one for each respondent group. Numerical data were entered into the spreadsheet and the written comments were entered verbatim.

Statistical Analysis

The numerical responses were subjected to statistical analysis using the IBM SPSS statistical package to identify the level and strength of agreement around the specific questions and written comments were subjected to thematic analysis.

- Demographic details were analysed for frequency and compiled into tables and some details graphed
- Yes/no answers and Likert scale responses were analysed for frequency and then graphed
- Comparisons were made between the pharmacists’ and technicians’ responses and these comparisons were graphed
- Comparisons of responses between the different groups were analysed using independent t-tests
- Calculation of Cohen’s-\(d\) to calculate effect size of pharmacist vs technician comparison were carried out
- Post-hoc power analysis was carried out to ensure the number of responses received was large enough to detect a difference between the two groups

Avoiding potential bias

It was anticipated that some of the pharmacist respondents would have previously worked with a CT therefore a question about this was included in the pharmacists’ survey. As this experience might bias the results it was originally thought that this group may need to be excluded from the results analysis. It was assumed that there would only be a small number of individuals in this category. The final number was far greater than first thought therefore rather than exclude these individuals their responses were analysed and compared directly to those who had not worked alongside a CT.
Independent t-tests

These tests were used to compare:

- Pharmacists’ with technicians’ responses to establish if there was a difference in attitudes or perceptions towards the new role
- Responses from both the pharmacists and technicians within the two main pharmacy settings (community vs hospital) to establish if there was any difference between the responses from within the two settings
- Responses from those pharmacists who had worked with a checking technician before and those who had not to establish if previous work experience with a checking technician influenced the pharmacists’ answers

Free Text Comments analysis

The written comments were subjected to manual thematic analysis with themes being identified and comments grouped accordingly. The comments were reviewed and then manually grouped according to individual themes. Additional themes were added until the availability of new themes was exhausted and these headings were further reviewed to determine if they were headings in their own right or were relocated to subheadings of a broader theme.

Although there are computer packages that can be used to assist in keeping track of this type of analysis, the decision was made to use manual analysis due to the origins of the data. These were comments made to specific questions in a survey which resulted in a focused response from the participant and limited the potential themes available. Also, many of the responses were short comments or single sentences which suited the manual analysis. Therefore, identifying themes and grouping responses was quite achievable using this method.

Additional Analysis

Effect size

The calculation of Cohens d to provide an indication of effect size was added to the planned analysis when it became apparent that the number of respondents was so large that all comparisons between the pharmacist and technician groups were statistically significant.
Post Hoc power

Post-hoc power analysis was carried out to confirm that the number of responses received was large enough to detect a difference between the two groups. Although it is generally accepted that power calculations should be carried out prior to commencing a research project, there is merit in post-hoc calculations. Power calculations are used as a method of establishing the required sample size needed to be certain that the results are robust and valid. This study was gathering initial information and therefore it was difficult to predict a result and apply power calculations. Post-hoc power calculation confirmed the robustness of this study.

2.5 Results

2.5.1 Number of returned surveys

Of the total of 1221 returned surveys 736 were from pharmacists and 483 were from technicians.

2.5.2 Response rate

2.5.2.1 Definition

The response rate is defined as ‘The number of complete interviews with reporting units divided by the number of eligible reporting units in the sample.’ This is a commonly utilised calculation to show that the responses are representative of the greater population.

2.5.2.2 Response rate - technicians

The technician response rate for this study was impossible to calculate because the technician surveys were sent out to pharmacies rather than individual technicians and there was more than one response from some of the pharmacies. As has been noted before the total number of individual technicians is unknown and there is no database of contact details therefore sending the surveys to the pharmacies was the only option.

Surveys were sent out to 858 community and hospital pharmacies excluding Christchurch. The reasons for excluding Christchurch are outlined above. Completed surveys were received from 485 technicians.

Each of these responses came from an individual technician but in some cases there was more than one response from an individual pharmacy. This means that the surveys were sent to 858 workplaces and replies received from 371 workplaces, therefore 43% of the workplaces surveyed.
Sixty-seven percent of these responses could be identifies as coming from technicians employed in community pharmacies and twenty-nine percent employed in hospital pharmacies.

NB. A number of responses were received in envelopes that were not supplied by the researchers therefore it is not possible to give the exact number of pharmacies represented—just the minimum.

2.5.2.3 Response rate – pharmacists
Surveys were sent out to all the pharmacists on the list provided by the Pharmacy Council, n=2095, 736 surveys were returned, after correcting for undeliverable surveys, the response rate was 35%.

2.5.3 Demographics
a) Gender

<table>
<thead>
<tr>
<th>Job designation</th>
<th>Male</th>
<th>Female</th>
<th>Responses not given (%)</th>
<th>Total number of responses (n=)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacist</td>
<td>250</td>
<td>421</td>
<td>57</td>
<td>9</td>
</tr>
<tr>
<td>Technician</td>
<td>12</td>
<td>434</td>
<td>90</td>
<td>8</td>
</tr>
</tbody>
</table>

As there is no register of technicians it is not possible to determine whether this matches the gender composition of the workforce, but in our experience there are few male technicians. The pharmacists’ data matches the Pharmacy Council Workforce data.82

b) Age

<table>
<thead>
<tr>
<th>Job designation</th>
<th>Age range in years</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacist</td>
<td>22-77</td>
<td>44.5</td>
</tr>
<tr>
<td>Technician</td>
<td>17-67</td>
<td>34.5</td>
</tr>
</tbody>
</table>

There is a 10 year difference between the mean ages of the pharmacists and technicians. Technicians generally start work at a younger age and finish work before the pharmacists. The pharmacists’ starting age of 22 is due to the four years of university study required before commencing work in a pharmacy.

Twenty-five percent of the technicians were under twenty-five years of age, with fifty percent under thirty-four years of age and seventy-five percent (75%) under forty-three years of age.
Figure 2-2. Histogram of technicians’ ages.

The pharmacists’ ages were evenly spread until the early sixties. There are fewer pharmacists older than this. A small number of the older pharmacists were retired but most were still practicing in one capacity or another.

Figure 2-3. Histogram of pharmacists’ ages.

c) Years of experience

Table 2-4. Technicians’ vs pharmacists’, comparison of years of pharmacy experience.

<table>
<thead>
<tr>
<th>Years of experience</th>
<th>Range in years</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacist</td>
<td>&lt; 1 year – 61 years</td>
<td>22 years</td>
</tr>
<tr>
<td>Technician</td>
<td>&lt; 3 months – 42 years</td>
<td>12 years</td>
</tr>
</tbody>
</table>

The survey comments showed some older pharmacists were still working, if only part time. One older pharmacist explained he had only recently retired in the six months prior to completing the survey. He was 76. Pharmacists continued to work in the pharmacy setting for longer than the technicians and some pharmacists had worked in pharmacies prior to attending university.
Workplace settings

Table 2-5. Technicians’ vs pharmacists’, workplace settings, in percentage.

<table>
<thead>
<tr>
<th>Workplace setting</th>
<th>Pharmacist (%)</th>
<th>Technician (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Community</td>
<td>61</td>
<td>68</td>
</tr>
<tr>
<td>Hospital</td>
<td>16</td>
<td>18</td>
</tr>
<tr>
<td>Other</td>
<td>8</td>
<td>&lt;1</td>
</tr>
<tr>
<td>Not given</td>
<td>15</td>
<td>14</td>
</tr>
</tbody>
</table>

The proportion of pharmacists from community pharmacy and hospital pharmacy is “similar” to the numbers given in New Zealand Pharmacy Council workforce data. The other settings included manufacturing, academic, publishing, governmental or administrative settings.

Some pharmacists reported mixed workplace settings, some a combination of both hospital and community settings and some were in both academic or professional roles as well as community roles.

Almost all of the technicians worked in hospital or community setting with less than one percent working in an ‘other’ setting compared to eight percent of the pharmacists.
Technician numbers in individual pharmacies

There was a wide variety in the total numbers of technicians employed in each of the pharmacy workplaces, both hospital and community. These results encompassed both full-time and part-time staff.

Table 2.6 illustrates the total number of technicians employed in each respondent’s workplace location. There was a range from no technicians at all up to twenty technicians employed in a single workplace.

Table 2-6. Total number of technicians employed in the different workplace sites.

<table>
<thead>
<tr>
<th>Number of technicians</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency (n)</td>
<td>9</td>
<td>73</td>
<td>145</td>
<td>76</td>
<td>56</td>
<td>40</td>
<td>23</td>
<td>11</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>2</td>
<td>9</td>
<td>7</td>
<td>0</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>25</td>
<td>2</td>
</tr>
<tr>
<td>Percentage (%)</td>
<td>2</td>
<td>15</td>
<td>30</td>
<td>16</td>
<td>12</td>
<td>8</td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>&lt;1</td>
<td>2</td>
<td>2</td>
<td>0.0</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td>&lt;1</td>
</tr>
</tbody>
</table>

n= 482, missing =2, total = 484
Number of technicians employed

Nine pharmacies responded with the information that they had no technicians on staff at all.

Seventy-two percent of the pharmacies that responded employed fewer than five technicians and in sixty-one percent of these pharmacies there were between one and three technicians. The most common number of technicians in these workplaces, in thirty percent of pharmacies, was two. See Table 2.6.

Full time vs part time

These numbers did not represent full time staff. In the pharmacies with only one technician eighty-five percent of the respondents worked full time and fifteen percent worked part time. Of the pharmacies who had two technicians, only forty percent had two full time technicians, forty-three percent had one full time and one part time technician and sixteen percent had only part-time technicians.

Hospital vs community

These results demonstrated the trend that the pharmacies with the larger numbers of technicians were more likely to be hospital pharmacies with all of the respondents with more than ten technicians being employed in hospitals. However, there was some lack of consensus on the total number of those employed in the largest hospital with the responses ranging from fifteen to twenty.

The largest number of pharmacies were community pharmacies and these were more likely to have four or fewer technicians. There was only one hospital with only one technician but there were 73 community pharmacies with either one full or part time technician. There was a variation in this trend with one community pharmacy employing eight technicians, a combination of full and part time employees and three others employing seven technicians. See Table 2.6.


2.5.4 Comparison of Question responses.

In the following section, results are presented for each question.

2.5.4.1 Section 1: Awareness and knowledge of the role of a CT

Q: Are you aware of the role of the checking technician? (T8 P8)

The responses were very similar between the two groups. Seventy-four percent of technicians and seventy-six percent of pharmacists were aware of the existence of a CT role.

Table 2-7. Technicians’ vs pharmacists’, awareness of CT role.

<table>
<thead>
<tr>
<th>Awareness of CT role</th>
<th>Yes (%)</th>
<th>No (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technician</td>
<td>74</td>
<td>26</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>76</td>
<td>24</td>
</tr>
</tbody>
</table>

Q: How much do you know about the CT role? (T9 P10)

The pharmacists felt that they knew more about this role than the technicians. Seventy-eight percent of the pharmacists felt that they knew a lot or quite a lot compared to thirty percent of the technicians.

![Figure 2-4. Technicians’ vs pharmacists’, knowledge of CT role](image)

Q: Have pharmacists ever worked with a CT? (P9)

Table 2-8. Have pharmacists previously worked with CT?

<table>
<thead>
<tr>
<th>Worked with CT</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>132</td>
<td>19</td>
</tr>
<tr>
<td>No</td>
<td>567</td>
<td>81</td>
</tr>
<tr>
<td>Total</td>
<td>699</td>
<td>100</td>
</tr>
</tbody>
</table>
Comments - Pharmacists

Although comments were not invited on this group of questions many pharmacists wanted to share some of their experiences working with a CT and wrote comments on the CT role. Some of these were quite extensive and all were very positive about the usefulness of the new role. More details of the themes identified in these comments are included in later sections.

2.5.4.2 Section 2: Workflow and workplace fit

Q: Can you see a checking technician fitting into the workflow of your pharmacy? (T23 P28)

The technicians were more confident about a CT fitting into their workplace than the pharmacists. Seventy-four percent of the technicians agreed with the question but only just over half of the pharmacists agreed. More than twice as many pharmacists (14%) than technicians (6%) disagreed.

![Figure 2-5. Technicians’ vs pharmacists’, would CT fit into their workflow?](image)

Comments - Technicians

There was considerable support from the technicians that a CT role would fit into their current pharmacy workflow. This was consistent across both the community and hospital settings.

The two major positive themes that appeared out of this question were:

- Freeing up the pharmacist or reducing their workload and pressure
- Better outcomes for the patient, mainly less unnecessary waiting
The technicians appreciated that the pharmacist has many tasks to perform and complete during their work day and this can mean that if they get tied up with any one task they would not be available to check and release a dispensing. This theme was particularly common in workplaces that have only one pharmacist on duty at any one time. There was also acknowledgement of the time constraints on the clinical role of the pharmacist if they are tied up with the dispensing process.

Better outcomes for the patient were often expressed in terms of not having to wait unnecessarily but also as the ability to spend more time with the pharmacist which would lead to improved clinical outcomes.

Those who responded negatively to the introduction of the CT role gave some quite specific reasons as to why they felt a CT role would not fit into their workflow. There were a few negative comments about the proposal itself but these were generally not very strongly against, more an expression of concern rather than a strong criticism. Two of the main themes were:

- Too small a pharmacy, with only one technician on at any one time
- Reluctance on the part of the pharmacist and other staff

Some of the technicians expressed concern that pharmacists might not be happy to see the introduction of the CT role and also that the introduction of this role would change the dispensary working dynamic so all dispensary staff would have to be comfortable with the new role.

- Improved procedures

There was general agreement with the need to have quality procedures and processes in place to ensure patient safety and many of the technicians made suggestions on how this could be achieved. Many of the suggestions involved procedures that would ensure good communication within the dispensary and also suggestions about safety.

Some of these suggestions were for improvements to the CT role as proposed in this study. Some of these suggestions would probably be included in the CT role in practice but had been left out of the survey to avoid confusion with those new to the concept of a CT. These included:

- Concerns were raised over competence, and safety

Concerns were also raised around competence and safety. Competence was an important consideration for the technicians, with the recognition that this new role would
not suit all technicians and that to ensure safety there would have to be an appropriate training programme in place.

Cost factors

The cost factors raised included who would pay for the required training, who would pay for the required registration and would there be a corresponding pay increase to reflect the extra training and increased responsibility.

Q: Would the pharmacist employ a CT? (P29)

Fifty-five percent would employ a CT if one fitted into their workflow. Thirty-three percent gave possibly as a response and twelve percent gave a negative response.

Q: Pharmacists’ opinion on the impact the introduction of the CT role would have on the pharmacist. yes/no. (P25)

Eighty-seven percent of the respondents felt that there would be an impact on the pharmacist role and thirteen percent felt there would not.

Q: Pharmacists’ opinion on the impact of the CT role on the pharmacist. (P26)

Sixty-six percent felt this would have a positive impact, with forty-one percent positive and twenty-five percent very positive. Fifteen percent felt this would have a negative impact, ten percent negatively and five percent very negatively.

![Figure 2-6. Pharmacists’ opinion on the impact of the introduction of a CT role on the pharmacist role.](image)
Comments - Pharmacists (P26)

The positive comments

More than half of the responses were positive, including a small number of comments that this role should be introduced now. The remainder of the comments were about the pharmacists’ ability to perform other roles if freed up from the current role of dispensing.

This freeing up of time was seen to allow the pharmacist to increase their clinical activities; this would result in increased use of their clinical skills and knowledge to improve medicine and patient outcomes by providing expert advice. These increased activities included:

- concentrating on the clinical accuracy of the script and appropriate action to be taken if discrepancies arise, the ability to deal with complicated prescriptions, conducting MUR or MTA reviews, researching and providing medicine information and management. In the hospital setting. This could include increased ward time for pharmacists in small hospitals, and protocol development.
- developing a multi-disciplinary team approach, increasing teamwork and talking to or working with prescribers.
- performing their role as a medicines advisor by spending time with the patient; discussing their medications and responding to customers’ clinical queries. This could include self care management and education, allowing more time for discussion of diet, lifestyle reviews and smoking cessation. Patient education and ensuring the patient knows what all their medications are for, including how to make the most of their medications. This would also cover assessment or counselling on adherence/compliance.
- chronic conditions monitoring could also be expanded e.g. Warfarin testing (INR) and/or counselling, diabetes testing and/or education.
- assessing and treating of minor ailments, being able to be more involved in OTC queries in the shop and providing more advice on products and conditions.
- expanding into a public health role was suggested with involvement in public health programmes e.g. Immunisation, travel medicines clinics.
- increased administration work, e.g. dealing with PHOs and DHBs, running an efficient business, wages, paperwork, and possibly reading.
The uncertain comments

There were many comments from respondents who were unsure of the impact. Some could see both negative and positive effects from the proposed change, but several respondents voiced concerns about pharmacists’ ability and desire to take on the clinical side of this proposal. As there were more negative statements these are detailed below.

The ability of current technicians to take on this role provided a mixture of responses. There were many positive comments on the technicians’ ability to perform this role and the benefit of the opportunity to up-skill and expand their role. This was coupled with concerns over the potential to create more errors. The style of the current training course was not seen as appropriate to produce a checking technician and there were several comments on the lack of clinical knowledge on the part of the technicians.

Some of the pharmacists’ concerns would be alleviated by the introduction of quality procedures to ensure safety of the patient and elimination of the possibility of errors. The pharmacists reinforced the need for clinical checks to be part of the procedures.

There was an understanding that the change in roles would have an impact on current practices and workflow. These were seen as needing to change to get the best use out of all staff. This was seen as potentially a significant challenge for all staff.

The negative comments

Concerns about job losses, liability, and funding were by far the greatest number of negative comments. This was followed by concern surrounding current clinical skill levels of pharmacists, and the perceived undermining of the status of the pharmacist. A few individuals commented that checking prescriptions is the role of a pharmacist and should not be handed on to anyone else.

Job losses were seen as inevitable with this proposal as it was felt that some pharmacist positions would be taken over by qualified technicians. There was anticipation that this change would be favoured by employers as a way of saving money and reducing their wages bill as a checking technician may get paid more than a current technician but they would not be as expensive to employ as a pharmacist.

Liability was also an issue: the pharmacists wanted a clear definition of who would carry the legal responsibility of the technician checking the prescription. They expressed concern that under the current system they would be seen as liable and they were not at all comfortable with that concept. Some individuals felt that the final responsibility
should always lie with the pharmacist as they should always have oversight of the whole process.

The funding model at the time of data collection was a concern to the pharmacists. They felt that an appropriate infrastructure, different to the current model, would be needed for the pharmacists to be reimbursed for clinical services. They felt that this model needed to be part of the pharmacy payment contract so that they would get paid for doing it. They hoped that with a change in the funding model, these cognitive services would become a fundamental and funded role for pharmacists in the future.

There was concern expressed that the pharmacist might lose an element of control but mostly that this change in roles might depreciate the value of the pharmacist, especially as the general public have no real appreciation of the difference between a technician and a pharmacist.

It was pointed out that there are huge variations in the level of clinical skills of current registered pharmacists, from those whose training contained no clinical component to those who are practising clinical pharmacists. This variation might result in a need for up-skilling on the part of some pharmacists, also the potential for different levels of skill between pharmacists to be acknowledged, from basic to advanced. It was noted that in spite of their current level of clinical ability there would be individuals who would not want to take on this role.

Many of the comments concerned the technicians’ ability to take on the role and the possibility of errors occurring. Pharmacists pointed out the inappropriateness of technicians’ training for this role, because their clinical knowledge of medications is limited.

2.5.4.3 Section 3: Ability, training and competence

Q: In your experience, do you feel that some technicians are capable of accurately checking a dispensed prescription to give out to a customer? (T10 P11)

More technicians held a positive belief (89%), in comparison with the pharmacists (75%). The technicians held much stronger opinions with sixty-one percent of the respondents strongly agreeing whereas only thirty-eight percent of the pharmacists strongly agreed.

Over twice as many pharmacists as technicians strongly disagreed (13% vs 5%).
Figure 2.7. Technicians’ vs pharmacists’ agreement that some technicians could do this role.

Comments - Pharmacists (P11)

This question was worded quite specifically to encourage the pharmacists to consider only their own experiences and thereby avoid any bias in their answer from the experiences of others, either from stories or anecdotes. The word ‘some’ was underlined to minimise the problem of a totally negative response if the respondents felt that this proposal could be universally applied to all current technicians. The word ‘accurately’ was underlined to emphasise that the whole proposal would only work if a high level of accuracy is maintained.

Many of the respondents agreed that some technicians would be more than capable but they were careful to clarify that this did not include all technicians. They wanted to be very clear that it was understood that not all technicians would be suitable to perform this role. They made many positive comments that some technicians possessed both the capacity and the mind-set to do this as well but they had reservations about others. Some of the respondents had worked with CTs in the UK and had very positive things to say about the role and how well it worked.

These positive comments were balanced with the negative comments around technicians’ ability to take on this role. Some respondents were concerned as they had not worked with a technician who by their assessment would be capable of taking on this role. Others questioned the technicians’ ability to take on the extra responsibility as they are used to the pharmacist being responsible. There were concerns expressed about the style of the current training, their current level of accuracy, mind-set and their lack of clinical knowledge which were seen to have the potential to negatively impact on accuracy.
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Mind-set/behaviour

The respondents stressed the need for a change in mind-set for the technicians to take on this new role. Currently they are not responsible for the final check and some respondents felt that this lack of responsibility may be why some technicians make mistakes as they know their work will be checked by someone else. So there would need to be a shift in mind-set to step up to the new role and ensure accuracy at all times. The pharmacists also felt that some specific character traits would be assets to those taking on this role. These included maturity, confidence, emotional stability, ability to work in a focused team and the cognitive ability to work accurately.

Training requirements and procedures that would need to be in place

The respondents argued that the current pharmacy environment does not train technicians for this role and there is always a pharmacist who is responsible for checking their work. Several pharmacists felt this may mean that this assessment is somewhat subjective as the pharmacists are being asked to comment on a situation that is not current practice. However, several of the pharmacists did comment that they felt some technicians they had personally worked with would easily step up to the role, but that more training was required. This training should be competence based and very specifically designed with competence in mind. The pharmacists felt that this additional training and good procedures to follow were essential. Some of the pharmacists were only comfortable with the technicians checking a pharmacist’s work.

Not able to clinically check or lack knowledge to do this

A lack of clinical knowledge was seen as a potential problem by some pharmacists as this would limit the technicians to checking only what was written on the prescription and therefore missing a potential mistake which could lead to errors not being picked up.

Liability

Taking responsibility for mistakes and the issue of who was liable was of great concern to many of the pharmacists. One commented that in their experience mistakes can be made by the best of them, so would the technician or the pharmacist be liable? Clear delineation between what a pharmacist would be responsible for and what the technician would be responsible for was essential in their opinion.
Q: Comfort level with checking a dispensing given technician’s current level of training? (T11 P12)

This question resulted in the largest difference in responses between the two groups.

Sixty-nine percent of the technicians held a positive opinion compared to fifty-three percent of the pharmacists giving a negative response to this question. Twenty-three percent of pharmacists were very uncomfortable compared to only seven percent of the technicians.

![Bar chart showing comfort levels of pharmacists and technicians with checking dispensing](image)

**Figure 2-8. Technicians’ vs pharmacists’ comfort level with checking a dispensing at current level of training.**

**Comments (current level of training)**

This question required the pharmacists to give their response depending on their perception of the current level of training for pharmacy technicians. This referred not just to the best technicians but to technicians in general.

The responses were generally not in favour of the technicians, given their current level of training, taking on the role of the checking technician. Some were very negative e.g. “Not at all comfortable”

The themes identified were:

- Depended on the individual
- Need for accreditation, assessment or more training first
- Procedures
- Liability
- Impact on pharmacists’ role

Once again the comments reiterated the belief that there are different levels of experience and skills across the spectrum of technicians. Occasionally one of the
pharmacists would be very comfortable with a current technician in their workplace but others would comment that they had not worked with any that they were comfortable giving the role to now. Some of the pharmacists voiced concern about the attitude and current mind-set of the technicians and that there would be a need for a mental shift that would see the technicians taking responsibility for their own work. There were many comments that they had confidence in staff they knew personally or had worked with: this personal relationship was important to them.

There were many comments on the need for further training and that this training should be specific to the advanced role the technicians would be taking on. It was noted that the current training programme for pharmacy technicians is not designed to train a checking technician, therefore a different style of programme would be more appropriate. One pharmacist described the required programme as a competency based system in which the focus is on accuracy. This would require careful assessment and it was suggested that this could be achieved by a requirement to log up a set number of checks without error. Pharmacists also suggested that a registration or re-accreditation process needed to continue after completing training to ensure ongoing competency. The lack of clinical knowledge was brought up and it was suggested that some clinical component should be included in their training.

The need for good procedures was hinted at with pharmacists giving examples of ‘simple’ prescriptions that they could see technicians being involved in now. The example of checking a repeat was given several times. Some pharmacists were happy if the technician was limited to checking work done by a pharmacist.

Liability and responsibility was another theme that re-emerged with this question. This was incorporated into training styles as well and the need to ensure that the training would teach the technician to take responsibility for their own work. Pharmacists were clearly unhappy with any arrangement that would make them responsible for the behaviour or accuracy of another.

One pharmacist commented that some pharmacists might feel threatened by the introduction of this role and see their position being ‘usurped’.
Q: *Comfort level with a technician, who has had extra specific training, checking a dispensing?* (T12 P13)

Compared to the last question, a greater percentage of the pharmacists responded positively. Seventy-four percent of the pharmacists now gave a positive response, an increase of fifty percent from the previous question (75% vs 24%).

The number of pharmacists who held a negative opinion decreased from fifty-three percent to thirteen percent. Those pharmacists who were uncomfortable dropped to nine percent and those that were very uncomfortable dropped to under four percent.

The positive responses from the technicians increased from sixty-nine percent from the previous question to eighty-nine percent.

![Figure 2-9. Technicians’ vs pharmacists’ comfort level after technician had completed extra specific training.](image)

**Comments (after extra training)**

Identified themes:
- Increased comfort after extra training
- Personal knowledge of individual technician/CT role
- Individual ability
- Professionalism/mind-set/experience
- Procedural
- Liability

With this question, no details were given as to the nature of the specific extra training: but the question of ‘what specific training?’ came up in the comments several times.

There were many comments on “more comfortable than above”, indicating that the pharmacists had some level of confidence in the technicians’ ability but would be far
more comfortable with their ability after extra training had been completed. There were further comments on the nature of the training and what it should consist of. There were comments on the need for this training to be competence focused and that there is the need for ongoing accreditation or re-validation. There were suggestions on the need for workplace based training so that it is a practical hands-on experience and the pharmacists felt that the achievement levels to gain this qualification would need to be set very high.

There were several comments that the pharmacists were more comfortable when the technician was someone they had a working relationship with. Several of the pharmacists had worked with checking technicians in the UK and were very positive about their abilities and commented that they had very high standards and took pride in their work.

There were further comments about the individual abilities of different technicians and reiteration of the belief that the CT role is not suited to all technicians.

The issue of changing mind-set was brought up several times, the need to move from the situation where someone else is responsible to the one where responsibility for the checking process lies with the technician. There were many positive comments on some technicians’ ability to make this shift and the fact that they currently work with a very high level of accuracy. Competence and professionalism featured strongly in these responses with the need for some previous years of experience to ensure a mature approach to the role.

There were several suggestions about the need for appropriate procedures to be in place with this change in role. The pharmacists’ suggestions were all aimed at ensuring errors did not happen and that the CT did not exceed their boundaries. They also argued that it was important to keep the pharmacist involved in the clinical side of the process, identifying prescription problems but also when handing out prescriptions and counselling the patient.

Liability features strongly in the responses as before. Liability was not spelled out in this survey but it is very clear that the pharmacist will not support any situation where they are responsible for the actions or errors of another. To ensure that the technician is accountable for their actions it was suggested that the technicians would need to be registered.
Q: Do you feel a technician would be competent to do this if they had extra specific training? (T13 P21)

Ninety percent of the technicians compared to seventy-three percent of the pharmacists gave a positive response. Thirteen percent of the pharmacists gave a negative response compared to three percent of the technicians.

![Graph showing responses of technicians and pharmacists regarding competence after extra training]

Figure 2-10. Technicians’ vs pharmacists’ agreement that a technician would be competent after extra training.

Comments Pharmacists (competency)

Pharmacists reinforced previous comments that this may apply to some but not all technicians. Therefore, there were several comments on the appropriateness of both a selection process as well as strict assessment criteria so that unsuitable candidates could be weeded out of the programme ensuring that only competent individuals completed the training and went on to perform this role.

As this survey did not give details of the type of training that would be undertaken some of the pharmacists felt the need to provide details on what they thought would ensure competence. They felt the style and level of training that would be undertaken should include some of the components outlined below:

- Experience needed before starting training
- Selection process, one suggested that maybe a pharmacist should ‘recommend’ suitable candidates
- Strict assessment so that unsuitable candidates would be weeded out
- Need for ongoing validation or accreditation
Chapter Two: Opinion survey of pharmacists and technicians regarding the introduction of a CT role

There was one suggestion that perhaps this new role should not be handed over to the technicians but that maybe pharmacists should be divided into those who dispense and those who provide clinical services.

2.5.4.4 Section 4: Expanded role.

Three examples of potential situations in which a CT could perform the final accuracy check of a dispensing where provided and the respondents asked if they would be comfortable with each of the different situations offered.

Example 1. Comfort with a technician checking a repeat where the initial dispensing was checked by a pharmacist. (T16 P14)

Eighty percent of the technicians compared to fifty-one percent of the pharmacists gave a positive response. Twenty-five percent of the pharmacists compared to eight percent of the technicians gave a negative response.

Figure 2-11. Technicians’ vs pharmacists’ comfort with a technician checking a repeat where the initial dispensing was checked by a pharmacist.

Comments - Pharmacist (repeats)

The comments for these three examples were collected at the end of the three questions. The two quotes below were specific to the questions of repeats. The pharmacists had reservations about the impact of the introduction of the CT role.

“Again, I am not sure of the wisdom of this. The initial dispensing pharmacist is just as capable of making an error as a technician with possible disastrous consequences, I wouldn’t want to see an error perpetuated”

“I don’t think this would save the pharmacist any time (which I am guessing is the aim when they have to do a clinical check and take responsibility for the meds dispensed anyway) – and with a repeat there is little difference in the room for error.”
**Example 2.** *Comfort with a technician checking a weekly tray that is unchanged since the initial dispensing.* (T17 P15)

Eighty percent of the technicians compared to sixty-one percent of the pharmacists gave a positive response. Nineteen percent of pharmacists gave a negative response compared to eight percent of technicians.

![Figure 2-12. Technicians’ vs pharmacists’ comfort with a technician checking a weekly tray that is unchanged since the initial dispensing.](image)

**Example 3.** *Comfort level in a technician checking a three month script for regular and ongoing medication that has not changed since last three month dispensing.* (T18 P16)

Eighty-six percent of the technicians compared to fifty-two percent of the pharmacists gave a positive response. Twenty-five percent of the pharmacists compared five percent of the technicians gave a negative response.

![Figure 2-13. Technicians’ vs pharmacists’ comfort level with a technician checking a three month script for regular and ongoing medication that has not changed since the last three month dispensing.](image)
Comparison of responses to the three scenarios.

Table 2.9. Comparison of technician vs pharmacist responses to the three examples (by percentage).

<table>
<thead>
<tr>
<th></th>
<th>Repeat</th>
<th></th>
<th>Tray</th>
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<th>3 month Prescription</th>
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<td></td>
<td>Tech</td>
<td>Pcist</td>
<td>Tech</td>
<td>Pcist</td>
<td>Tech</td>
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<tr>
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<td>3</td>
<td>8</td>
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<td>5</td>
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<td>5</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
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<tr>
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<td>Very comfortable</td>
<td>55</td>
<td>23</td>
<td>55</td>
<td>30</td>
<td>59</td>
</tr>
</tbody>
</table>

The technicians expressed similar comfort levels with all three examples.

The pharmacists were most comfortable with a CT checking example 1, a repeat, less comfortable with example 2, a medication tray, and least comfortable with example 3, a new but unchanged three month prescription. The number of neutral responses remained constant across all three examples.

Suggestions for other situations where a CT might be useful

Comment on additional examples, technician vs pharmacist.

Many examples of possible scenarios that might suit a CT were given by both the pharmacists and the technicians. Both groups suggested that simple prescriptions would be appropriate for a CT role. These included antibiotics, oral contraceptives or original pack (OP) dispensing, e.g. eye drops or creams. The pharmacists also suggested single strength medications, inhalers or nicotine replacement therapy. Both groups suggested ‘owings’ as appropriate.

The technicians gave more suggestions than the pharmacists. They could see many other situations that could utilise the CT role including compounding (which they already have a partial role in) and other options that at the moment they are not involved in e.g. blisterpacks/compliance packs, repacking, filling MPSOs or OTC available medicines such as ibuprofen etc. The technicians also suggested that they could possibly take over some of the current Pharmacist Only sales.

There was agreement that some situations would be inappropriate; both groups agreed that Controlled Drugs should remain the domain of the pharmacist. The pharmacists also felt that dangerous drugs or narrow therapeutic index drugs should also be excluded.
Technician comments

The survey asked the technicians to give examples of any situations or scenarios where they could see a CT being able to perform the final check on a dispensing. Many of the respondents gave no suggestions, but those that were given were analysed for the themes that were found to be present.

The suggestions gave details of examples that the respondents felt would be appropriate for them with only one example of something that they felt was inappropriate.

There were examples of specific activities and themes on the survey topic itself. Several of the examples fitted into the general description of ‘simple’ prescriptions e.g. oral contraceptives, original pack dispensing, antibiotics, OTC available medication. Also included was increased compounding activities and blister/compliance packaging.

Other examples included ‘owings’, these are balances of medications owing to the patient where the pharmacy was unable to supply the entire quantity when the prescription was first dispensed. Repackaging and imprest stock were also suggested, these are medications repacked into smaller quantities to be supplied to hospital wards and held on the wards until required for a patient.

Filling a Medical Practitioners Supply Order (MPSO), (this is a form used for the supply of a specific group of medications that can be supplied without a prescription. This allows a supply of these medications so they can be kept in a doctor’s bag or Doctor’s practice for use in an emergency), providing emergency supplies (a legal exception to the requirement for the need for a prescription to obtain a prescription medicine. Pharmacists may supply a three-day supply of a medication that a patient is currently taking, if they believe the patient needs it), Pharmacist Only Medications (POMs), a specific group of medications that are able to be supplied/sold to the patient by the pharmacist and emergency contraceptives were also suggested by a couple of individuals as options for increasing the responsibility of technicians. These are currently examples that are legally only open to a pharmacist.

The only example that was given as inappropriate by the technicians was the handling of controlled drugs (CD’s) which require more paperwork and record keeping than other prescription medicines. Several stated specifically that this would not be a task they felt should be opened up to the CT role. It should be noted that no technician gave handling CD’s as an appropriate role for a CT.
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The themes on the survey topic itself were:

- Support for proposal
- Opposition to proposal
- Increased ‘clinical’ role
- Administration role
- Hospital vs community

There were some comments that were more specific to the proposed introduction of the CT role. There were a lot of positive comments in support of the advanced role of the CT, many respondents were enthusiastic about the possibility of undertaking this advanced role and hoping the introduction of such a role would happen in the very near future. There were also a couple of respondents who were sure that this was not an appropriate role for a technician.

Another recurring suggestion related more closely to communicating with patients, but not replacing the pharmacist in this role. There were suggestions that a CT could be utilised to explain brand changes to the patients, follow up with prescribers when changes to brands were needed or making patients aware of any changes a prescriber may have made to their medication regime.

An increased administrative role was seen as a way to free the pharmacist from these specific tasks allowing them to spend more time talking to the patients, a role that the technicians felt was a better utilisation of a pharmacist’s skills and training.

One criticism of the suggestions given in this question was that the examples given were more fitting to the community pharmacy setting than the hospital setting although several respondents noted that they could see how the CT role would work well in the hospital environment.

Comments - Pharmacist

The pharmacists made many suggestions as to how this new role could or could not work. There was a scale of confidence in this new role that ranged from allowing a technician to check after the pharmacist had dispensed through to allowing the technician to perform the mechanical side of the role as long as a clinical check/assessment had been performed by the pharmacist.

The ongoing need for a clinical check was reinforced many times with concerns expressed over the possibility of technicians missing any subsequent changes that may
have happened to the patients’ medications. Therefore, there were suggestions for procedures that could be put in place to ensure these changes were detected.

These procedural changes all appear to have a safety focus. They all highlight the necessity of reducing the possibility of errors and keeping the patient safe.

Protecting the patient was a recurrent theme, as was liability. The pharmacists once again were very concerned about errors and liability. Concern was frequently expressed over who would be liable should an error occur.

There were specific examples of situations that could suit this new CT role. These included many of the examples that the technicians gave to this same question. Pharmacists also felt it would be helpful for technicians to check when dispensing balances or owed prescriptions as well as simple prescriptions that included short courses of antibiotics, inhalers and other medications that come in original packs e.g. eyedrops and creams, OTC medications or oral contraceptives and nicotine replacement therapy. Another option was medications that have only have one strength, as the medication could not be selected wrongly.

There were also many suggestions on what would be needed to ensure that the right patient got the right medication. Once again the pharmacists referred to the need for careful selection of ‘capable’ technicians, the need for training, even going as far as to suggest what this training might include.

There were a few negative comments though a couple of the pharmacists had concerns about the handling of ‘dangerous drugs’, i.e. those with narrow therapeutic indexes or potential for abuse. In these cases it was felt that a pharmacist should oversee each dispensing. Controlled drugs were also given as an example that should remain the sole responsibility of the pharmacist.
Q: Would technicians be interested in taking part in extra training to become a CT? (T14)

Eighty-three percent of the technicians gave positive responses and five percent gave a negative response.

Figure 2-14. Technicians’ interest in taking part in extra training to become a CT.

Q: Would technicians be interested in taking on the extra responsibility of becoming a CT? (T15)

Eighty-two percent of the technicians responded positively and seven percent responded negatively.

Figure 2-15. Technicians’ interest in taking on the extra responsibility of becoming a CT

2.5.4.5 Section 5: Procedures and safety considerations

Q: Agreement that a CT would only be allowed to check the work dispensed by another staff member. (T20 P18)

Eighty-six percent of the pharmacists compared to eighty-five percent of the technicians gave positive responses. Six percent of both groups gave a negative response.
Chapter Two: Opinion survey of pharmacists and technicians regarding the introduction of a CT role

Comments - Pharmacists

NB. This was not a question that called for comments in the survey but some pharmacists did add comments, many suggested that the ‘other’ staff member should be a pharmacist.

Some requested clarification on the identity of who the ‘other’ staff member should be. Some suggested this should be another dispensary staff member, with all the limitations the law puts on that role and some went further, suggesting that both training and experience needed to be taken into account and because of this some staff should be excluded.

One pharmacist commented that in the UK, ‘another staff member’ excluded an intern pharmacist or student technician and other training staff, and only includes qualified dispensers.

Q: Agreement with the importance of the requirement that all prescriptions should have a clinical review by a pharmacist. (T21 P19)

Responses to this question from pharmacists and technicians were similar. Ninety-one percent of the pharmacists compared to eighty-six percent of the technicians gave a positive response. Three percent of the technicians compared to only two percent of the pharmacists gave a negative response.
Figure 2-17. Technicians’ vs pharmacists’ agreement with the importance of requirement that all prescriptions should have a clinical review by a pharmacist

Comments - Pharmacists

The pharmacists gave mixed responses to this question, mainly because they were unsure how the whole process would work. There were several very positive comments, several very negative comments and a selection of comments questioning how this would possibly work. The respondents raised the issue of the need for good procedures to make this work but questioned whether this change and the ongoing need for the clinical assessment would actually free up any of the pharmacists’ time. It was noted that any assessment should include the full patient history, not just access to the list of medications being taken as this would result in a limited review of interactions or contraindications. Two respondents questioned many pharmacists’ ability to perform this review.

The issue of liability was raised with regard to who would be responsible for which part of the process. One owner pointed out that any error, irrespective of who made it, reflects badly on the pharmacy as a whole.

Q: Agreement with the need for a standard operating procedure that would clearly define when the CT can check and release a prescription and clearly spell out when a prescription must be referred back to the pharmacist. (T22 P20)

Ninety-six percent of the technicians and ninety-four percent of the pharmacists gave a positive response. Less than one percent of technicians and three percent of pharmacists gave negative responses.
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Figure 2-18. Technicians’ vs pharmacists’ agreement with the need for a standard operating procedure.

Comments pharmacists

There were a couple of negative comments to this question suggesting that technicians should not be checking prescriptions at all and one pharmacist, in spite of agreeing with the need for an SOP, did not support the introduction of the CT at all.

There were several cautious comments surrounding the limitations of SOPs; that it was not always possible to capture all potential situations with them. However, the most repeated concern was that even with quality SOPS in place there was no way to ensure they would be complied with.

One positive comment was the inclusion of clear training on the scope of practice of a CT, this was seen as one way to ensure that the technicians understood the need to comply with the SOPs.

Q: Should all technicians be registered with the Pharmacy Council? (T25 P30)

Fifty-seven percent of the pharmacists compared to fifty-four percent of the technicians gave a positive response. Twenty-two percent of the technicians gave a negative response compared to nineteen percent of the pharmacists. A quarter of both technicians (25%) and pharmacists (24%) had no strong feelings either way.
Figure 2-19. Technicians’ vs pharmacists’ agreement should all technicians be registered with the Pharmacy Council?

Q: Should only checking technicians be required to be registered with the Pharmacy Council? (T26 P31)

Sixty-three percent of the technicians compared to fifty-four percent of the pharmacists gave a positive response. Twenty-seven percent of pharmacists compared to twenty percent of technicians gave a negative response. Nineteen percent of the pharmacists and sixteen percent of the technicians gave a neutral response.

Figure 2-20. Technicians’ vs pharmacists’ agreement should only checking technicians be required to be registered with the Pharmacy Council?

Technicians’ comments on Registration- both now or as a CT

Although there was no requirement for comment on these two questions many respondents felt the need to express their agreement, disagreement or concerns.

These could be broadly categorised as:

- General agreement with need for registration for all technicians
Agreement that only ACT should be registered

Perception of benefits

Cost

Training

Liability

There was agreement from some respondents that all technicians should be registered, but also specific comments from some respondents that this should only be a requirement for a CT.

There were comments on perceived benefits, both positive and negative. Some respondents could see the advantages of registration in terms of better legal cover and representation and some questioned the need for registration as they could see no real benefit from it.

There were comments about cost. Some respondents questioned the ability of individuals to pay an annual registration fee and raised the question of whether this cost should be met by the employee or the employer. There were others who raised the issue of increased wages to offset the increased responsibility.

Some respondents made a suggestion about the training required to be a CT. They emphasised the need to have had experience as a technician before taking on the extended role of a CT and that the focus of the advanced training must suit the role itself with more responsibility.

Liability was raised as an issue, respondents questioned whether being registered equated to being held liable for errors.

2.5.4.6 Section 6. Pharmacists’ responses to impact on separation of clinical from mechanical tasks

Q22: Pharmacists’ opinion on whether the separation of the clinical check and the mechanical process of dispensing will have an impact on public safety. Yes/No

Sixty-three percent of the pharmacists responded yes and thirty-seven percent responded no.

Q: Pharmacists’ opinions on whether the separation would have a negative or positive impact. (P23)

Fifty-three percent of the pharmacists gave a positive response, thirty-four percent were positive and nearly nineteen percent were very positive. Nine percent felt it would have
a negative impact upon public safety with four percent feeling it would very negatively impact upon public safety. Thirty-four percent were undecided.

![Figure 2-21. Pharmacists’ opinions on what impact the separation of the clinical and mechanical aspects of the dispensary process may have](image)

**Comments - Pharmacists (P23)**

This question obtained one of the largest number of written responses (400), in the form of comments, from the pharmacists. This was over half (56%) of those who returned surveys and 80% of the respondents to this question.

These comments were subjected to thematic analysis, which resulted in the comments being divided into six broad headings.

- **Improvements to clinical outcomes** - most recognised benefit
- **Procedural, how this should/could happen**
- **Impact on the pharmacist**
- **Impact on the public**
- **Safety**
- **Capability of technicians**
- **Current practice here and in the UK**

**Improvements to clinical outcomes for patients.**

The respondents agreed that the greatest benefit to any separation of roles would be improved clinical outcomes for the patients. They also agreed that this would result in better use of pharmacists’ clinical skills and training and less time on perceived inappropriate roles. Some typical comments were:
“pharmacist would spend more time utilising their clinical skills on the script, rather than counting tablets.”

“anybody can count and pour, that is a techs role. The difference a pharmacist makes is the clinical knowledge and the ability to apply that to a specific patient and situation.”

The clinical benefits are this “allows pharmacist time to counsel more”, “better patient relations and compliance” and “medicine and medical condition interactions would be picked up more often”. It was noted that it was possible with more attention given to the clinical check that the pharmacist was more likely to spot/address prescribing problems.

The bonus of this would be that “it would mean all scripts undergo clinical assessment.”

Improved job satisfaction was ‘With roles divided, a checking technician can be devoted to that role and a pharmacist can have more time to interact with patients and prescribers – I foresee greater job satisfaction for both pharmacists and techs.”

**Procedural, how would / could this happen?**

“as long as the systems are well established to minimise possible errors that may occur in between the two processes, an impact on public safety is unlikely to happen.”

The respondents repeatedly stressed the need for processes and procedures to be in place to minimise the possibility of errors and ensure public safety. These included clearly defined roles and responsibilities for both pharmacists and checking technicians, the requirement that a clinical check happen before the dispensing process begins, checking the patient’s history for changes before handing over to the checking technician, utilising a team approach rather than a disjointed process with clear and robust communication procedures, the pharmacist should hand out prescriptions giving an opportunity for discussion with the patient, and lastly these procedures need to be adhered to. There was some suspicion on the part of the respondents that this might not always be the case.

**Impact on the pharmacist**

It was suggested that the requirement for a clinical check of all prescriptions would result in improved clinical knowledge on the part of the pharmacists, but also the possible need for extra training for some individuals.

The biggest impact on the pharmacist was seen as the shift in focus from the mechanical process of dispensing to the clinical process of assessing the appropriateness of
medications. Currently the focus is on the accuracy of the dispensing and not the appropriateness of the medications. The separation in roles would bring the pharmacist’s focus back to the patient and away from the supply role.

“sometimes pharmacists can become robotic and be consumed with the mechanical check and lapse on the clinical check”

“pharmacist is able to focus on clinical – more interactions, less distractions”

However a couple of pharmacists observed that clinical issues can be picked up during the checking process.

**Impact on the public**

The pharmacists expressed mixed opinions on the issue of impact on public safety. Many found it hard to predict as they could see both potential positive and negative issues and others said that they could see the change having very little impact.

**Safety**

The greatest number of comments surrounded the issue of safety, but all with very similar themes. There were both positive and negative comments.

The positive respondents identified the two processes as two separate aspects of a single process and felt that they were already separated to a degree, especially those in the hospital setting. They could see benefits in having two distinct aspects of the process and different staff involved in each aspect.

“Two different sets of eyes would be looking at the script from quite different perspectives and focusing on separate issues so more likely to pick up defects/anomalies

They could also see the benefit of utilising the strengths of the different staff.

“Technicians - focused on the mechanics can prove to be better at picking up issues that a pharmacist might miss due to the pharmacist being more focused on the ‘clinical’ issue. - the combination would prove very good”.

Some positive comments were conditional on quality procedures being in place to ensure errors were avoided. Others remarked that a structured clinical check would benefit the patients but that problems could occur if these were omitted.
Other positive comments surrounded the increased accuracy that would result from good processes and from this procedure resulting in multiple people being involved in the dispensing process.

The pharmacists gave the increased number of individuals involved in the overall dispensing process and the addition of a clinical check on the patient’s medication as positives that would result in an increase in safety by increasing the possibility of identifying potential errors or issues for a patient.

“More 'sets of eyes' on a script, can minimise errors.”

“in many situations there will be more eyes on a dispensing, more chances of picking up problems”

The negative comments surrounded the possibility of harm resulting from the increased breaks in the dispensing process leading to the potential for more errors and as indicated previously there was concern regarding communication throughout the whole process. Poor communication or breakdowns in communication could lead to errors. There were also reservations around the accuracy of those responsible for the mechanical side of the process.

Some of the respondents disagreed that there should be separation as they felt both aspects needed to remain together as they viewed it as a continuous process.

“The checking process is a very inclusive task - we check clinically and mechanically all together at each stage of the process.”

Some saw the separation of the two aspects as a potential for clinical issues to be missed as these might be picked up during the checking process.

“Separating different areas of the dispensing and counselling /clinical checking process could cause issues to be missed leading to a decrease in public safety”

“I feel there is more consistency when a single person is both clinical screen and final check.”

**Capability of the technicians**

Once again there were questions raised with regard to the ability of technicians to perform this role accurately. There was concern about their current level of training not preparing them for this role and that they had no training on the clinical aspects of medication. Pharmacists did not believe that all technicians could take on this role and there were reservations about the type of training that would be needed to up-skill a
current technician to the level of checking and taking responsibility for the mechanical side of the dispensing process.

There were several comments on the difference in the type and style of training that pharmacists receive compared to that of the technicians. This was seen as having a positive impact on the patient. Some of the pharmacists felt the technicians needed an understanding of clinical considerations, drug doses, indications of use and interactions.

Participant said there would need to be a shift in mind-set for the technicians, into looking at a prescription as a larger process and considering the clinical aspects.

There were both negative and positive comments on the issues of accuracy. Some were concerned that the technicians did not take accuracy seriously enough and others were very confident in the technicians’ ability to perform this role with a high level of accuracy.

“Not convinced technicians have full realisation that they must be 100% accurate ALL THE TIME, not 99% etc”

“Technicians are likely to be more accurate as this is their primary function and they are less likely to be interrupted by other issues.”

Current practice here and in the UK

Several respondents drew attention to their own experience with ACTs in the UK and that this role worked very well and the ACTs were very accurate.

It was noted that this separation already exists to a significant degree in the hospital setting in NZ.

The current practice of a NZ pharmacist checking their own work was highlighted as creating a potential for errors and that two sets of eyes would reduce errors.

2.5.5 Comparison of Technician and Pharmacist statistics

$t$-tests

Independent $t$-tests demonstrated that technicians had a more favourable opinion of their abilities than the pharmacists. They were more confident in their ability to take on the role and considerably more confident in their ability to take on the role with no additional training. However they could appreciate the benefit of extra training. The technicians were also more comfortable with checking repeats, compliance packs and an unchanged three-month prescription.
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There was no difference however between the two groups with respect to the limitation of checking the work of others, the importance of a clinical review and the need for standard operating procedures.

There was also no difference in responses between the two groups as to the need for future registration of technicians, either all or just those taking on advanced roles.

**Post hoc power**

Post-hoc power analysis reports power of 0.99 for a medium effect size \((d = 0.5)\) and 0.82 for a small effect \((d = 0.3)\). This confirmed that the sample size was sufficiently large enough to demonstrate a difference between the responses in the different groups.

**Measure of effect size**

*Table 2.10. Comparison between technicians and pharmacists question responses using Cohens D as a measure of effect size.*

<table>
<thead>
<tr>
<th>Tech mean</th>
<th>P’cist mean</th>
<th>Standard deviation</th>
<th>Cohens d</th>
<th>Effect size</th>
<th>Question number</th>
<th>Question title</th>
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<td>Awareness of role</td>
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<td>0.33</td>
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<td>9/10</td>
<td>Knowledge of role</td>
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<td>1.113</td>
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<td>10/11</td>
<td>Some accurate</td>
</tr>
<tr>
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<td>2.56</td>
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<td>1.10</td>
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<td>12/13</td>
<td>Extra training</td>
</tr>
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<td>Competence</td>
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<td>Repeat</td>
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<td>Tray</td>
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<td>Three months</td>
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<td>4.44</td>
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<td>0.0</td>
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<td>20/18</td>
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<td>4.55</td>
<td>4.65</td>
<td>0.844</td>
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<td>21/19</td>
<td>Clinical check</td>
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<td>4.81</td>
<td>4.71</td>
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<td>0.15</td>
<td>small</td>
<td>22/20</td>
<td>sop</td>
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<td>1.47</td>
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<td>3.76</td>
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<td>small</td>
<td>26/31</td>
<td>CT registration only</td>
</tr>
</tbody>
</table>

⇒ \(0.1 = \text{small}, >0.3 = \text{medium}, >0.5 = \text{large} \)

**2.5.6 Comparison of Community and Hospital**

A comparison of question responses from the technicians and the pharmacists in the two main pharmacy settings, community and hospital was undertaken.
Hospital pharmacists had a more favourable view of checking technicians than community pharmacists, more strongly agreeing that some technicians are capable of accurately checking a prescription, being comfortable with a technician checking a prescription following extra training, and that technicians would be competent to fill this role after extra training (Table 2.11). No differences were found for technicians working in the different settings: the respondents held equally strong opinions.

Table 2.11. Comparison between technicians and pharmacists question responses from the two pharmacy settings, community and hospital.

<table>
<thead>
<tr>
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<th>Hospital</th>
<th>t</th>
<th>Effect size (d)</th>
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</thead>
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<td>0</td>
</tr>
<tr>
<td>Pharmacist</td>
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<td>1.1</td>
<td>5.3</td>
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<td><strong>Knowledge of Checking Technician Role?</strong></td>
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<td>-7.2</td>
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<td><strong>Do you agree that some technicians are capable of accurately checking a prescription?</strong></td>
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<td>4.4</td>
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<td>0.1</td>
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<td>Pharmacist</td>
<td>3.9</td>
<td>4.3</td>
<td>-3.7***</td>
<td>0.4</td>
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<td><strong>Would you be comfortable with a technician checking a prescription given their current level of training?</strong></td>
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<tr>
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<td><strong>Would you be comfortable with a technician checking a prescription after extra specific training?</strong></td>
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<td>4.3</td>
<td>-4.2***</td>
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<td><strong>Do you agree that a technician would be competent to perform this role after extra training?</strong></td>
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<td>Mean</td>
<td>SD</td>
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<td>3.4</td>
<td>1.4</td>
<td>4.0</td>
<td>1.2</td>
<td>-3.7</td>
<td>0.5</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>3.5</td>
<td>1.3</td>
<td>4.0</td>
<td>1.1</td>
<td>-4.0</td>
<td>0.2</td>
</tr>
<tr>
<td>Registration for CT only?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Technician</td>
<td>3.9</td>
<td>1.3</td>
<td>3.2</td>
<td>1.7</td>
<td>4.0</td>
<td>0.5</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>3.6</td>
<td>1.4</td>
<td>3.3</td>
<td>1.5</td>
<td>-4.2</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Cohen’s D (d) - 0.3 = small, 0.5 = medium, 0.7 = large
Significance (p): - * = <.05, ** = <.01, *** = <.001

2.5.7 Comparison of Pharmacists who had previously worked with a CT and those who had not.

Total number of pharmacist responses, n=736. Seventeen percent of respondents had previous working experience with a CT.

At the time of completing the survey the majority (60%) of these pharmacists were employed in the hospital setting.

The pharmacists who had previous work experience with the CT role held more favourable opinions of the technician’s ability to take on the CT role and to most of the questions overall.
Table 2-12. Comparison of question responses between pharmacists who had previously worked with a CT and those who had not.

<table>
<thead>
<tr>
<th></th>
<th>Previous experience</th>
<th>No experience</th>
<th>T</th>
<th>Effect size (d)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Do you agree that some technicians are capable of accurately checking a prescription?</td>
<td>Pharmacist 4.4</td>
<td>0.8</td>
<td>3.8</td>
<td>1.1</td>
</tr>
<tr>
<td>Would you be comfortable with a technician checking a prescription given their current level of training?</td>
<td>Pharmacist 2.8</td>
<td>1.3</td>
<td>2.5</td>
<td>1.2</td>
</tr>
<tr>
<td>Would you be comfortable with a technician checking a prescription after extra specific training?</td>
<td>Pharmacist 4.4</td>
<td>0.9</td>
<td>3.8</td>
<td>1.1</td>
</tr>
<tr>
<td>Do you agree that a technician would be competent to perform this role after extra training?</td>
<td>Pharmacist 4.4</td>
<td>0.9</td>
<td>3.8</td>
<td>1.2</td>
</tr>
<tr>
<td>Would you be comfortable with a technician checking a repeat where the initial dispensing was checked by a pharmacist?</td>
<td>Pharmacist 4.0</td>
<td>1.0</td>
<td>3.8</td>
<td>1.1</td>
</tr>
<tr>
<td>Would you be comfortable with a technician checking a new three-month prescription for regular ongoing medication with no changes?</td>
<td>Pharmacist 3.8</td>
<td>1.1</td>
<td>3.3</td>
<td>1.2</td>
</tr>
<tr>
<td>Do you agree that a CT would only be allowed to check work dispensed by another staff member?</td>
<td>Pharmacist 4.7</td>
<td>0.7</td>
<td>4.4</td>
<td>1.0</td>
</tr>
<tr>
<td>Do you agree that all prescriptions should have a clinical review by a pharmacist?</td>
<td>Pharmacist 4.8</td>
<td>0.7</td>
<td>4.6</td>
<td>0.8</td>
</tr>
<tr>
<td>Do you agree there should be a SOP that clearly defines when a CT can check a prescription?</td>
<td>Pharmacist 4.8</td>
<td>0.7</td>
<td>4.7</td>
<td>0.8</td>
</tr>
<tr>
<td>Would the separation of the clinical from the mechanical side of dispensing have an impact on public safety?</td>
<td>Pharmacist 3.9</td>
<td>1.0</td>
<td>3.5</td>
<td>1.0</td>
</tr>
</tbody>
</table>
2.6 Discussion

This study collected and compared technicians’ and pharmacists’ opinions about the possible introduction of the advanced technician role, the checking technician. There is value in directly comparing the responses of these two groups. Any change in the roles and responsibilities within the pharmacy workplace will impact on both these groups and it is appropriate to assess the beliefs and opinions of both. There is some research on the views of pharmacists but there is far less information on the opinions of technicians with regard to changing roles.

There are some limitations to this study. Firstly there is no nationwide list of pharmacy technicians as technicians are not required to belong to any national body or organisation. This meant that the surveys for the technicians had to be sent to the community and hospital pharmacies rather than individual technicians. It is therefore reasonable to assume that the surveys did not reach all the technicians currently employed in NZ pharmacies. So although it is possible to say that a sizable number of individual technicians want to take on the advanced role of a CT it is not possible to show that a majority of technicians want to increase their level of responsibility as the total number of technicians employed in NZ pharmacies is unknown.

Similarly, pharmacists in NZ have to ‘opt-in’ to be included in the list of pharmacists prepared to be contacted for research purposes. It is possible that only those who are motivated and interested may choose to be involved in research. Therefore, it is not possible to say that all NZ pharmacists would agree with the findings of this study as only those who made the decision to be involved in research were available to take part. It is possible that this result may reflect a more positive attitude toward this change than may be the case. Those who are included in the contact list are about half of the registered pharmacists.

Conversely, one of the strengths of this study is the number of respondents. The number of respondents in this study is larger than required to ensure that the responses are representative of the wider community. The post-hoc power calculation confirmed that the study was well powered to detect group differences. Also, the demographics of the respondents corresponded to workforce data collected by the NZ Pharmacy Council. This provides confidence that the results had obtained a representative sample from both workplace settings. Also, the presence of the consistent number of negative responses allows for a degree of confidence that a balance of possible opinions has been obtained.
This study showed considerable support for the introduction of the CT role from both technician and pharmacist respondents, although the pharmacists were less confident and had more reservations. Throughout this study there was a very small but consistent number opposed to the concept in both the pharmacist and technician groups.

The results clearly demonstrated that if the opportunity to take on a CT role was made available to NZ technicians, there would not be a universal uptake of the opportunity, but a significant number would be interested in taking on both the added responsibility and any necessary training required.

The introduction of this new role would require a change in how workload and individual roles are distributed within a dispensary. There would be a separation of the mechanical from the clinical part of the dispensing process. This would see a clinical assessment of a prescription take place prior to dispensing, and to accomplish this would result in a rearrangement or redesign in the workflow of the dispensary.

Better outcomes for the patients were seen as the greatest benefit from this change. This included less waiting time in the pharmacy, improved workflow but mainly improved clinical outcomes as a result of the pharmacist being able to spend more time with the patients and on inter-professional relationships that would improve patient care.

This increased time with the patients created by the proposed separation of tasks and re-distribution of roles would lead to an improvement in clinical outcomes. Being able to spend more time interacting with patients was seen to lead to better patient relationships, and it was suggested that this would facilitate the identification of possible drug related problems and adherence issues.

The respondents could clearly see the benefits to the patients of this separation of the clinical from the mechanical side of the dispensing process, although the pharmacists demonstrated a level of reluctance to hand over any part of the process that had previously been their responsibility. Much of their reticence was reportedly due to concerns surrounding the possibility of increased errors. They were not comfortable handing over the mechanical part of their role unless they could be reassured that this would not have a negative impact on patient safety and that they did not want be held responsible for the errors of others. They believed that this was possible with clear procedures. This was summed up by one respondent, "as long as the systems are well established to minimise possible errors that may occur between the two processes, an impact on public safety is unlikely to happen."
Many respondents, while appreciative of the benefits of the proposed separation of roles, needed clarity on how this concept would actually happen in the workplace. Over the years, significant amounts of time and effort have been spent establishing the current processes and procedures, with the aim of ensuring that dispensing errors are minimised. Although some information on the proposed new roles was provided in the study material the respondents requested more information so they could be further reassured about the safety of the proposal. They wanted the added reassurance of robust procedures to ensure public safety. They made a considerable number of suggestions to this end.

One of those recommended processes and procedures was the need to have clearly defined roles and liabilities for both the pharmacists and checking technicians and it needed to be clear that the liability should lie with the checker. The clear role definition was to ensure that no one worked outside their defined roles or scope of practice and remove an identified area of potential friction in the pharmacy. There was some suspicion on the part of the respondents that processes and procedures might not be adhered to, as has been reported in the UK. It is important to ensure public safety and that procedures and processes exist and are adhered to.

Currently in the NZ community pharmacy setting pharmacists can focus more on the accuracy of the dispensing and subsidy requirements than the appropriateness of the medication. Many of the pharmacists saw their time and training better spent providing medication focused services “rather than counting tablets” In 2009 the US pharmacists reported spending 55% of their work day performing tasks related to dispensing while only spending 16% of their time in direct patient care services and in the same year in Ireland, McCaan et al showed that pharmacists spend nearly a quarter (23%) of their time with product assembly and labelling. Although, even if the time spent interacting with patients increased ‘this has not always been mirrored by a decline in time spent on manipulative dispensing’, as demonstrated by Savage in the UK. The reallocation of the mechanical side of dispensing would make significant amounts of time available for a more clinical focused role for the pharmacist.

The technicians could also appreciate the benefit to the patients from this change with decreased waiting times and increased consultation times and generally easier access to the pharmacists and their knowledge.

As with any proposed change, the change needs to be safe and not decrease the current standard of care but rather improve it. One of the concerns expressed was the ability of
the technicians to be accurate. There is a body of evidence that advanced roles for technicians do not compromise patient safety and technicians can be as accurate as pharmacists in performing and checking mechanical tasks. As early as 1978 Grogan et al. were demonstrating the accuracy of technicians with mechanical processes. In some of the studies the technicians performed better than the pharmacists but it has been suggested that in the studies where pharmacists did not do as well as the technicians these results may be attributed to the technicians having fewer distractions, a sentiment echoed by several of our respondents. If fewer distractions mean reduced errors, this would be another argument for the separation of roles having a positive impact on safety.

Given their current level of training and experience, many technicians believed that they are already capable of performing the mechanical side of the dispensing process with a high degree of accuracy.

It is possible that the technicians perceive dispensing a prescription as a purely mechanical process. They are aware that the pharmacist is legally responsible for all manufacturing and dispensing that occurs in the pharmacy, as this is covered in their training. But if they are unaware of or perceive that very little or no clinical input has gone into the pharmacists’ assessment of a prescription, this may reinforce the perception of dispensing as a purely mechanical process which they are more than capable of performing.

One of the areas of concern raised by the pharmacists was the lack of clinical training on the part of the technicians, but the clinical assessment of the prescription is not part of the advanced technicians’ role in the UK, or in the model proposed in NZ. Their role is to check that the product dispensed and labelled matches the prescription or medication order, not whether the medication is appropriate for the patient. This is the role and responsibility of the pharmacist in this model.

Concerns about individual ability were expressed by the pharmacists. Some pharmacists doubted the ability of any technicians they had worked with to perform at an advanced level, whereas others would unhesitatingly recommend individual staff for this role. There was far greater confidence from the pharmacists when they had worked with a particular technician and had a good working relationship with that individual as was reported by Zargarani in 2007. This confidence appears to be based on trust in that individual’s ability to perform a specific role rather than the training they have
undertaken. This is recognition of the ability and skills of an individual, not a qualification or a training process.

Even if the CTs had specialised training there was recognition that this kind of advanced role would not be suitable for all technicians. Several of the overseas examples, although not ruling out any technician applying for an advanced role, documented individual technicians being personally selected from currently employed staff. These individuals were seen to have an appropriate experience level and in some instances the required personal traits that would match the new role.70

Another important consideration is the current training model. Some of the pharmacists commented that in spite of the abilities of some technicians, the current level of training is not designed to produce checking technicians and therefore their current training would be inappropriate to prepare them for this role. As this new role is similar to that of the UK ACT, it would be appropriate to introduce into NZ a similar training programme as that currently used in the UK.91 This adapted model and a careful selection process as well as a strict assessment criteria would ensure that only competent individuals completed the training and went on to perform this role. Experience or lack of experience on the part of individual technicians was noted as relevant here too, with the suggestion that individuals should have several years of workplace experience after completing the initial technicians’ training before taking on an advanced role. Many of the overseas advanced roles have involved additional training specific to the new roles being taken on. This may involve learning additional material which was the case for a technician who took on an advanced oncology role (he completed oncology training modules in this area designed for pharmacists).70 In the example of technicians obtaining medication histories the focus was more on learning the procedural aspects of the new process when using very experienced technicians and expanding the training to include shadowing a previously trained technician. Also included were privacy and legal considerations when less experienced individuals were added to the programme.53

The technicians raised the question of cost, as they could see training costs potentially becoming a barrier for those wishing to take on this role. The technicians appreciated that this advanced role would mean taking on greater responsibility and felt that this should come with increased remuneration, but they doubted that this would happen. Cost may be a limitation to the uptake of this new role. If the technicians were not going to be paid more to recoup training costs, some might be unable to finance the training,
and this advanced role might become limited to work settings where employers met these training costs. This may also be extended to covering any future registration costs.

There were some differences between pharmacists working in hospital and community pharmacy settings, with hospital pharmacists having a somewhat more favourable attitude toward checking technicians. This could be because of the more structured hospital pharmacy setup. Overall, however, staff from both environments agreed with the proposal to introduce this new role.

International studies have also detailed the new non-traditional roles being taken up by technicians. For example, in the US the introduction of Tech-check-tech allowed technicians to take over the management of unit dose dispensing systems, in the UK the introduction of the ACT has met with significant uptake from staff, and Canada has seen expansion into clinical areas which require both training and adherence to protocols. These advanced roles lead to increased job satisfaction which could assist in achieving a low turn-over of staff. The level of uptake of these new non-traditional roles supports the concept that technicians want to expand their roles. NZ studies have shown that technicians are willing to take on a more advanced role and any additional training required if the opportunity arose.

It is important to note that while there are many technicians who were interested in advanced roles, there are still those that prefer the current situation, as found in Braund et al.

**Considerations for implementation**

One of the benefits of this proposed change would be that all prescriptions would undergo a clinical assessment, which is currently not compulsory. This assessment would increase the chances of identifying medication or prescribing problems. However, even with this model it may not be possible to perform a comprehensive clinical review of an individual patient’s medications. With the exception of Christchurch, NZ community pharmacies do not have access to a shared clinical record for individual patients which means that they lack access to diagnostic and laboratory information. This may be complicated by the fact that some patients utilise more than one pharmacy for their medications. The lack of a shared record may mean that an individual pharmacy does not have access to the data held in a different pharmacy therefore the patient details they hold may be incomplete.
However, even in areas without access to these patient details it should still be possible to identify changes in dose, medication brand or addition of new medications or removal of existing or previous medications. It should also be possible to identify compliance or adherence issues from the pharmacy dispensing data. If a patient is not collecting prescriptions regularly it may be an indication of a problem with a particular medication or a combination of medications.

An appreciation of the benefit of more attention to the contents of a prescription and time spent with the patient identifying potential issues were expressed by staff in both workplace settings. This increased time, if used well, should result in improved safety for the public by improving relationships with patients and the identification of possible medication related problems.

Pharmacists have identified lack of time as one of the main reasons for non-uptake of new roles. This advanced role for the technicians, with its associated reallocation of tasks, would hopefully provide the pharmacists with more time to take on a more clinically focused role. NZ professional pharmacy bodies have been advocating an increased clinical role for some time and this rather than practising pharmacists has been the main driver for change. 43

This study identified some of the elements outlined in organisational change described in the literature, as factors to consider in implementing this change. The respondents highlighted three elements recognised as facilitators in organisational change frameworks outlined by Roberts 2008. Remuneration, manpower or staff and communication and teamwork were themes they identified.93

Remuneration for community pharmacies in NZ has seen a shift to a more clinically focused model, allowing pharmacists to be reimbursed for their clinical input into patient care.27

Manpower and staff elements encompass the utilisation of enough appropriately trained staff. NZ currently has an accredited training programme in place for anyone wanting to work as a pharmacy technician. This has been in place for decades and NZ law limits who can work in a dispensary and assist the pharmacist. Only qualified technicians, technicians in training, intern pharmacists and pharmacy students can work under the direct supervision of a pharmacist.46 Having a pre-existing training programme in place that consists of a set of prescribed standards will make expansion of the technicians’
role easier with a solid foundation to build on and a pool of trained, experienced and qualified technicians to draw from.

Effective communication and working as a team with clearly defined roles and responsibilities was described as essential to minimise errors. This would only be part of the clear strategies needed to ensure that there is no compromise to patient safety, thereby overcoming the element of reticence demonstrated by the pharmacists.

Not all technicians may want to take on this role and not all pharmacists may want to change their current practice. A small number of both pharmacists and technicians did not feel that this was an appropriate role for technicians and that the checking of prescriptions should be the responsibility of the pharmacist. These individuals are unlikely to change their mind-set and it would be unsafe to attempt to force this model upon them.

This model will not work in every workplace, especially in smaller pharmacies with only one pharmacist and one technician, and a different model would be needed for these situations. The proposed model relies on the presence of a non-pharmacist dispensary staff member to prepare the prescriptions for checking. There would be no point in having a CT checking the work of a pharmacist, where a pharmacist was the only other staff member. This could be done by any technician as a second set of eyes and the pharmacist would still be responsible for the accuracy of the dispensing, making a CT redundant.

There are benefits to introducing registration for technicians, although this was not met with universal approval in this study. Registration provides individuals with educational support and the possibility of contact with others performing the same role. But one of the most important benefits is the ability to demonstrate that they are taking their role seriously, that they are taking responsibility and are prepared to be answerable for any decisions or mistakes that they make. This would help cement the image of a professional approach on the part of the technicians to their role by others, especially pharmacists.

**Conclusion**

This study directly compares the attitudes of both pharmacists and technicians to the possible introduction of an advanced checking technician role to the NZ pharmacy setting. This study demonstrated that both technicians and pharmacists positively support this proposal. The technicians were more supportive of the concept and their
ability to perform this role, with the pharmacists being more cautious and with more reservations. The pharmacists had significant reservations about the appropriateness of some technicians taking on this role. Both groups supported the introduction of specific training for this advanced role and both were confident that specific training could produce competent checking technicians although there was a small number of negative responses.

This new role’s resulting redistribution of workload and the corresponding separation of the mechanical side of the dispensing process from the clinical assessment of the appropriateness of a prescription were seen as resulting in an increased emphasis on the clinical component of the dispensing process. This could lead to more time dedicated to a clinical assessment of prescriptions which the pharmacist felt would improve clinical outcomes for the patients. Pharmacists demonstrated a level of reluctance to hand over any part of the process that had previously been their responsibility. This reluctance could be overcome by clear and stringent guidelines and standard operating procedures, stringent training requirements for the technicians, alongside a change in the work dynamic of a pharmacy.
Chapter 3: Investigation into whether pharmacist and technician roles changed in response to a specific crisis
3.1. Introduction

During the course of the fieldwork for this thesis, major earthquakes occurred in the city of Christchurch. This provided an opportunity to explore whether and how roles of pharmacy staff were re-negotiated in an emergency situation. The surveys presented in the previous chapters show that many pharmacy staff (both pharmacists and technicians) supported change in technicians' roles. Therefore, this study aimed to investigate if, as we surmised, that these changes may occur naturally in the aftermath of a natural disaster as staff endeavoured to provide the care that their patients required in spite of significant upheaval and disruption, and that this might allow us to further explore the facilitators and barriers to such change. This chapter explores if the staff worked at the top of their scope of practice and identified if there were some tasks that the pharmacists were prepared to relinquish and what they were, based on interviews with pharmacy staff who were working in Christchurch during the earthquakes in 2010 and 2011.

3.2 Background

Christchurch is located on the east coast of the South Island of New Zealand (NZ). It is the second largest city, by area, in NZ and is the largest population centre in the South Island. On the 4th of September 2010 at 4.35am an earthquake of magnitude 7.1 rocked the Christchurch area. It was centred 40km west of Christchurch at a depth of 10km. This quake resulted in some structural damage to buildings and infrastructure but no loss of life. On the 22nd of February 2011 at 12.51pm a smaller quake measuring 6.3 caused major structural damage throughout Christchurch, particularly in the central city, and resulted in 185 deaths. This second quake was centred less than 10km from the Central Business District (CBD), but at a shallower depth of 5km, resulting in significantly greater damage.
The second earthquake brought down many buildings, some of which were already damaged by the earlier September quake and its subsequent after-shocks but also many other buildings that had been previously unaffected. The CBD was very hard hit as were many of the eastern suburbs. Liquefaction, the liquification of light sandy soils by the pressure and repeated shaking from the earthquakes, created a lot of damage as structures were swallowed or pushed up, roads were seriously damaged making them un-driveable, water and sewage pipes were broken, and power and cell phone coverage were disrupted.

The initial February earthquake was a single quake, but followed by thousands of aftershocks that continued for years after the initial quake. Almost two hundred of these aftershocks were nearly as strong as the initial quake itself registering over 5.0 and 6.0 on the Richter scale. These recurrent aftershocks caused constant disruption with schools and businesses having to close each time a strong after-shock occurred.
Images of earthquake damage from the Christchurch area, February 2011.

Figure 3-2: The Christchurch Cathedral tower damaged during the February 22nd 2011 earthquake. Source: nessanook.com

Figure 3-3: Liquefaction of the roads resulted in vehicles being swallowed by the liquefied ground. Source: stuff.co.nz.
The impact of the earthquake varied across the city. Some pharmacies’ buildings were unaffected but had stock shaken off shelves, and other buildings were completely destroyed. Areas in the southern and western side of the city were less affected in the February quake than the September one. The February quake caused a different pattern of destruction.

After the February quake, a number of pharmacies were immediately closed once staff and customers were moved outside to safety. Some of these pharmacy buildings appeared to be
sound but later assessment deemed them unsafe and the buildings were later demolished or significant repairs required.

The pharmacies in the CBD were inaccessible due to a large area being designated as a ‘red zone’, i.e. exclusion area. Access to this area was denied even if the building was still useable. All members of the public were excluded from the ‘red zone’ immediately after the initial quake in February 2011, and police and soldiers prevented access to the area. The boundary of the zone changed over time and access to the area was restricted while rubble was removed and damaged buildings were demolished. The total area that was inaccessible reduced over time but the final barriers were not removed until 13th June 2013, 859 days later.95

Not all areas suffered the level of damage that occurred in the CBD. In other areas, some pharmacies continued in the same premises but others moved to new buildings, some temporarily and others permanently. In areas of minimal damage some pharmacies continued to operate as normally as possible and to open as usual. They continued to work and endeavoured to provide care for their own patients and in some cases many additional patients from other areas. This was due to the redistribution of the city population. Many homes were destroyed or left uninhabitable effectively leaving people homeless. In the days immediately after the February quake thousands of people left the city to stay with family or friends, but even larger numbers of people moved within the city from one area to another. This resulted in significant shifts in pharmacy use, some busy pharmacies became quiet and quiet pharmacies became busy as customers who had moved to new areas went to the nearest available pharmacy to their new residence.

The disruption caused by the initial quake and the continuing after-shocks made working very difficult. There was considerable pressure on all staff endeavouring to perform the usual tasks with the ongoing challenges caused by disruption to amenities. Workloads increased due to the relocation of the population and the reduced number of pharmacies available. There were difficulties with supplies of medications and in many cases little or no information with regard to a patients’ medication history. People had fled their homes without medications and needed to replace them, but at times there was little or no information for pharmacy staff to work with to ensure a continued supply of medication. This increased workload was further exacerbated by staffing problems. Many staff made huge efforts to get to work but it was not always possible to have all staff on site at all times.

Workloads also increased due to changes in bureaucratic requirements. To ensure continued supply of regular medication, pharmacists are allowed by law to provide prescription medications without a prescription (an emergency supply), but this is normally limited by legislation to a maximum of three day’s supply in total. This allowed pharmacists to provide
small amounts of medication to patients who had left home without their regular medicines, but was not very convenient for patients. In response, many changes were made to the regulations surrounding emergency supplies and many other pharmacy rules. These changes also created additional work for pharmacy staff.

The uncertainty of the situation and the increased workload resulted in the reallocation of tasks and responsibilities within pharmacies. Identifying how this was achieved and who took on which roles was the reason for undertaking this study.
3.3 Methodology

3.3.1 Qualitative methodology

This section of the thesis utilised qualitative research methods.

“The most basic way of characterising qualitative studies is to describe their aims as seeking answers to questions about the ‘what’, ‘how’ and ‘why’ of a phenomenon, rather than questions about ‘how many’ or ‘how much’.”\textsuperscript{96}

Characteristics of Qualitative research.

- Select respondents who are knowledgeable about the topic
- Select a natural setting, conduct the data collection in the setting where the event occurred rather than a contrived environment, e.g. a lab
- The researcher is a key instrument. Qualitative researchers collect the data themselves rather than rely on questionnaires or other instruments.

This type of research puts more focus on the process utilised to collect the data. There is a lot of attention paid to how the information is obtained, how the participants are selected and how the analysis is performed.

Use of Semi-structured interviews

Semi-structured interviews were utilised for this section of the thesis.

This type of interview yields direct quotations from people about their experiences, opinions, feelings, and knowledge. Data, once collected via interviews is recorded and transcribed for analysis. The interview is conducted by the researcher with a set of themes or questions to be covered. This is utilised as a guide for the direction the interview takes or as prompts for new topics if an interview stalls. (A copy of the guide used for these interviews is detailed in the later methods section).

Strengths and weaknesses of semi-structured interviews

The strengths of semi-structured interviews are:

- Depth of information
- Respondents can influence the topic, so unexpected issues/topic emerge
- Researchers can probe to understand perspectives and experience
- Topic guide ensures that a core list of questions is asked in each interview but because the order of questions is not fixed, flow and sharing views are more natural
The weaknesses of semi-structured interviews are:

- Trained interviewers are needed to probe without being directive or judgemental
- Analysis of findings is difficult – must be done by the people who did the interviews
- Researcher has to avoid bias in analysis by reflecting and being aware of their own position and how this might affect the interviews and analysis
- Researcher needs to know something of the culture to capture the interviewees’ real meaning
- Analysis is time consuming
- Difficult to generalise findings

Limiting the number of interviews

It is recommended to limit the number of interviews, as semi-structured interviews are quite time-consuming to conduct and analyse. The aim is not to get a statistically representative sample of the various categories of informants, but to gather a substantial body of information from them.

Field notes

These are additional notes taken at the time of the interviews, but they are more than just additional notes made by the researcher. Field notes often include comments and observations from the perspective of the researcher. They can detail how the researcher experienced the interview process, how they felt about some of the participants’ responses and may include initial interpretations of responses. These notes can include photos or any other materials collected over the time of the study. The notes may include observations on the body language of the participants which does not come across in audio recordings or written transcripts. These impressions of the participants assist in providing depth to the details collected. They also provide a greater degree of context.

Impact of the researcher

The researcher cannot be ignored in the context of qualitative methodology. The background, beliefs and even appearance of the researcher can influence both the questions asked and the answers given. (see later)
Chapter Three: Investigation if pharmacy roles changed in response to a specific crisis

3.4 Methods

3.4.1 Ethics
Ethics approval was applied for and given, by the University of Otago Human Ethics Committee, No. 13/280. The Ngai Tahu Research Consultation Committee was consulted as part of the university requirements prior to commencing the project.

3.4.2 Original Study Design.
It was decided to sample three pharmacies from each of three different zones, from the areas of minimal damage (Level 1), moderate damage (Level 2) and severe damage (Level 3). It was decided to make up a list including four pharmacies from each of these three different levels as this would allow for one to be excluded if the criteria were not met.

Inclusion criteria
The pharmacy needed to have at least one technician on the staff and the technician or technicians needed to have been working there at the time of the February earthquake.

Number of participants
The number of participants to be recruited was set at more than twenty but no more than thirty, to gather a rich data set, and to allow for time to analyse the interviews later.

Number of visits to Christchurch
The researcher was based in Dunedin so the interviews required her to travel to Christchurch. It was decided to make several visits to Christchurch to provide as much flexibility for the interviews as possible, and also to manage the effect of the potentially emotionally charged interviews on the researcher.

Managing the stress
Interviewing individuals about a time of stress and fear is known to have an impact on those participating in the interviews as well as those conducting the interviews. Pharmacists and their staff are able to access counselling services via the Pharmacy Defence Association (PDA). PDA provided access to counselling services, support and advice for pharmacists and pharmacy staff in response to stressful situations. Therefore, the PDA was contacted to ensure that any participant who wanted to take up the option of having a counsellor to speak to would only need to make contact with the PDA to request this.
During this conversation to organise the potential needs of the participants, PDA agreed to fund counselling sessions for the researcher as well, as I am also a pharmacist. As the researcher is a student at the University of Otago it was also possible to utilise the counselling services provided by Otago Student Health Services at the University. It was decided to utilise a counsellor who worked for the Student Health Service and also in a private capacity as this overlap of roles and experience made him well placed to appreciate the impact of the stress level of others and also the pressures of research. Debrief sessions for the researcher were conducted after each visit to Christchurch.

3.4.3 Background search

A search of available internet material and grey literature (newspaper articles and social media) was conducted in an effort to establish the degree of damage to different areas of Christchurch. It was difficult to establish precise assessments of the degrees of damage as even within individual suburbs there were variations in the level of damage, but it was possible to generate a general picture.

A search of articles published in the few months after the February earthquake made it possible to further identify a number of pharmacies that were damaged or attempting to continue working through trying circumstances.

As the boundaries between the three different areas were not well defined it was decided to set up an initial list of potential pharmacies and devise a series of visits to Christchurch, spreading the identified pharmacies over the different visits. Three or four pharmacies were included in each visit.

3.4.4 Initial list

From the background search an initial list was generated and these locations collated and compared to the area’s level of damage. The initial list consisted of twelve potential pharmacies to approach, four from each of the three target groups.

Utilising a snowballing technique an additional pharmacy was added to the initial list.

Exclusion criteria

Pharmacies who had participated in the LEAN study were excluded. This was a project funded by Health Workforce New Zealand investigating efficiency gains within a pharmacy by improved workflow design and task redistribution. This was independent from this research team, however it had looked at redistributing workloads in the dispensary and it was decided that the focus on two sets of changes might confuse the participants in our study.
3.4.5 Setting up interviews

From the constructed list of twelve potential pharmacy sites phone calls were made from Dunedin to a selection of the pharmacies on the list requesting the opportunity to discuss the study.

Appointment times were made with a small number of pharmacies (four to start with) and after each of these introductory meetings, further times were scheduled to conduct the in-depth interviews with both pharmacists and technicians. A face to face introductory meeting was scheduled to give the researcher the best chance of recruiting as many participants as possible, to address any particular issues with the nature of the material to be discussed and the stressful nature of recalling the time around the earthquake.

This process was repeated over the next few months (from the beginning of March 2014), resulting in five visits to Christchurch, the first to set up times for the first round of appointments and the remainder to conduct the arranged appointments and set up further appointments for the upcoming visit. The initial list of potential participants was expanded to include pharmacies recommended by the staff from those pharmacies who had already participated in the study.

Interview times

To minimise disruption to the workplace, interviews were expected to happen in the evenings and over the weekends. Interviews were expected to last up to approximately one hour. Participants were recruited during one visit and interview times arranged for the following visit.

All participants were given a copy of the written information about the study and consent forms were completed prior to conducting the interview.

Table 3-1. Details of interviews arranged and conducted over the five visits to Christchurch.

<table>
<thead>
<tr>
<th>Number of visit</th>
<th>Pharmacies contacted (n=)</th>
<th>Interviews arranged for next visit (n=)</th>
<th>Interviews conducted (n=)</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>4</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>Two</td>
<td>3</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td>Three</td>
<td>3</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Four</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Five</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>
3.4.6 Interview guide

Table 3-2. Interview guide for technicians, Version One.

<table>
<thead>
<tr>
<th>Establish demographic details</th>
<th>Gender</th>
<th>Age</th>
<th>Training qualifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where were you working at the time of the February quake?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is this where you are still working?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What were your responsibilities in the pharmacy?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did your job/responsibilities change after the quake?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did you do anything extra?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did jobs/tasks have to be redistributed?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How did you feel about the changes?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are they still in place?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

After interviews with technicians during the second visit it became obvious that in many cases all tasks were being shared and this was not obtaining much detail. ‘You just do what needed to be done.’ Also, it became obvious that the pharmacist was in constant demand. So a small number of questions were reworded.

Table 3-3. Interview guide for technicians. Version Two.

<table>
<thead>
<tr>
<th>Establish demographic details</th>
<th>Gender</th>
<th>Age</th>
<th>Training qualifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where were you working at the time of the February quake?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is this where you are still working?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What were your responsibilities in the pharmacy?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did you do things differently to ease the pressure off the pharmacist?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Take over anything?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Were there times when you had to do things a little differently to cover him or her?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How did you feel about the changes?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Are they still in place?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This version was extended to include additional questions about changes in workloads.

Table 3-4. Interview guide for technicians. Version Three.

<table>
<thead>
<tr>
<th>Establish demographic details</th>
<th>Gender</th>
<th>Age</th>
<th>Training qualifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Where were you working at the time of the February quake?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Is this where you are still working?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>What were your responsibilities in the pharmacy?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did you do things differently to ease the pressure off the pharmacist?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Take over anything?
Were there times when you had to do things a little differently to cover him or her?
Did your workload increase as you were open?
Did you need more staff? Did you get them?
Did the increase in workload change who did what?
Was there a readjustment of roles?

<table>
<thead>
<tr>
<th>Table 3-5. Interview guide for pharmacists.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Establish demographic details.</strong></td>
</tr>
<tr>
<td><strong>Questions</strong></td>
</tr>
<tr>
<td>Where were you working at the time of the February quake?</td>
</tr>
<tr>
<td>Is this where you are still working?</td>
</tr>
<tr>
<td>Can you tell me what happened at your work?</td>
</tr>
<tr>
<td>Did the building get damaged, lose power, have to close, relocate?</td>
</tr>
<tr>
<td>What staff were there at the time?</td>
</tr>
<tr>
<td>Did staff change?</td>
</tr>
<tr>
<td>Did you have to reassign tasks and responsibilities?</td>
</tr>
<tr>
<td>Did you find there were new tasks to be undertaken?</td>
</tr>
</tbody>
</table>

3.5 Analysis

The interviews were transcribed verbatim and loaded into the NVIVO analysis programme.

Thematic analysis was performed using the NVIVO analysis package. An initial map of themes was created and revised as themes were grouped into headings and sub headings.

NB. The methodology and theory of thematic analysis is covered in detail in the methods of the survey chapter.

One difference between the survey study and this study is that a computer programme was utilised to perform and record the thematic analysis for this study. The survey study involved the analysis of written text and this section involved thematic analysis of interviews conducted by the researcher. During the survey section the researcher is removed from the collection process. The data collected during interviews is richer and more detailed therefore a different approach to analysis was needed. This results in a wide variety of themes requiring grouping (clustering) of themes.

The advantage of utilising a computer package is the ability to easily manage a large amount of material. The computer package makes changing headings or sub-headings, rearranging
and reorganising the identified quotes and other material a simple process and a trackable one. It is possible to view progress as the analysis proceeds.

3.6 Results

Twelve pharmacies were approached and interviews were set up with staff from nine of these. Two of the pharmacies did not meet the criteria as one did not employ a technician at the time and in the other pharmacy the technician was not a technician at the time of the quake. With the last pharmacy there were problems arranging an interview.

Although staff were recruited from nine pharmacies, due to staff moving workplaces after the quakes there were fourteen pharmacies represented in the final interviews.

Thirty-four staff were approached to take part in the interviews, thirteen pharmacists and twenty-one technicians.

<table>
<thead>
<tr>
<th></th>
<th>Approached (n=)</th>
<th>Interviewed (n=)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pharmacists</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>Technicians</td>
<td>21</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>21</td>
</tr>
</tbody>
</table>

\*  - two pharmacists and four technicians did not meet the criteria.
\* - five technicians opted not to be interviewed
\# - two pharmacists were not interviewed due to problems arranging a suitable time

All of the pharmacists who were approached to be part of the study agreed to participate. Two pharmacists did not fit the criteria; one as they were not working in Christchurch at the time of the February quake and one was working overseas. Two pharmacists, from the same pharmacy, who did agree to participate were not interviewed due to difficulty in co-ordinating researcher visits with availability. They both agreed to participate but one was going overseas for several weeks therefore the interview date was left until he had returned. Two attempts were made to set up later appointments but each time these appointments were cancelled and rescheduled. A phone interview was considered but given the stress level of this site it was decided against.

The interviewer had a short discussion with one of the pharmacists at each pharmacy at the initial time of contact. This was a pharmacy where the three (two full-time and one part-time) technicians who were employed there declined to be part of the study. The pharmacy building suffered only minor damage as a result of the quake but the surrounding area was extensively damaged. The technicians had lost their homes and many other homes around them had been
destroyed and although they wanted to be helpful they felt any discussion about the quake would be too emotional and stressful. “They didn’t want to re-live the experience as it was still too fresh and painful” (from field notes). Both pharmacists had tried to encourage them to participate but were unsuccessful.

There had been significant impact on this pharmacy business and field notes taken after the first conversation recorded being told that the pharmacy had experienced a significant decrease in business and was now down to two partners from three due to this and the resulting inability to sustain three partners. “The area around the pharmacy was seriously damaged and many homes were destroyed and many of the local people and families had left the area. This had had a serious impact on the pharmacy business, they had lost a lot of customers and business.” (quote from field notes taken at the time)

The two technicians, from two other pharmacies, who did not participate in an interview but pulled out before-hand had slightly different stories. The first one I had spoken to in the pharmacy and invited to participate in the study and she had agreed, an appointment time was set for the full-length interview but she contacted the University just before I was returning to Christchurch to conduct the interviews to withdraw from the project.

When I had approached the other technician to ask her to participate she had been quite happy to be interviewed. However while I was still in her pharmacy, the technician came over to ask if she could drop out. This was only about 15 minutes later and she had been thinking about the quake and what had happened and had found herself getting very anxious and shaking thinking about it.

Three technicians from one pharmacy declined to participate when first approached (see above) and one technician said she would consider it but later declined.

Four technicians did not meet the criteria, two who were overseas at the time of the quakes, and two who had only recently completed their training so were not technicians at the required time.

3.6.1 Final number of interviews
As a result twenty-one interviews were conducted, with seven pharmacists and fourteen technicians.
### 3.6.2 Individual participant demographics

**Table 3-7. Demographic details of individual staff interviewed.**

<table>
<thead>
<tr>
<th>Interview number</th>
<th>Gender</th>
<th>Age range</th>
<th>Owner or employee</th>
<th>Pharmacy Type</th>
<th>Changed pharmacy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pharmacists</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>Male</td>
<td>50-59</td>
<td>Owner</td>
<td>Community</td>
<td>no</td>
</tr>
<tr>
<td>18</td>
<td>Female</td>
<td>50-59</td>
<td>Owner</td>
<td>Community</td>
<td>no</td>
</tr>
<tr>
<td>17</td>
<td>Male</td>
<td>50-59</td>
<td>Owner</td>
<td>Community</td>
<td>no</td>
</tr>
<tr>
<td>5</td>
<td>Female</td>
<td>30-39</td>
<td>Employee</td>
<td>Mall</td>
<td>yes</td>
</tr>
<tr>
<td>8</td>
<td>Female</td>
<td>50-59</td>
<td>Employee</td>
<td>Community</td>
<td>no</td>
</tr>
<tr>
<td>13</td>
<td>Female</td>
<td>30-39</td>
<td>Employee</td>
<td>Mall</td>
<td>yes</td>
</tr>
<tr>
<td>11</td>
<td>Male</td>
<td>40-49</td>
<td>Owner</td>
<td>Community</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Technicians</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>Female</td>
<td>50-59</td>
<td>Employee</td>
<td>Community</td>
<td>no</td>
</tr>
<tr>
<td>16</td>
<td>Female</td>
<td>50-59</td>
<td>Employee</td>
<td>Community</td>
<td>no</td>
</tr>
<tr>
<td>19</td>
<td>Female</td>
<td>50-59</td>
<td>Employee</td>
<td>Community</td>
<td>no</td>
</tr>
<tr>
<td>15</td>
<td>Female</td>
<td>20-29</td>
<td>Employee</td>
<td>Community</td>
<td>no</td>
</tr>
<tr>
<td>14</td>
<td>Female</td>
<td>30-39</td>
<td>Employee</td>
<td>Community</td>
<td>yes</td>
</tr>
<tr>
<td>6</td>
<td>Female</td>
<td>30-39</td>
<td>Employee</td>
<td>Community</td>
<td>no</td>
</tr>
<tr>
<td>12</td>
<td>Female</td>
<td>30-39</td>
<td>Employee</td>
<td>Mall</td>
<td>no</td>
</tr>
<tr>
<td>10</td>
<td>Female</td>
<td>30-39</td>
<td>Employee</td>
<td>Mall</td>
<td>no</td>
</tr>
<tr>
<td>7</td>
<td>Female</td>
<td>50-59</td>
<td>Employee</td>
<td>Community</td>
<td>yes</td>
</tr>
<tr>
<td>1</td>
<td>Female</td>
<td>40-49</td>
<td>Employee</td>
<td>Community</td>
<td>yes</td>
</tr>
<tr>
<td>4</td>
<td>Female</td>
<td>40-49</td>
<td>Employee</td>
<td>Packing</td>
<td>yes</td>
</tr>
<tr>
<td>3</td>
<td>Female</td>
<td>50-59</td>
<td>Employee</td>
<td>Packing</td>
<td>yes</td>
</tr>
<tr>
<td><strong>Community</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>40-49</td>
<td>Employee</td>
<td>Packing</td>
<td>Yes</td>
</tr>
<tr>
<td>9</td>
<td>Female</td>
<td>20-29</td>
<td>Employee</td>
<td>Community</td>
<td>No</td>
</tr>
</tbody>
</table>

Community = a pharmacy in the community, often close to or adjacent to a doctor’s practice.

Mall = pharmacy located inside a shopping mall

Packing = a pharmacy that utilises robotic packaging systems to fill compliance packaging for individual patients.

No walk in customers.
As a result of the quake

The details of the damage to the city buildings caused by the quake is outlined in the Background chapter of this section. But the results of the quake were more far reaching than the destruction of buildings and the injuries and deaths. The quakes caused disruption on many levels. For the pharmacies still operating and their staff the resulting lack of amenities made continuing with their jobs very difficult at times.

Table 3-8. Demographic details of the pharmacies represented by the staff interviewed.

<table>
<thead>
<tr>
<th>Pharmacy location</th>
<th>Type of pharmacy</th>
<th>Damage or disruption level</th>
</tr>
</thead>
<tbody>
<tr>
<td>North eastern</td>
<td>Community</td>
<td>Major damage. Worked from port-a-com while front of store rebuilt</td>
</tr>
<tr>
<td>Western</td>
<td>University</td>
<td>Major damage. Worked from doctors’ storeroom until new premises became available</td>
</tr>
<tr>
<td>North western</td>
<td>Community</td>
<td>Minimal disruption</td>
</tr>
<tr>
<td>Western</td>
<td>Mall</td>
<td>Minimal disruption</td>
</tr>
<tr>
<td>Central</td>
<td>Community</td>
<td>Moderate disruption, relocated to new site later</td>
</tr>
<tr>
<td>Northern</td>
<td>Mall</td>
<td>Major damage. Worked out of caravan until mall repaired and the public allowed back</td>
</tr>
<tr>
<td>CBD</td>
<td>CBD</td>
<td>Original building totally demolished. Business relocated to new premises</td>
</tr>
<tr>
<td>Eastern</td>
<td>Community</td>
<td>Minor disruption</td>
</tr>
<tr>
<td>Central</td>
<td>Robotic dispensing</td>
<td>Minimal disruption at original location, moved to current site two years later, merged with another business</td>
</tr>
<tr>
<td>South western</td>
<td>Community</td>
<td>Minimal disruption</td>
</tr>
<tr>
<td>South western</td>
<td>Community</td>
<td>Minimal disruption, supported mall patients when mall closed</td>
</tr>
<tr>
<td>South western</td>
<td>Mall</td>
<td>Intermittent disruption as mall closed after each significant quake</td>
</tr>
</tbody>
</table>

As has been described earlier the level of disruption varied from suburb to suburb. In the first few days there were problems with telephone communication, cell phone coverage was intermittent and sometimes it could take a day for a text message to be delivered. To avoid overloading the cellular system people were encouraged to use text messages rather than make phone calls.

In some areas electricity supply was not interrupted at all and in others it came and went and for some it took weeks to have the power supply re-established. When there was power, operating the pharmacy was possible, phones and computers worked. There were issues with fax machines (used to receive prescriptions from doctors’ practices) and portable phones. If there was no power neither of these devices worked and even though the phones were still operating the portable phones and faxes needed power to maintain communication.
3.6.3 Themes identified

- Workload
- New work
- New ways to do things
- Work that continued
- New practices/doing things differently
- Sticking to the rules
- Emotional support and cost
- Dedication and responsibility
- Shifting roles
- Memory problems

Workload

The redistribution of work did not appear to happen in a structured or planned process, more a case of whichever staff were available doing what work was required. "Just what needs to be done, at the time." (T14)

There was only one specific incident where a task was handed over from the pharmacist to the technician in a deliberate fashion. The rest-home organisation was delegated to the technician, so she became responsible for the organisational requirements of the medication compliance trays and preparing them in readiness for the pharmacists to check. This was a change the technician had previously wanted to put in place and the earthquake provided the impetus for this to happen.

There was a lot of ‘new’ work as a result of the quake, so it was not a simple process of shifting tasks from one staff group to another. Some ‘new’ work was above and beyond the previous tasks performed on a daily basis and new to all staff. Due to the chaos created by the quakes there was often no time for planning and task allocation at that time therefore whoever was around took care of the work that needed to be done.

Who took on the work was affected by staff absences: these had a huge impact on who was available to perform which tasks in the pharmacy. Parents were restricted to when they could be at work if children were unable to attend school or if partners were unable to care for children thereby allowing the other parent to go to work. Sometimes staff would be at home sorting out damage issues so could not come in, at other times there might be long delays in getting to work because of the damage to roads. At times stress and emotional upset meant some staff did not come to work.
New work

The new work introduced as a result of the earthquakes’ impact on the daily running of the pharmacies included simple things like cleaning up stock that had fallen off shelves. This was not a single clean-up after a one-off event. There were repeated after-shocks that caused stock to fall off shelves and this needed to be cleaned up – again. This was a task that everybody got involved with, both pharmacists and technicians, retail staff and even the customers who sometimes lent a hand while waiting for their prescriptions. Pharmacists and technicians often focused on the dispensary clean ups.

“yep, just tidied up in the shop, and it’s all on the floor again” (P20)

“and then the next day we had power but it was just shambolic. I mean every time there was an after-shock, well not every time, almost… those big ones, it stopped us, everything again. The stock just fell off the shelves, so you had to stop for half a day and then pick up everything and find out where it went” (T21)

This did make it difficult to work due to the mess: as one of the technicians pointed out you had to get the cleaning done first so you could get on with the dispensing. If all the stock had fallen off the shelves it took time to get it back into some semblance of order to allow staff to continue working.

“So just, of course the cleaning up we couldn’t dispense, the prescriptions, which would be the same as everybody else. We just tidied up” (T21)

The repeated nature of the damage and the constant cleaning was emotionally draining.

There were many bureaucratic issues that had to be dealt with during this time. This was not just coping with and putting funding changes into practice, there were changes that were made by authorities and communicated to pharmacies about how they were allowed to run and there was also paperwork for the business itself. Changes to legal and emergency supply regulations were actioned by all dispensary staff, but paperwork for the business involved owners (in many cases the pharmacist on at the time) trying to locate information on insurance, leases etc. or trying to locate the business owner. Much of this information took time to access as many insurance and legal businesses were in the red-zoned central business district in seriously damaged buildings. If owners and managers did not have easy access to their own copies of documents locating this information was delayed. Later this bureaucratic burden changed to obtaining all the consents and permits required to undertake repairs or rebuilding.

But the frequent funding changes were difficult to work with.
“yes, that changed. It felt like day to day, the faxes coming through, this is how you’re going to do it, step 1, 2, 3, 4. Next day, scratch that, we’re now doing it this way. Scratch that, now it’s going to be this way.”(P18)

Complicating things further, this information was not always consistent between different sources.

“So we didn’t close at all. So we had these people coming in, then you’d get letters from Pharmac, then you’d get letters from the earthquake people, and they weren’t the same. You can give this. You can give three days. You can give five days. You can give a month. And it’s like; what do you go with, you know?”(T7)

The timeliness of the information created a few issues for pharmacists trying to look after their patients. One pharmacist noted that he had to turn away a couple of patients’ requests on the first day as the usual restrictions in place at the time meant he was unable to help but this changed within a couple of days.

“At that stage we’d already turned down a couple of people, cause you know, we didn’t know the situation on the first day.”(P3)

Many people moved out of areas where they had been living and some fled town altogether. Some of the population left immediately and others over the subsequent weeks. Due to their location some pharmacies were very busy due to an influx of additional patients. This varied in different areas: those on the main arterial routes north and south saw a lot of patients immediately after the quake as people tried to evacuate Christchurch and areas of minimal damage saw steady increases in their local population.

“They were from all over the place. Yes, a lot of people from Brighton, cos all their pharmacies had closed. and.. um …or in the middle of town, pharmacies from the centre of town and things like that that were usually… and they were usually working in town and they couldn’t get there and they never opened again so…”(T15)

“cause we started having quite a big influx of people, obviously, you know, our side of town was safe. You know, there was no liquefaction, there was not really any substantial damage to anything over our side of town, so a lot of people who lived over the other side, you know, were coming and staying with family and friends and all of that. Over our side of town, so we did have a lot of people coming in, you know?” (T4)

These population movements resulted in some work reductions in places as people moved away and then increased work as some came back later as repairs were carried out.

Many of these patients came to a pharmacy where they did not normally get their prescriptions filled. This was because they had sought shelter with family and friends in other areas and therefore didn’t go back to their usual pharmacy. Many had left without any medication. This meant that there were problems with the lack of records for these patients as their records
were not held at the new pharmacy. At times there were delays getting access to records. It took a while for the records to be able to be recovered from damaged buildings and set up in a new location. Coupled with a lack of electricity at times this meant that some pharmacies were unable to access pharmacy records.

At these times, therefore the staff had to question the patients and work out what medication they needed. This was an important source of new work. Pharmacists usually deal with all requests for medication and staff would usually refer all requests to them and then the pharmacist would collect the necessary details from the patients. However, there were so many medication requests at this time that the pharmacists needed help. Other staff, especially technicians, moved out of the dispensary and into the shop to respond to these requests. Technicians took on the task of collecting all the necessary information and then passing it on to the pharmacists. Many individuals arrived in the pharmacy asking to speak to the pharmacist and the technicians would obtain as much information as possible before passing it on to the pharmacist.

“And what the pharmacists did was pretty much give us control of that. Yeah. It’s like: find out who the doctor was, what medication they’re on, what dose, and do a phone script and that was it, because they were so busy, you had to take a lot more responsibility…” (T14)

This was not always straightforward and at times it was necessary to take people at their word about what medications they were on. Some pharmacies and doctors' practices were out of contact in the early days, and those pharmacies who were open were forced to rely on patient recollections and descriptions of medications. The staff, often the technicians, would question the patient and see if they knew what they took or what the medication looked like, “we had to go on trust about what they had...you know, what they were taking.” (T1). This was not always easy for the staff as many patients struggled to provide information about their medication. As one of the technicians commented “it just surprised me that, that was something that came through very strongly. Was that people don’t know what they are taking.” (T9)

“so one thing I really noticed, was people didn’t know, and whether it was because they were under stress, they couldn’t remember their doctor, you know? So women were better. Women more than likely will know what they are on and at least know the name of their doctor” (T9)

They tried to identify the medications the patients were on and some people arrived in the pharmacy with boxes or bottles but, especially immediately after the initial February quake, many had abandoned homes in a hurry or were unable to re-enter them and so had nothing. Sometimes the patients just had no idea ‘oh, you know, the little round white blood pressure tablets’ (T14)
“Yeah, and I mean we just…patient name, address, you know, if they had a yellow card from the hospital, anything like that, that they could bring in, I’ll you know, boxes, bottles, anything like that, then we sort of start to work with, you know, we encouraged them to do that as much as possible. But you know, you still got the odd one where they just…no, don’t have it.”(T4)

It goes against the training of pharmacists not to confirm what a patient was taking, a ‘best guess’ was not something that staff are generally comfortable with:

“Some with prescriptions, some with nothing, just; this is what I have been taking and 9 times out of 10 we didn’t have any way of verifying it, which you know made life interesting. …just trying to get hold of people to try and verify it, because you know, that’s what you’re taught to do, you’re meant to verify it before you hand anything, and you know you spent a lot of time trying to get hold of people and trying to verify it.”(T15)

To assist the pharmacist the technicians would conduct many of the interviews and generate the required paperwork to cover any supplies given and make it up ready for the pharmacist to check.

“Like the pharmacist didn’t want to have to bother ringing people with prescriptions or anything. They didn’t have the time to do it and they, you know, they knew that you knew what you were doing, and if you didn’t know what you were doing you’d ask another tech or whoever.”(T5).

This was not the case everywhere: in some pharmacies if the technicians didn’t feel confident in asking the questions the query was immediately passed over to the pharmacist.

Occasionally there were requests for some medications that were a bit suspicious. This did not happen initially but it was handled by staff directing individuals to doctors. Having strong relationships with doctors made it easy to refer any unusual requests to them. Not all the unusual requests came from criminals taking advantage of the lack of information - sometimes they were for medications that could not be supplied under the emergency supply rules.

“And the doctors next door were going, so if it was anything dicey we got the, shunted them there.”(P17)

Rebuilding the pharmacy: for those businesses that were still operating but needed to be repaired this was work that had to be arranged on top of the daily dispensing work in the pharmacy. Although there were draftsmen and other experts to help it was still very stressful and time consuming for owners. In addition, the rules and regulations changed several times and even when work was completed sometimes it had to be redone. This took not only time but also involved extra costs in many cases.

Getting the repairs and rebuilding underway was a very difficult and time consuming task, there were on-going changes to building requirements which made it hard to make plans and fulfil requirements for consents and paperwork. This would often mean getting plans redrawn
and additional information needing to be collected to comply with the latest requirements. This resulted in additional delays in the whole process. But delays did not end once building got underway, everything took longer than planned. In one case a five month rebuild took fourteen months, as one pharmacist commented “this was par for the course for Christchurch…..three times the expected time was about right.” (P1)

Rebuilding or repairing the pharmacy was often the responsibility of the pharmacist who in many of the pharmacies that participated in these interviews, was the owner of the pharmacy. Therefore it was extra work for them. Other new pharmacy work was taken on and shared between staff, depending on who was available. Many of these new tasks, collecting information from patients, tracking down missing patient information, locating stock, dispensing prescriptions, were taken on by the technicians in an effort to relieve the pharmacist of some of their extensive workload. Cleaning up was a constant challenge to which everyone leant a hand.

New ways to do things

There were many regular tasks that needed to continue and due to the disruption many workplaces had to change the way they had been doing these tasks. They had to develop and introduce whole new ways of performing tasks, and often these had to be performed by different people at different times depending on who was available. All those interviewed talked about having to do things differently and the need to develop new ways to do things.

This meant that it was necessary to think up ways to handle new situations as they presented themselves and also how to handle old situations with limited resources. Many respondents would use ‘we’ when asked how new processes were worked out implying that it wasn’t just one individual making the decision but a collective process. According to one technician in her workplace everyone contributed to the ideas, it was a situation of “ok we have got this problem, let’s come up with some ideas on how we can….“(P17) and all ideas were considered and those that would work were used.

Work that continued

There were many regular activities in pharmacies that needed to continue: these included filling prescriptions for regular patients and assembling compliance packaging for individuals. Stock handling, ordering in more stock, checking it off, restocking shelves and many other regular activities needed to be done each day.

The disruption to communication created many issues, one of which was obtaining stock. Courier services were unavailable for some time, the road conditions meant that they were
unable to continue with normal services and in some areas stock deliveries could not get to the pharmacy and therefore the staff had to go and collect them. Sometimes stock sat awaiting collection and the pharmacy staff didn’t know they wouldn’t be delivered.

“though you know, orders sat at Propharma [wholesaler] thinking someone was going to come and pick them up, and you know, there was a lot of mis-communication, and that made it really hard. They made it really hard to do your job properly, because you’re like, well we were expecting stock to arrive, but we don’t know when...”(T15)

Home deliveries to patients needed to continue. In some pharmacies this would usually have been performed by high school students. Some did continue to deliver medications to patients’ homes when it was possible but in other cases the technicians and pharmacists took over the delivery process and used vehicles to get to patients rather than the bicycles the school pupils had used.

In one case in the afternoon immediately after the quake, one of the technicians delivered medication packs to the patients on a scooter, with the help of her husband. At several sites staff took over doing deliveries not only because the road conditions were bad but also to protect the young ones from what they might find when they knocked on the door. The staff were protecting them from scared and upset patients. Caring about the delivery kids was mentioned several times. One pharmacy made their boys check back at the pharmacy once the deliveries were completed so that they knew they were alright.

Many patients had medication packs and these needed to be prepared and delivered to patients in time to make sure they did not run out of medication. Several participants spoke of the need to make sure the trays were prepared in plenty of time and also that they made sure that people never ran out of medication “make sure….well they’ve actually got a bit of a reserve”(P7). This was achieved by delivering medication trays a few days earlier than had previously been the case.

“We had to get our packing done and then get it out to the rest-home, so at least if something happened and we couldn’t get in for two or three days that they had enough medicines to cover them.”(T13)

*Prescription handling:* Many prescription handling practices remained the same but a lot changed. In the first few days while stock supplies were uncertain it was deemed necessary to limit individuals to one week’s supply. Pharmacies *limited the amount of medication* that they would supply to a patient. Even if a patient had a prescription for a three month supply at times they would only be supplied with one week or one month of medication and they would have to come back to the pharmacy later to get the next supply. On the first day as the extent of the destruction became more obvious decisions were made - “we started working our way
through the prescriptions that we still had in the pharmacy, and you know, anyone who was getting three month’s supply, all of a sudden was only getting a month’s worth, and we were saying right, we need to be conserving, you know drugs.” (T15) This got the pharmacy through the first few weeks of uncertainty and helped the pharmacy regulate their stock control as the numbers of prescriptions varied so much with people moving around. This was felt necessary early on when staff were still unsure about how much medication would be available and where further supplies would come from and when.

This increased the amount of work involved in the dispensing process and once again the technicians did everything they could in the process to relieve the pressure off the pharmacist. They made sure that everything was completed right up to the checking process that only the pharmacist could perform.

Prior to the quake the most a pharmacy could supply to a patient without a prescription was three days’ worth of medication as mentioned before. This changed very quickly to become a week’s supply and then one month’s supply to avoid the need for all patients to see a doctor for a prescription. Where in the past the patient was charged the full cost of the medication the pharmacies were now only required to document the supply and there was no charge to the patient. Allowing pharmacies to supply these medicines also reduced the workload for medical practices allowing them more time to deal with emergency and acute conditions.

Many of the pharmacies had good working relationships with nearby prescribers. This meant that the pharmacy was able to supply replacement medications to local patients and the doctors were happy for them to generate a telephone prescription as a record of the supply which the doctors would sign later.

As mentioned before, the quake was impetus for getting procedural changes in place that were awaiting implementation. This included such tasks as getting medication trays prepared earlier than previously and having them sitting waiting so they were ready to go out, delegating some tasks to others or redistributing the regular tasks between staff, keeping slightly more stock or a different range/selection of stock.

Most businesses tried to maintain the usual hours where possible, and some stayed open longer as they were open at a time when others were closed due to damage or aftershocks.

New practices/ doing things differently

Temporary building arrangements. A couple of the pharmacists interviewed made use of a secondary building/structure while their main building was being repaired. One used a Portacom (a small portable building) and the other a caravan so there was a space that the
public could use or be allowed into. A mall pharmacy being repaired meant that the patients were not allowed into the mall but the pharmacy had to operate out of the premises inside the mall. The pharmacy staff were allowed into the mall but they had to wear safety equipment, hard hats and fluoro safety vests. The staff, often the technicians, ran between the pharmacy inside the mall and the patients with their prescriptions outside in the caravan.

Safety was a serious consideration in this situation, not just the need for safety equipment but practices that kept the staff safe. There were always two staff inside the mall at any time, so that no-one was left in there on their own and when there was an after-shock they just dropped everything and ran outside.

For the pharmacy operating out of a portacom, technology played a big role in getting the job done. Staff inside the pharmacy building used cameras to monitor activities in the portacom. A fax machine was used to fax prescriptions from the portacom to the dispensary so the staff could make up the prescription. Walkie-talkies aided in communication between the two sections of the pharmacy.

Working from two separate premises was problematic but it did have the advantage of reducing the number of distractions during the dispensing process, “so the work was really uninterrupted a lot of the time”. (T16).

Operating out of two premises meant that these businesses effectively lost their retail side and “it was more dispensary orientated for some time after the earthquake” (T16) and their interim arrangements meant they only kept a small amount of Pharmacy Only medications and the Pharmacist Only medications were kept inside the dispensary. They kept “cough and colds and your first aid” (P20). There was very little opportunity to sell gift or cosmetic lines as the additional spaces that were being utilised were very small.

Keeping Pharmacist Only medications inside the pharmacy building meant the pharmacist would have to go out and talk to the patient and then return to the dispensary to get the product from where it was kept. This made for extra work in the process but they made sure that all required regulations were adhered to. It seemed important to them to make sure that the rules were followed.

**Sticking to the rules**

Many staff made comments on the importance of doing things right and sticking to the rules. (field notes). Some said it was important to them, the pharmacists and other staff, to stick to the required processes. Others just gave examples of how it was necessary to stick to the
rules. At this time there were many rules changing, so this was not always easy for the staff. There were several examples of the need to follow the rules.

“...a lot of things were made really extremely difficult for our businesses to keep running. There was a lot of; i’s to dot and t’s to cross that really, really, you know there were a lot of things… you’d come up across rules and regulations, when really you were just trying to keep the business running, and trying to continue to give these people their medications”.(T16)

As mentioned earlier, even when they wanted to help the patients if the regulations at the time didn’t allow it they felt they had to refuse. When the regulations surrounding emergency supplies changed they embraced the changes but would only supply the amount the rules allowed.

When queried about doing things differently one respondent replied...

“do we do things differently? I think that I, I think yes is the answer, but not by a great deal. Because we are constrained by so many rules, that you can’t move too far outside the square “(P11)

One of the pharmacists related the story of collecting the medication from a pharmacy inside the red zone that was unable to continue working. He had very little time allocated to him to empty the dispensary and shop and remembered “knowing all of the rules and regulations of pharmacy, and how strictly you have to look after stuff, and how you know you’re supposed to only store things in particular ways, and here I was throwing my entire dispensary into a back of a caged trailer and then driving through the town with bottles of stuff that were in boxes (P11). He found it amusing and strange as this was the complete opposite of normal practices and not at all how the medication would normally be handled.

Many of the pharmacies had a practice of generating prescriptions for patients who needed medication but could not get to their doctor: this was a common practice before the quakes. It is not a formal arrangement and results from a verbal agreement with a prescriber. It is not quite within the rules if it happens without checking with the prescriber first on each occasion. But it does happen quite often. Generating prescriptions when needed on the understanding that the doctor would sign them later bends rules but was done before the quakes and therefore the pharmacists were happy to generate scripts as needed after the quakes. In some cases the pharmacists were encouraged to do so. This was familiar behaviour and they were more comfortable continuing this activity than bending any rules that they didn’t usually bend.

Several staff commented on the pharmacists’ tendency not to delegate jobs, one of the pharmacists acknowledged this to be the case ‘pharmacists are a bit funny the ones I know, don’t delegate very well.’(P20)
This was seen as the normal situation but some of the technicians expressed surprise that the pharmacist didn’t allow them more scope. They felt that they ‘definitely got more responsibility than what they had before’ (T14), but this would vary between technicians ‘and certain pharmacists will give certain technicians different responsibilities’(T14). They felt that they could have done more but both rules and pharmacists restricted it.

Sharing resources: this crisis produced a supportive environment that saw pharmacies share premises when one was too damaged to continue operating to enable patients to still collect available repeats. The pharmacy records were taken to a second pharmacy that was able to continue operating and the patients were able to collect repeats from there. Having the records in a working pharmacy also allowed access to the patients’ medication records. This made extra work for all staff at the pharmacy with two sets of records.

There were situations in which stock was shared between pharmacies as there were delays in getting replacement stock, and this created double handling.

Where individuals owned more than one pharmacy, staff; both technicians and pharmacists, were shared between pharmacies, This helped keep people employed and busy but also shared the workload that increased in some places. Insurance policies made it possible for owners to continue paying staff even if the business was not operating and there was no work to be done. Some businesses were out of action for months and some were gone altogether. There were staff absences when individual staff were unable to come to work as they had family to care for, this meant some workplaces were short staffed at times and sharing staff helped to alleviate that.

“Yeah, we also had a pharmacist come in to help us out. He’d been in town and lost his, his pharmacy, so he came in and worked for us for quite a while, which was wonderful.” (T16)

Sharing staff could also be stressful to staff working in different places as they no longer had the familiarity of their usual workplace and work practices. Although there is a basic structure to the process of filling a prescription, subtle differences between workplaces can cause tension if different practices are happening at the same time.

Sharing information is a common practice between pharmacies, and the disruption caused by the quake made this even more necessary. A lot of time was spent ringing round other pharmacies for patient details to ensure that patients got the right medication.

This supportive environment was not limited to relationships between pharmacies, as the pharmacies also provided information to the doctors’ practices. The disruption resulted in
pharmacies becoming used as a source of information but also many established relationships were used to ensure care for the patients

“I can’t remember when the health centre re-opened, but we liaised with them.” (P18)

“The doctors next door to us lost power, so uh, they spent most of the afternoon in our place. He didn’t have a clue what to do either” (P17)

As mentioned earlier, several pharmacists “commented on the good working relationship they had with the local doctors and the doctors were happy to have the pharmacy generate scripts for regular medications for their patients and they would sign anything later.” (from field notes)

“and yeah, I think the relationship really strengthened between the doctors and the pharmacy in that time, because they pretty much said: if it’s a patient of ours, do up a script.” (T14)

Emotional support and cost

Providing emotional support to frightened and upset patients became a big part of the ‘new’ work that needed to be carried out. This was something that all staff believed was an important part of their role. Providing support meant listening to the stories of individuals: some were traumatic and many of the patients were traumatised. Listening comes at a cost, and it is impossible not to be affected by the emotions of others and when it is every person coming into the pharmacy it was exhausting for the staff.

“everyone was just so scared, and everyone was just tired…..because nobody could sleep a full night for a long, long time.”(T2)

The stress level was added to by fear of the quakes themselves and potential for even more damage or personal injury and concerns for their own family and belongings.

Many patients were very stressed and upset and became very agitated by changes to usual practices. Limiting the supply of medication caused some patients to get very irate.

But we had irate people coming in with a three month script and demanding three months...cause they wanted three months and we said we couldn’t do it, and they abused us and took off. (T15)

It was tiring trying to be nice to people,

“just trying to be extra nice to people, you know, and that’s exhausting on you, as well.”(T2).

The emotional impact of what had happened didn’t always hit immediately, and some found themselves struggling months later.

Providing emotional support to customers and other staff was a task shared by all but frequently fell to the front of house staff who were often a mixture of retail staff and technicians.
They were frequently the first point of contact for the patients coming into the pharmacy. All staff felt the need to comfort and support the customers and to listen to their stories. But it was stressful as they became aware that regular customers had been killed or seriously injured.

**Dedication and responsibility**

The pharmacy staff felt very keenly the need to continue working and looking after their patients. Even if they wanted to leave they felt they could not.

Very few pharmacy staff left town. When an individual did this had a significant impact on those who remained. “I think that weighed very heavily on those of us who stayed behind,” even though they said they understood why “but still very, very hard to put that additional pressure on those who stayed.”(T36)

Individuals were stressed, worried about their own families but also worried about their patients. This concern for their patients is what kept them coming to work in stressful and tiring conditions. They put themselves in physical danger to ensure that patients were provided with ongoing supplies of medication, and they went out into unpredictable conditions to deliver medication.

“They needed their pills. So yeah, we delivered the pills, and got home.”(T36)

Also, there was an element of danger working in buildings under repair. The staff of a pharmacy in a mall worked inside during the repair process.

The staff came into work to look after their patients, but they also felt an obligation to their colleagues and employers. They worked hard to cover others who couldn't get into work at times.

“Yeah, so I worked a bit longer and just did what I could to help out where I could.”(T14)

To the other staff…

“I um, I had, I thought I had a responsibility to my team and to the elderly people that couldn't leave here…..”(T36)

To their employers,

“I don’t know, some people have greater sense of responsibility. I felt I did have a responsibility to our rest homes. I did have a responsibility to my management team, and I did have a responsibility to my team, you know. To the other technicians to actually be there and do what I could.” (T38)

**Shifting roles.**
Chapter Three: Investigation if pharmacy roles changed in response to a specific crisis

It was difficult to identify exactly who did what in the initial weeks after the February quake. As already mentioned it could be difficult at times for the respondents to remember exactly what they did at the time surrounding the initial quakes. This made defining who performed individual tasks problematic. (from field notes)

One technician “was a bit vague about who did what at the time of the quake as her impression was that they all just got to work when they could and everyone just did what needed to be done.” (from field notes)

“Without even thinking about it, you just carry on and fit in and do the extra things that you have to do without asking questions or wondering why. You just fit into the process.” (T3)

It appears that the technicians did take on a lot of the new tasks, whether consciously or not in an effort to take some of the burden off the pharmacist. As one of the technicians commented,

“I think, pharmacists can be busy at the best of times, so I’ve always been proactive in making sure that I get my, my job done properly and I look see what else needs to be done……when I need a pharmacist then it is all there for them to do, I’m not calling them backwards and forwards.”(T16)

They had just got on with the necessary work and had done everything they could to make it easier for the pharmacist who was in great demand.

The technicians did a lot of extra work when patients started arriving with requests for medication. They took many histories and tried to work out what the patients were taking and what they needed. A script would then be generated and dispensed and then everything checked by the pharmacist.

Both pharmacists and technicians commented that reorganising tasks was a tricky thing to do as pharmacists don’t give up or hand over responsibility easily. (from field notes)

One of the technicians commented that she felt that she was given lots of extra responsibility as her pharmacist trusted her but she felt many other pharmacists would not have been comfortable with her collecting histories at all, and she did not think some would let any technician take on more responsibility. (from field notes)

“and you do find that some pharmacists don’t actually appreciate what technicians actually know. And the level of experience of different technicians and different working environments, and different things, they’re not appreciative of the fact that we’ve had this training. And that we know what we’re doing. But they’re not prepared to do anything more about it.”(T36)

Another was impressed with the way every one of the other staff members helped out, everyone worked together in a really tight team, even the big personalities, everyone just got
on with it. They had to work very hard with the added work load from all the other people from outside the area. Both the shop and dispensary staff had to work a lot harder and faster, there were waiting times of up to an hour or more to get simple prescriptions filled that would normally be a lot quicker. (from field notes)

Many of the technicians could not give specific answers as to how their role changed or if it changed after the February quake. Many made reference to doing what they had to do and just getting on with everything. The first cluster of interviews were very much like this. This included doing anything they could to allow the owner to sort out insurance or rebuilding issues etc. The staff expressed concern that they could not really remember a lot of details around this time and I noticed if I pushed the issue they started to appear more stressed.

Memory problems

The issue of memory repeated itself. Several participants expressed concern about their ability to contribute to the project as they were aware that their memories of this time were very sketchy. They struggled to bring up specific details of many things that occurred over the first few weeks. Sometimes they acknowledged that this was due to the circumstances, being frightened and upset by the destruction and loss of life as they became aware of the extent and impact of the destruction. It was a way of coping.

“I can’t remember much now. It’s a time that you don’t want to recall too much” (T21)

Some images and incidents were very clear in their memories but other details were very hazy. Partly this was due to the level of emotional upset that accompanied this time making it difficult for people to recall specific details.

“if you’d asked me if that afternoon, can you remember doing such and such, I’d have to say no, I don’t remember a thing.”(P8)

A level of emotional upset was anticipated during the design of this project therefore the ability to access counselling services was set up for all participants. The researcher is unaware of any individuals taking up this option but all were made aware that the option existed.

During the planning for this project PDA staff pointed out that counselling was available free to all staff who felt the need to talk for a considerable amount of time after the quakes. It was interesting to note that initially retail staff members sought counselling, then some of the technicians and the pharmacists were the last group to seek help, often many months after the February quake.
3.7 Discussion

This study collected information from both pharmacists and technicians about their experiences during a time of chaos and confusion. This study focused on any changes to individual pharmacist and technician roles during this time and how they carried out their jobs. It also examined how their work changed, the addition of new work and changes to how they carried out existing work. The earthquakes caused considerable damage and disruption and against this background pharmacy staff behaved with exceptional professionalism. In spite of the confusion and pressure on them, they put the needs of others ahead of their own and staff continued to come to work. They felt a huge sense of responsibility towards their patients and the need to ensure they continued to get the same level of care as they had prior to the quakes. This meant turning up for work even in difficult stressful circumstances. The technicians were willing to take on additional responsibilities but were limited by the pharmacists’ perception of the technician role and the need to adhere to the rules.

Reflecting on these stressful times is not without difficulties. Memory issues provided some limitation to this study. Fuzzy memories may have been a survival mechanism but it did result in a degree of vagueness on the part of the respondents. At times it was difficult to ascertain who took on which tasks. This may have been compounded slightly by the researcher’s role as a community pharmacist. It is possible that some topics were not probed to the extent that they could have been because of the researchers’ experience in community pharmacy. Respondents may also have assumed as the researcher was a pharmacist they did not need to provide as much detail as they would to questions from someone with no pharmacy experience. This may have an impact on the level of details given but the responses still provided a clear picture.

Responsibility and dedication are themes that run through all the interviews. The respondents keenly felt a level of responsibility to their patients. They were determined to make sure that the patients did not run out of medication and that regular medications (like those in compliance packs) actually got to the patients, especially when the pharmacy would normally arrange for them to be delivered to the patient. This dedication by community pharmacy staff to patients’ needs has been discussed elsewhere in other times of crisis.98 One respondent commented that she felt she could not leave even though she wanted to as she felt a huge responsibility for making sure the patients were being looked after. Many of the respondents spoke of needing to get to work and going to extra lengths to make sure they got to work even if it meant getting there late.
Feeling this level of responsibility meant that people went to great lengths to do their job. They took on more tasks, worked longer hours, worked harder, did things differently, but especially they provided a lot of emotional support for very upset and frightened people. This is not a new role; pharmacy staff often provide emotional support for worried and stressed patients but not on the level and with the frequency that occurred as a result of the quakes. To help patients it was often necessary to calm and reassure individuals before it was possible to take care of their medication needs.

The technicians took over as many tasks as possible in the dispensary to free up the pharmacist for the tasks that only the pharmacist could perform. The pharmacist is the person responsible for checking and releasing a prescription. The technicians performed the interviews that were necessary to identify the requirements for the patient. They then dispensed the items ready for the final check by the pharmacist.

In many situations there was an increase in workload as there were only a limited number of pharmacies open, which increased the pressure on the both pharmacists and other staff.

Every part of this situation added to the stress experienced by pharmacy staff. Dealing with their own fear generated by the repeated shakes was hard enough in itself but this was compounded by other sources of stress. Cleaning up repeatedly after each strong after shock was demoralising, trying to support other stressed staff was hard work, and endeavouring to remain cheerful was exhausting. Their work, both new and existing, had to be done differently.

One of the difficult aspects about defining who took on which tasks was the fact that this was a very stressful time and the nature of the crisis has an impact on memories. Several participants commented prior to the recorded interview that they did not really remember lots of the details about the early weeks immediately after the quake, they just knew they went to work and got on with what was necessary.

However, they did agree that this was primarily determined by the availability of those who were able to get to work once family were settled and they were able to negotiate the damaged roads or lost cars. Some of those available were staff from other businesses where the business was damaged and not functioning. Many technicians are female and many of those who were mothers felt very strongly the need to care for their children and to ensure they were alright, but once they were sure their family were ok many headed straight back to work. They could not function and do their jobs if they were not sure their family were safe.

The individuals with the necessary skills took on tasks. This may have been a function of how long they had worked in a pharmacy but also confidence on the part of other staff. Often this
meant the pharmacist having confidence in staff to perform the necessary tasks. As was mentioned, it can be hard for pharmacists to relinquish responsibility to others but it was necessary in this situation. Increased workloads due to the reduction in the number of pharmacies available on top of developing new ways to get things done made pharmacists rely heavily on their support staff.

Both the technicians and pharmacists gave examples of the technicians trying to make things as simple for the pharmacists as possible. They ran a filter process, they talked to the patients and worked out what was needed and if it needed to be referred to the pharmacist and they did as much as possible before passing it on to the pharmacist. As outlined in the findings this often involved working out which medications the patients were on when the individuals themselves didn’t know.

The quakes were incredibly disruptive and resulted in reorganisation of how tasks were done and who did them. But the crisis caused people to fall back on the rules. Rather than ignore the rules due to the crisis, people/staff tried very hard to follow the existing rules. It became very important to follow procedures.

Many individuals in response to an upheaval often resort to habit or rules and regulations. When everything else is in uproar and out of control there is comfort in the familiar. Also, it gives authenticity to decisions. ‘I can do this but not that’ as those were the rules. Sticking to the rules saves energy, in not having to think through the situation. It is tiring to have to constantly think through each new situation and coming up with new ways of addressing a problem or reacting to a situation.

Sticking to the rules meant that the technicians could not take on anything that they were currently not allowed to do. The technicians did not take on any new roles or responsibilities that were not available to them prior to the quakes but individuals did take on roles that were previously the responsibility of another staff member.

Taking on the responsibilities of other staff was often necessary as the number of staff present at any one time could vary. The number of staff present was always dependent on who could get to work and this could vary from day to day. Many of the tasks that needed to be done remained the same but could be performed by a different person each day or on subsequent days.

The technicians expressed willingness to take on extra roles and were frustrated to a degree that they could not do more. They took on the necessary tasks but they believed the best way they could help was to take as many of the tasks from the pharmacist as possible. There is a
considerable overlap in the tasks performed by both the pharmacists and technicians. The technicians tried to assist the pharmacist with the tasks that the technicians could perform, leaving the pharmacists more time for their own special responsibilities. They were aware that the pharmacist was in great demand and this could put considerable pressure on the pharmacist.

The literature surrounding natural disasters often focuses on how to get emergency aid to the site of the disaster and how to get medical assistance where needed. Many stories emerge about the personal tragedies that happen as a result of each crisis. There is not a wide pool of literature from a pharmacy perspective and much of what there is focuses on changes in processes and procedures rather than individual roles.  

One of the greatest challenges faced in Christchurch was obtaining patient histories, this could have been made easier with the presence of a shared patient record. This would have made it possible for both doctors and pharmacists to confirm exactly what medication a patient was taking. This was a suggestion that came out of the aftermath of hurricane Katrina in New Orleans. One was developed very quickly in the weeks after the hurricane and has been upgraded and improved since then in response to lessons learnt after other natural disasters like hurricane Charlie.

This development acknowledges the integral role community pharmacies can play in a crisis, ensuring that patients who do not require urgent medical attention but require ongoing medication can be catered for in the community and not add to the workload of overburdened hospital and emergency services.

In 2013 Mak et al reported on the impact on community pharmacies as a result of three massive bush fires. They recommended that their three-day emergency supply of medicines regulations should be reviewed. The emergency supply regulations were expanded here in response to the disruption to supply but the staff also self-regulated and ‘rationed’ supply to ensure all patients had ongoing supplies. The problem in NZ was the communication of these changes, disruption to power and phones created, and number of changes. As mentioned before the pharmacists were not comfortable operating outside clearly defined procedures.

**Conclusion**

In response to a crisis the technicians demonstrated that they were prepared to take on more responsibility but were limited by the current rules and regulations and their interpretation. They stepped up and did everything they could to look after the patients. At the time the pharmacists were not comfortable working outside the usual limited definition of the
technician’s role. They needed to delegate tasks but were careful to ensure that the processes and regulations in place prior to the quakes were followed and then they carefully adhered to the new regulations as they were introduced.

Individuals, both pharmacists and technicians, moved around the city to where there was work and to where they were needed but the overall roles did not change. They changed for particular individual technicians as they took on additional tasks but the technicians’ overall role did not extend outside of the limits of the currently defined role for a technician.

There is still the possibility for change in the future. This study identified some of the technicians’ attitudes to their roles and their willingness to take on more responsibility. This would be a facilitator, as it bodes well for the future potential for any increased role. The pharmacists’ reluctance to break out of the confines of the accepted role and need to stick to the rules, although necessary, was a barrier to change. Necessity could have been another facilitator for change as there was a significant increase in workloads during this crisis and tasks needed to be redistributed, but the chaos and uncertainty surrounding the quakes proved to be both a barrier and a facilitator.
Chapter 4: Investigation into role changes that occurred during a pilot study of the introduction of a checking technician


4.1 Introduction

This section of the thesis aims to examine the introduction of a checking technician role into pilot sites and whether this allowed the pharmacist to spend more time with patients. This was a planned and structures introduction utilising volunteers. The impact of the new role on work patterns, task allocations before and after the change and pharmacy staff members’ perceptions of its introduction of this new role as it was implemented were examined.

4.2 Background

As previously mentioned the Checking Technician (CT) role has been in place in the United Kingdom (UK) for approximately ten years. There is significant awareness of the role of a checking technician amongst NZ pharmacy staff, both pharmacists and technicians as demonstrated in our earlier study. A number of staff in NZ have previous experience working alongside CTs in the UK. The introduction of a checking technician role into NZ pharmacies has been supported in many pharmacy circles for some time, and the NZ Hospital Pharmacy Association (NZHPA) has been in favour of the introduction for many years.

In 2011 Health Workforce New Zealand (HWNZ) was approached directly by the Pharmacy Manager from Christchurch Hospital with an innovative proposal to use this site to introduce CTs. This was in response to a perceived reluctance from the Pharmacy Council and Ministry of Health to introduce any new health professional under the Health Practitioners Competency Assurance Act 2003 (HPCA Act) guidelines.

HWNZ’s role for the Ministry of Health is to monitor current and future staffing levels within the NZ health workforce. One of their aims “is to lead the development of a workforce that can respond to changes in how health services are accessed”. A key way to do this is “to support demonstration sites where new workforce roles, new models of care and new training programmes can be tested”. This made them ideally placed to be involved in a project on the introduction of the advanced technician role.

The innovation proposal signalled to HWNZ that the introduction of a checking technician could release pharmacists from a significant part of their workload and allow them more time to spend on patient focused activities. While the innovation proposal was not initiated at that time, it was revisited in 2014, leading to the HWNZ CT pilot project.
In 2014 HWNZ were tasked with ensuring that pharmacists (along with other health professionals) were working at the top of their scope. It became timely to revisit the CT proposal and so it was decided to fund and evaluate several CT pilot sites across NZ. These sites would trial the introduction of a Pharmacy Accuracy Checking Technician (PACT), a checking technician role specifically tailored to the NZ pharmacy setting.

HWNZ devolved the logistics to the Pharmaceutical Society of New Zealand who assumed responsibility for the management and oversight of this project and appointed a project manager. A steering committee was formed to represent all professional groups and stakeholders and included representatives from:

- Pharmacy Council of New Zealand
- Pharmaceutical Society of New Zealand
- New Zealand Hospital Pharmacists Association
- Pharmacy Guild of New Zealand
- Pharmacy Defence Association

And also included:

- Ministry of Health Chief Pharmacist
- Ministry of Health Pharmacy Manager
- Senior Project Manager

The function of the steering committee was to provide professional support to PSNZ for the duration of the Pharmacy Accuracy Checking Technician Pilot Project and specifically to assist in determining the appropriate criteria required to select participants in the pilot project, which included pharmacy, pharmacist and technician criteria. They also considered the legal and professional ‘hurdles’ in the project and implementation if the pilot project was successful. They were instrumental in customising the imported training material to the NZ workplace.

Expressions of interest were then sent out to all NZ pharmacies and from the returned expressions of interest, the steering committee selected twelve sites to participate.

University of Otago researchers were not part of the original committee but were later invited to participate due to their experience and expertise in this area. Their role was to develop an evaluation programme for the project, designed to fit around the pilot training programme set in place by the Project Manager. This involved designing the evaluation methods, ensuring the desired data was collected and analysing the data obtained.
Some of the obtained data was provided to the external evaluation provider (Quigley and Watts) to complete their report on the project.  

4.2.1 What would a Checking Technician do in the pilot programme?

The checking technician would be responsible for the final accuracy check of a dispensed prescription. They would take responsibility for ensuring the medication dispensed and the label information corresponded to the prescription or other documentation. They would not be responsible for a clinical check of the appropriateness of the request, which would remain the responsibility of the pharmacist.

All the procedures and responsibilities would be detailed in an additional specific workplace SOP developed for the introduction of this new role. This new SOP would cover the roles and responsibilities of all dispensary staff.

There would be a structured training process to be completed by the technician, which would consist of a combination of training days, written modules and a logbook recording one thousand items checked by the trainee followed by a final assessment (for more details see later). During the training period they would be supervised by a designated registered pharmacist.

4.2.2 Legal considerations

During the initial development of the Pilot Project and prior to the Expressions of Interest being sent out to the pharmacies, some legal issues were identified. Therefore, a reference group was convened to address the legal and regulatory issues that might impact on the project. This group, having sought appropriate advice, would determine whether a checking technician was able to function under the existing legislation and regulations or whether an alternative mechanism would be required to allow the project to proceed.

Members of the steering committee had assumed that the only way to allow the introduction of the advanced role of the checking technician would be to create a new health professional. This was due to the existence of the Health Practitioners Competency Assurance Act 2003 (HPCA Act). This Act regulates a range of health professionals in NZ. 

The HPCA Act’s principal purpose is “to protect the health and safety of members of the public by providing for mechanisms to ensure that health practitioners are competent and fit to practise their professions” (HPCA Act, 2003, s1).
The HPCA Act requires health practitioners to demonstrate competence to perform their job within a defined scope of practice. It allows for registration of a health professional under a registering body, the definition of a scope of practice for each health profession and a requirement to ensure competence. There is also a provision for the registering body to withdraw registration to practise in cases of discipline and possible censure and to remove people from the appropriate professional register for incompetence or breach of a defined scope of practice.

Registering bodies are responsible not only for establishing a scope of practice but for setting the standards of the training/qualifications requirements for those who wish to practise within a specific discipline. As mentioned in the introduction all pharmacists have to be registered with the Pharmacy Council and it was assumed that this new technician role would require the same registration with the Pharmacy Council.

Currently in NZ there is an expectation that a pharmacist is responsible for prescriptions that are filled in the pharmacy. This is only broadly covered in the legislation but it is a long standing interpretation within the profession that a pharmacist has final responsibility and that all prescriptions must be checked by a pharmacist before being handed out to a patient. This is not clearly specified in the legislation.

There is an expectation that a technician working in a dispensary must work under the direct supervision of a pharmacist, a point which is clearly defined in the legislation, in the Medicines Regulations 42(1A), but there was some debate surrounding how this should be interpreted.

The Medicines Act 42A requires a pharmacist to be in the pharmacy at all times the pharmacy is open and providing pharmacy services. There is no specific reference however, to the requirement that a pharmacist has sole responsibility for the final accuracy check of a prescription. This created some initial concern because if it had existed and a law change was required it could take many months if not years to put this into effect. This lack of specific details in this part of the legislation worked in the project’s favour. These points needed legal clarification as this project appeared to work outside the current standards.

Therefore, clarification was sought from Medicines Control, the body within the Ministry of Health that regulates pharmacy practice occurring in licensed pharmacy premises, through the licensing regime of the Medicines Act 1981 and the Medicines Regulations 1984.
Medicines Control noted that in the initial training phase of the project the pharmacist would still be responsible for the final check. This meant that there were no legal barriers or requirements for change to this part of the project.

Regulation 42(1A) of the Medicines Regulations 1984 requires that at all times the technician must be under the direct supervision of the charge pharmacist. Medicines Control clarified this as meaning “that a pharmacist must be present and able to intervene in the dispensing process if required”. This was interpreted to mean that they might not necessarily need to be in the dispensary but on the pharmacy premises.

With respect to the need for all prescriptions to require a final check by a pharmacist, this requirement is present as per the standards (NZS 8134.7.2010 Health and Disability Services Pharmacy Service Standards)

“all prescription forms clearly record who dispensed the prescription and the pharmacist responsible for the final check for completeness and accuracy”

Medicines Control investigated the possibility of initiating a review of the standards with the view to enabling accuracy checking of prescriptions by appropriately trained technicians. This would also take time, but there was another option.

With respect to the final phase of the project where the PACT would be checking prescriptions unsupervised, Medicines Control stated that they would “consider enabling an exemption from specific aspects of the Standards relating to the final check by a pharmacist at the demonstration sites, for a specified period, through the addition of conditions to the corresponding pharmacy licences”. This exemption would be put in place as the trainees completed their training and took on the PACT role. As each trainee successfully completed their training and assessment the pharmacy they were employed in would be issued with a variation to their contract to allow the PACT to undertake the final accuracy check and to take responsibility for this role. This exemption would continue after the pilot project had finished for the period of one year at which time it would be reviewed.

This interpretation removed the last potential regulatory barrier to the pilot project and allowed the development and start of the project and its evaluation.

4.3 Methods and Methodology

This study utilises mixed methods methodology.
4.3.1 Ethical approval
A Category B Human Ethics application was submitted and approved by the School of Pharmacy under delegated authority from the University of Otago Ethics Committee, number D14/372.

4.3.2 Study design
The study was designed by the candidate in discussion with supervisors and others.

Data collection was initially intended to occur at three defined periods that paralleled the progression of the technicians through the PACT training. Data collection was to occur:

- First - initial data collection (baseline data collected prior to training)
- Second - mid-point data collection (data collection during the accuracy training phase)
- Third - final data collection (data collected when the PACT was solely responsible for checking)

The timing of data collection was modified during the latter part of the study as not all technicians progressed at the same rate. For the reporting/completion of this pilot project a census date was set at which final data collection occurred in all pilot sites regardless of the stage they had reached.

The overall evaluation consisted of three different types of data gathering:

- Surveys
- Error logs
- Time and motion study

4.3.3 Survey methodology
This section of the project utilised the same methodology as the initial survey as outlined in Chapter 2. It also utilised self-administered surveys by the participants. The difference in these particular surveys was the tool of delivery. Although a paper copy was provided to the participants when necessary, this survey was primarily conducted via the on-line tool Survey Monkey.

Survey Monkey is an on-line format that allows for the construction of a customised survey that can be completed by respondents. The survey is constructed on the website and a web link to the survey can be supplied to the respondents to allow each individual to complete their own copy of the survey online. There are many features to Survey Monkey that allow for a great variety in question type and layout. The data retrieval
function was one of the reasons for using this tool. Survey Monkey collates the responses to the website which removes the need for data input. It also provides graphs, tables and summaries of the data collected making it very quick to perform some basic analysis of results.

4.3.4 Survey design

The surveys were designed to capture demographic data and the opinions and some of the experiences of the participants in the pilot project.

This survey consisted of yes/no questions, Likert scale ranking questions and for some of the questions the participants were asked to write comments.

**Survey data collection points**

Opinion surveys were conducted at the three time points outlined above and involved all the staff in the pharmacy. Retail staff were included as it was anticipated that the introduction of a PACT might have an impact on all staff.

**First survey (Baseline)**

The first survey was a baseline assessment of the retail staff, technicians’ and pharmacists’ understanding and opinions about this advanced role prior to the training and introduction of the PACT. The survey consisted of questions about participant demographics, their belief in a technician’s ability to take on this role, their perceptions of the impact this new role might have on the workplace and work patterns, and any perceived benefits or disadvantages of the introduction of the new role.

See Appendix 3

**Second survey (Mid-point)**

This survey covered changes to workflow as a result of the new role, impact on staff, whether they felt it had freed up the pharmacist’s time, any advantages or disadvantages experienced so far, and their experience with the pilot project. Provision was also made for comments on their experience and suggestions for improvement.

The second survey was constructed at the start of the project, although it was anticipated that some questions would require modification or additional questions might need to be added in response to any issues raised by the participants after the baseline survey. An additional section was added after analysis of the baseline survey. This was to elicit comments from the wider group with respect to some positive and negative experiences reported earlier by some of the other individual respondents.
See Appendix 4

Third survey (Final)

The third and final survey was a repeat of the second survey, in order to ascertain whether perceptions had changed over the course of the project. An expanded section on workflow was added to obtain insight into the impact the new role had produced on the overall work patterns once the PACT was in place.

See Appendix 5

Survey analysis

The inbuilt data analysis feature of Survey Monkey was utilised to produce frequency data for the demographic and Likert scale questions for each of the three surveys. Manual thematic analysis was utilised to code the written comments from the respondents and to produce lists of grouped comments.

4.3.5 Errors methodology

Definition of dispensing errors

Dispensing errors are often defined in the literature as errors that are undetected by the checking process and where the medication has been supplied to the patient. There is also an implication that there is a potential for the error to cause harm to the patient.104

For the purposes of this study dispensing errors can be identified as errors that occur at any stage of the dispensing process. These could be picked up at any point of the process both before and after the medicine leaves the pharmacy.

Reportable errors are the errors that are missed in the checking process, where the prescription leaves the pharmacy and the error is brought to the attention of the pharmacy staff by a patient or their carer. As these are errors that went undetected by the pharmacy staff, the staff insurers (PDA) require that pharmacists notify them of the details of the error. Many of these reported errors go no further than the stage of insurer notification as the pharmacy staff will take all necessary actions to correct the error but all errors of this type need to be reported in case further disciplinary action results.
Figure 4-1. Details of time points at which dispensing errors may be detected and their classifications

For the purposes of this thesis dispensing errors were defined as below.

**Filling error**
An error made by other dispensary staff and identified by the pharmacist or PACT and rectified at the point of checking the prescription for release to the patient.

**Near miss**
An error that was detected after checking, and up to and including the point at which the medication was handed over to the patient or the patient’s representative (or in hospital, prior to leaving the hospital dispensary to go to the patient or the ward). These may be identified by the pharmacist or another staff member.

**Reportable error**
An error that is detected after leaving the pharmacy, by the patient, a prescriber or carer. These need to be reported to PDA i.e. PDA need to be notified that an error has occurred and provided with the details of the error (what happened and who was involved).

### 4.3.6 Severity of dispensing errors

For the purpose of this thesis there was no attempt to quantify the severity of any errors. See later discussion.

### 4.3.7 Error Log Monitoring

Error log monitoring was designed as a measure of safety. This part of the evaluation looked at the levels of errors detected by the pharmacists and then the PACTs once they were in place.
Assessment of Error Logs

Assessment of the error logs also took place at the three time points.

a) Initial assessment of errors-level of the pharmacy error rate prior to PACT training (via additional error logs)
b) Assessment of errors missed by PACT but picked up by pharmacist post training (via ongoing technician log)
c) Assessment of errors detected by PACT during checking process (via ongoing technician log)

At point a), any dispensary staff dispensed the medication and the pharmacist performed the final accuracy check. At point b), the PACT had been trained and was working through the accuracy checking phase of the project, during which time they performed the check of one thousand items as if it was solely their responsibility but their pharmacist supervisor still performed the final check on the dispensing. After this phase was complete at point c) the PACT trainee became solely responsible for the final accuracy check. Although they might still be involved in dispensing, they were not able to dispense and check the same prescription.

Additional error logs

The technician candidates who trained to take on the PACT role were required to keep an error log where they documented all dispensing errors that they identified as part of the PACT training process. This only happened during the training portion of this pilot study and therefore after they had completed their training, an additional error log was created and utilised to collect the baseline data.

Additional Error Log Design

First data collection, (baseline)

The initial assessment of error level involved recording all the errors identified by the pharmacists during the prescription checking process for one working week. This was to take place before any of the training of the pharmacist or technicians had occurred and was to look at the baseline level of errors in the dispensing process, excluding prescribing errors that required intervention. Also included were any errors identified after the checking process or after leaving the pharmacy.

The error logs recorded the prescription item number, the type of error (see figure 4.2) in a formatted table with space to attach an incorrect label if the error was on the label
Chapter Four: Investigation into role changes that occurred during a pilot study of a CT role

Error Log. 1 = filling error, 2 =near miss, 3 =reportable error

<table>
<thead>
<tr>
<th>Date</th>
<th>Rx number</th>
<th>Description of error</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 4-2. Example of initial error log table utilised for baseline data collection.

A table of types of errors was developed and supplied to the participants. This was to ensure that the error reporting from participants would be consistent. This was not a comprehensive list of every possible error but was constructed from previous literature on published errors, from both NZ and overseas.\textsuperscript{104} \textsuperscript{105} \textsuperscript{106} This table was utilised at all collection times.

Label errors are the most common type of error.\textsuperscript{104} \textsuperscript{107}

**Classification of dispensing errors**

<table>
<thead>
<tr>
<th>Drug/Content errors.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect drug dispensed</td>
</tr>
<tr>
<td>Incorrect strength dispensed</td>
</tr>
<tr>
<td>Incorrect form dispensed</td>
</tr>
<tr>
<td>Incorrect quantity, too little/too much</td>
</tr>
<tr>
<td>Expired/deteriorated drug</td>
</tr>
<tr>
<td>Failure to supply drug/missed item</td>
</tr>
<tr>
<td>Other content error not included in the above categories</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Labelling error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incorrect drug name on label</td>
</tr>
<tr>
<td>Incorrect strength on label</td>
</tr>
<tr>
<td>Incorrect dosage form on label</td>
</tr>
<tr>
<td>Incorrect directions/warnings/ CALs on label</td>
</tr>
<tr>
<td>Incorrect patient’s name on label</td>
</tr>
<tr>
<td>Incorrect quantity on label</td>
</tr>
<tr>
<td>Incorrect ward/prescriber</td>
</tr>
<tr>
<td>Completely incorrect label on bottle</td>
</tr>
<tr>
<td>Typos</td>
</tr>
<tr>
<td>Any other labelling error not included in the above categories</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Issue error</th>
</tr>
</thead>
</table>

131
Chapter Four: Investigation into role changes that occurred during a pilot study of a CT role

<table>
<thead>
<tr>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Issued to incorrect patient</td>
</tr>
<tr>
<td>Incorrectly bagged</td>
</tr>
<tr>
<td><strong>Subsidy error</strong></td>
</tr>
<tr>
<td>Incorrect brand on label</td>
</tr>
<tr>
<td>Incorrect patient code</td>
</tr>
</tbody>
</table>

Figure 4-3. List of the classifications of dispensing errors used in this project.

Second data collection (Mid-point)

This data collection was to take place after the PACTs had completed their initial training and at approximately the midpoint in their one thousand item check.

In the PACT checking process, errors that the PACT identified were classed as ‘checking errors’ and were recorded in the error log. Any error brought to the attention of the pharmacy after leaving the pharmacy was recorded as a ‘reportable error’, which was recorded in the error log and the appropriate report sent to PDA.

PACTs were also asked to record how many items they checked each day.

Third data collection (Final)

This data collection was to take place after the trainee had completed all training and assessment and was acting as the PACT by taking over responsibility for the final accuracy check.

There were some unforeseen delays in carrying out this assessment. These are explained in the results section.

Data analysis - errors

The types of errors identified at each data collection point were counted and recorded in a table.

4.3.8 Time and Motion Methodology

Time and motion studies have developed over the last seventy to eighty years as a tool for identifying the types of tasks performed by an employee and the amount of time these tasks take up in a work day. This type of study started out in the industrial setting but is being increasingly utilised in almost all workplace settings. It is utilised in the healthcare sector to calculate both current and future staffing numbers. It is also a valuable tool to identify tasks that can be reallocated to different staff.\(^{108}\) \(^{109}\) \(^{110}\)
These can be performed utilising a variety of methods, direct observation, indirect observation and self-reporting. These methods can be performed using continuous observation or work sampling.

**Direct observation**
This method utilises trained observers to shadow the personnel who are being studied. The observer records how much time is spent on each of a set of pre-determined tasks that are the focus of the study. One of the disadvantages with this method can be the presence of the observer, which can be disruptive to normal workflow and intrusive in the workplace. This method is also subject to interpretation on part of the observer. They may record some activities incorrectly therefore clear directions during initial training are essential and an understanding of the work environment where the data is being collected is beneficial.

**Indirect observation**
This method relies on interpreted data from other sources. This can be by counting products produced at different points along a production line or usual workplace reports that are part of day to day activities. This method often produces only a limited amount of detail.

**Self-reporting**
This method uses the individuals being monitored to collect the data. In this situation individuals record what they did and how long it took them to perform specific tasks. This is performed retrospectively but introduces the problem of recall bias where the reported times may be influenced by the participants’ recollections. This can result in under-reporting of perceived pleasant activities and over-reporting of unpleasant activities. Therefore, it is preferable to record information as the activities occur.

This has been performed via barcode readers in which a predetermined selection of activities are allocated individual barcodes and the participants scan the corresponding barcode. This can be recorded continuously where the participants identify each activity as they change from one to the next or they could utilise a work-sampling technique and record activities at specific time points.

**Continuous observation**
Continuous observation requires an observer to shadow the target staff and measure the amount of time spent on individual tasks as they occur. This method has been used extensively in medicine, nursing and pharmacy. There are advantages to this method as information is collected continuously, and all tasks and the exact amount
of time spent undertaking each are reported. However, it has disadvantages as well. It is very time consuming and requires trained observers to monitor activities. It requires the constant physical presence of an observer, which can have an impact on the staff and the patients they interact with. Also, where space is limited it can be intrusive and physically restraining to have an extra person present. The observer needs to be trained and paid for the time spent observing and recording the activities, and this can lead to high costs.

**Work Sampling**

This is a method of gaining time and motion data via a non-continuous process.

Work sampling also has its origins in the industrial settings. Tippet, a statistician, realised that where the work performed was repetitious in nature it was possible to gain a picture of activities using randomly spaced observations rather than continuous observation. It is a statistical technique used to determine the proportion of time spent by workers in various defined categories of activity.

Tippet’s model utilises a standardised set of categories determined prior to commencing observations. These are usually the tasks of interest to the aim of the research but may include other general categories as well.

The choice of time intervals may be influenced by the environment and the individual participants. The smaller the interval the more intrusive the recording process can be: this can be overcome by collecting data utilising longer time intervals i.e. 10 minutes vs 2 minutes and for a longer period i.e. 5 days vs 1 day. A process that is too intrusive can affect the results and generate an inaccurate picture of the participants’ activities.

**4.3.9 Method options for time and motion study**

The time and motion study method options considered were:

- a. Direct observation (using trained observers)
- b. Indirect monitoring (using video cameras)
- c. Self-monitoring (using barcode scanners or phone app)

Direct observation was ruled out for this study as it would not be practical for many of the reasons outlined above. The pilot would occur in all twelve sites concurrently and these may have been scattered across NZ. Recruiting and training the number of observers to shadow the participants would not be practical. The high cost involved was prohibitive and in small work spaces two additional personnel (one for the pharmacist and one for the trainee) would be too disruptive to the normal running of the pharmacy.
Therefore, we considered indirect monitoring and self-monitoring as options.

Indirect monitoring was considered utilising individual video cameras that could be positioned in the dispensary of each participating pharmacy. A camera limited to taking pictures only and with no capacity to record audio was investigated to avoid inadvertently recording patient conversations or information. These would be positioned in such a manner as to cover only dispensary activities.

The video recordings would be recorded on memory cards and the cards removed from the camera, returned to the researchers and stored securely and the data analysed. During the analysis process a review of the video recording would be performed to quantify the amount of time spent on patient focused activities. The recording quality could be very good and it would be simple to discern what the individuals being recorded were doing.

The main problem with this method lay in placement of the cameras. Time and distance constraints prevented the researchers from arranging the positioning the cameras. Relying on the pharmacy staff to position the cameras, without having any idea of the layout of the work place would be likely to reduce the value of the data collected. Some workplaces may have needed two cameras to cover work areas due to line of sight obstructions such as shelving units.

Also, the data from cameras, although simple, could be very time consuming to analyse and if there was a fault with any device or its position this could reduce the amount of usable data.

It was decided that there were many disadvantages to using cameras so this method was rejected.

Self-monitoring is a method in which the individuals that are being studied collect their own data. This is a commonly used technique in workplaces where the presence of an additional individual may be problematic.

Strengths and limitations

One of the strengths of self-monitoring is the accuracy of the data collected. The person collecting the data reports exactly what task they were performing. This eliminates any possible misinterpretation by observers and is more accurate.

One of the weaknesses of this method is the need for participants to be interrupted repeatedly during their work day. When staff get busy or are changing tasks frequently.
it is possible that they will not record some of the changes in task or activity thereby resulting in missing data.

Self-monitoring using barcode scanners has been utilised in the past. This consists of a page of barcodes, one for each activity of interest, from which the participant can scan the corresponding barcode to signal the activity being performed at each time interval.

It is possible to signal all activities performed in a workplace, changing the codes as each new activity commences or it is possible to utilise a work sampling technique.

A self-monitoring technique was chosen for this study.

Cost considerations

Smart phones were utilised due to the significantly lower cost than bar-code readers. Smart phones could be purchased for less than one hundred and fifty NZ dollars each whereas bar-code readers were four hundred dollars or more each.

It was initially anticipated that it might be possible to utilise smartphones that belonged to individuals who were participating in the project. If there were individuals who did not have a smart-phone then devices could be purchased for this purpose. This idea was rejected because of concerns about what to do if the phones were all different and needed different apps, and potential problems with data analysis for data produced from different apps. We also wanted to eliminate the problem of having active cell phones in the dispensary and the possible interruptions personal text messages or phone calls might create. Therefore, we decided to purchase phones for the participants to ensure consistency of data collection. This meant locating a suitable app for the study and determining the categories for the data collection.

Category considerations

The choice of categories was made principally to allow us to collect the data we required and to make the task as simple as possible for the participants. To allow accurate comparison of results the button categories needed to be the same for all the respondents. Categories also needed to be appropriate to both hospital and community settings.

HWNZ, the funder for the pilot project was interested in evaluating whether the introduction of the PACT would result in the pharmacists spending more time in direct contact with the patient. It was decided that this was too narrow a focus therefore patient focused activities were divided into three categories. As well as direct patient contact,
we also included non-contact activities and supportive activities that indirectly benefit the patient. See the details in the Table 4.1.

**4.3.10 Time and Motion Study design**

The time and motion study was performed to evaluate whether there was a change in the work patterns of the pharmacists and technicians participating in the pilot project. This investigation focused on whether there was a change in the amount of time the pharmacists and the PACTs spent on identified activities.

This took place at the same three time points:

1. Initial assessment of the activities of those participating in pilot project (baseline)
2. Assessment of activities during training (mid-point)
3. Assessment of activities toward the end of the pilot, once PACT role in place (final)

At each time point, data was to be collected by both the supervising pharmacist and the PACT trainee/s for the duration of a standard working week (5 days) for each participating site.

**Initial plan**

 iPhones and an app called ‘Now Then” were investigated. This app had seven buttons that could be customised to the tasks for this project. The cost of this app was $3.80 per copy. The app also had a built in alarm to remind the user to reset the task they were currently performing. Data could be emailed to the researchers.

An equivalent Android app was investigated and several free app options were trialled by the researcher.

The button labels would have limited information visible therefore a detailed description of what each category consisted of would need to be provided to the participants.

**Final version**

It was decided that to ensure consistency of data that the researchers would supply the phones to the participants. It was also necessary to check that the pharmacist/managers would be willing to permit cell phones in the dispensary. Removing all communicating functions from the phones used in the study, rendered them data collection devices only. (see below).
The Vodafone Smart 4 (an Android phone) was chosen as supply of sufficient phones in time for the start of the project was easily achieved. Vodafone is the preferred supplier for the University of Otago.

Supplying all participants with phones meant that they could be customised with the required app. This introduced an element of security so that no-one could alter the phones’ functioning. After trialling some free Android apps the TimeRecorder app was chosen. TimeRecorder allows for nine or more customisable buttons.

Choosing the categories

To facilitate ease of use seven categories were chosen, three patient focused activities, three dispensing activities and a category for personal time. This had the added advantage of keeping the button size on the phone screens large which would help minimise incorrect category selection.

As mentioned above, the patient focused activities were divided into three. The dispensing process was divided into “assembling” and “checking” and the third category “other” was added to accommodate any additional dispensing tasks not covered by the first two categories. The specific “checking” category allowed for direct comparison between the pharmacist and checking technician pre and post introduction of the new role.

The final categories chosen were: “Direct patient activities”, “Indirect patient activities”, “Supportive patient activities”, “Assembling prescriptions”, “Checking prescriptions”, “Other” and “Break”. The buttons on the phones were labelled “Direct activities”, “Indirect activities”, “Supportive activities”, “Dispensing Rx”, “Checking Rx”, “Other” and “Break”.

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Figure 4-4. Screen shot of the phone, illustrating the categories used for data collection

To promote consistency in recording activities, additional information was provided to the participants at the training days to assist them in choosing how to categorise and record their activities.
Chapter Four: Investigation into role changes that occurred during a pilot study of a CT role

Table 4-1. Copy of the additional details for the phone’s button category selection, provided to study participants at the training day

<table>
<thead>
<tr>
<th>Assembling script items</th>
</tr>
</thead>
<tbody>
<tr>
<td>The mechanical process of entering prescription details into the dispensary computer when not part of a clinical check, issuing a repeat, counting, pouring or labelling a script ready for checking. Preparation of extemporaneous products is also included.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Checking a prescription</th>
</tr>
</thead>
<tbody>
<tr>
<td>Checking that the appropriate medication and instructions have been prepared according to the prescription</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Direct activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over The Counter inquiry</td>
</tr>
<tr>
<td>Pharmacist only sales</td>
</tr>
<tr>
<td>Counselling/education of patient</td>
</tr>
<tr>
<td>Counselling a patient while handing out a script</td>
</tr>
<tr>
<td>Counselling due to enquiry</td>
</tr>
<tr>
<td>Smoking cessation</td>
</tr>
<tr>
<td>Immunisation</td>
</tr>
<tr>
<td>Blood Pressure testing</td>
</tr>
<tr>
<td>Blood glucose testing</td>
</tr>
<tr>
<td>Warfarin/INR monitoring</td>
</tr>
<tr>
<td>Medicine use review</td>
</tr>
<tr>
<td>Methadone/suboxone</td>
</tr>
<tr>
<td>Clinical assessment of script if the patient is present</td>
</tr>
<tr>
<td>Speaking to patient on the phone</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Indirect activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Text reminders to patient</td>
</tr>
<tr>
<td>Email correspondence with patients or prescribers</td>
</tr>
<tr>
<td>Talking to prescribers re medication issues (excluding substitution, chem no.)</td>
</tr>
<tr>
<td>Setting up compliance packaging when appropriate</td>
</tr>
<tr>
<td>Medicine reconciliation</td>
</tr>
<tr>
<td>Information to staff on how to administer specific meds</td>
</tr>
<tr>
<td>Clinical advice to prescribers</td>
</tr>
<tr>
<td>Information on product medication safety/interactions</td>
</tr>
<tr>
<td>Checking lab results</td>
</tr>
<tr>
<td>Clinical assessment of script if patient absent</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Supportive activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>LTC documentation</td>
</tr>
<tr>
<td>MUR documentation</td>
</tr>
<tr>
<td>Research on medication issues i.e. side-effects, interactions.</td>
</tr>
<tr>
<td>Drug information inquiry</td>
</tr>
<tr>
<td>Breaks</td>
</tr>
<tr>
<td>Coffee/Tea breaks, lunch breaks, toilet breaks</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>Any other activity not covered by the previous options</td>
</tr>
</tbody>
</table>
Communicating with the participants

Instructions were provided at an initial training day and later questions answered via email and telephone communication.

Customising the phones

Each phone had the time and motion app (TimeRecorder) loaded onto it. To do this we created a Google account for the project, named Pact Pilot Project. This allowed us the opportunity to purchase the app from the Google store and download it onto the phones. The app itself was customised with all the unnecessary buttons removed from the app and the remainder edited to the titles that we utilised for the buttons (see above list). All extra icons were removed from the front page of the phone so that the only icon visible was the app for the study i.e. TimeRecorder. The screen was set so it could not rotate, thus avoiding this distraction for the participants.

Security

As an additional security measure the phones had their SIM cards removed so participants were unable to search the web or make calls. The phones were however able to access a Wifi signal, thus allowing the researchers to download the app to the phones.

Phone distribution

The phones and their chargers were handed out at the pharmacists’ training day. Each pharmacist was given their own phone and the phone(s) for the technician(s) in their workplace, along with a printed version of the instructions for how to use the phones for collecting the data.

Data extraction

The phones were returned to the researcher after each of the three data collection points and the data downloaded. The data was extracted from the phones using the app’s inbuilt extraction function which uploaded the data to the researcher’s computer as an Excel file. This data was then cleaned and subjected to frequency analysis and the generation of pie graphs.

Handling missing data

Missing data is not unusual when data points are being collected at regular intervals, especially when the individuals being monitored are recording their own data. This is
always a reality when individuals are recording during normal work hours. Some data points may not be collected at exactly ten minute intervals and there is the possibility of incorrect button selection, therefore a data cleaning process was required.

Data cleaning

Data cleaning was necessary as not all data points corresponded to exactly ten-minute time periods. The data extracted from the phones included all the times the respondents pressed one of the category buttons. There were times when the incorrect button was selected and then corrected and these data points needed to be accounted for before analysis could occur. There were also times when the buttons were not selected at the ten-minute interval and allowed to run on. There were other times when the button selection did not occur as predicted and all these irregularities had to be corrected before analysis could occur. (for copy of cleaning protocol see Appendix 6)

Analysis

Each individual cleaned data file was subjected to manual analysis. The individual number codes were counted and the number of data points in each category recorded in a table (see results for tables). The data from the table was utilised to create pie charts for each data set from each phone using Excel (see results section for pie charts).

Comparison of baseline and final data collection

The SPSS statistical package was used to compare the results from the baseline data and the final data collection. Microsoft Excel was utilised to generate comparisons.

Projected timeline from original project design constructed by Project Manager

The project was to start in September 2014 when the Expressions of interest invitations would be sent out to the pharmacies. The aim was to notify the selected pharmacies that they would be part of the pilot by the end of October 2014.

It was anticipated that training and assessment would be completed by all trainees by the end of May 2015.

NB. The predicted timeline did not match the anticipated timeline. It took longer for all the trainees to complete their assessments. This resulted in a ‘census’ type final data collection taking place.
4.4 Results

4.4.1 Progress table/timeline

This table summarises the progress of the trainees at specific milestones: the completion of the written modules, the 1000 item checking log, the practical test, the final interview and the probationary period. NB. This summary includes the details of two technicians who did not complete the programme (see below).

Table 4-2 Summary of the number of trainees completing set training milestones (grouped by month)

<table>
<thead>
<tr>
<th></th>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>Jun</th>
<th>Jul</th>
<th>Aug</th>
<th>Sep</th>
<th>Oct</th>
</tr>
</thead>
<tbody>
<tr>
<td>Written modules completed</td>
<td>5</td>
<td>7</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1000 item checking completed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Practical exam completed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Final interview completed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Probationary period completed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

The completion dates covered from January 2015 to October 2015, considerably longer than anticipated. Four of the trainees completed all their training by May 2015 but the last three trainees did not complete their training until October 2015.

4.4.2 Data point collection dates

The baseline data was collected from each pharmacy over the same week in November 2014.

The data at mid-point was collected over a six-month period starting in February 2015 and ending in July 2015.

The final (census) data was collected in the final week of August 2015.

4.4.3 Pharmacy Demographics

Twelve pharmacies were enrolled into this pilot project, four hospital pharmacies and eight community pharmacies. There were two trainees at one hospital site and in two community sites, the remaining sites had one trainee only.

One of the community sites pulled out of the pilot project before the mid-point data collection due to unforeseen staffing issues resulting in one pharmacist and one technician not collecting any data from this point.

One technician failed the assessment at the 1000 item check and withdrew from the project at this time, mid-point.
4.4.4 Survey results

These results contain the collected responses from all respondents, the pharmacists, technicians, the retail staff and other support staff grouped together.

NB. It should be noted here that these mid-point responses included two sites where the trainee had not completed the training and assessment therefore the trainee was not yet operating in the full capacity of a PACT.

4.4.4.1 Return rate

1. baseline returns = 150 online returns and 6 paper copies
2. midpoint returns = 80 online returns

This data was collected as each trainee reached approximately the 400th checked item in their 1000 item check. The PACTs were completing training at differing rates, resulting in a staggered data collection period.

Table 4-3. Summary of the number of survey responses received, by month.

<table>
<thead>
<tr>
<th>month</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
<th>May</th>
<th>June</th>
<th>July</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of respondents</td>
<td>38</td>
<td>33</td>
<td>9</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

3. Census return = 119 online returns and 2 paper copies

Table 4-4. Return rate comparison at baseline, mid-point and final data collection, including the number of surveys, sites and workplace settings.

<table>
<thead>
<tr>
<th>Returned surveys (n)</th>
<th>Sites (n)</th>
<th>Hospital (n)</th>
<th>Community (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>156</td>
<td>12</td>
<td>4</td>
</tr>
<tr>
<td>Midpoint</td>
<td>80</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>Final</td>
<td>119</td>
<td>11</td>
<td>4</td>
</tr>
</tbody>
</table>

NB. 57 responses at baseline (37%), 27 responses at mid-point (33%) and 43 responses at census (36%) came from one hospital.

4.4.4.2 Workplace Setting

Table 4-5. Summary of the number and percentage of responses from each workplace setting, at baseline, midpoint and final data collections.

<table>
<thead>
<tr>
<th>Workplace setting</th>
<th>First data collection (Baseline)</th>
<th>Second Data Collection (Mid-point)</th>
<th>Third Data Collection (Final)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=</td>
<td>n=</td>
<td>n=</td>
</tr>
<tr>
<td>Hospital</td>
<td>156</td>
<td>80</td>
<td>119</td>
</tr>
<tr>
<td>Community</td>
<td>59</td>
<td>27</td>
<td>45</td>
</tr>
<tr>
<td>Total</td>
<td>156</td>
<td>80</td>
<td>119</td>
</tr>
</tbody>
</table>
4.4.4.3 Gender details
The gender data collected at baseline and mid-point were very similar, male 19% vs 15% and female 81% vs 85%. No gender data was collected at the final time point as the demographic data collected was reduced in size to focus on the respondents experiences.

4.4.4.4 Questionnaire responses
The surveys contained questions in common at the three different time points. All contained sections on demographics, the ability of technicians, workflow, impact, benefits and disadvantages. There were some differences between surveys. The mid-point and census survey had a more detailed section on the impact on workflow and a selection of options from the previous experiences reported by the respondents of the first survey. There were differences in wording of some questions between the different time points (see later).

4.4.4.5 Section 1  Technicians’ ability
The respondents held very positive views on the four questions about technicians’ abilities to take on the PACT role at the time of the baseline data collection. The positive responses remained constant throughout the duration of the study. A small proportion of participants held negative views, and this proportion remained relatively constant.
Table 4-6. Question responses from all staff at baseline, mid-point and final data collection re technicians’ ability to be accurate

<table>
<thead>
<tr>
<th>Q: In your experience, do you feel that SOME technicians are capable of ACCURATELY checking a dispensed prescription to give out to a customer?</th>
<th>Baseline</th>
<th>Mid-point</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Disagree</td>
<td>4</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Neither disagree or agree</td>
<td>6</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Agree</td>
<td>44</td>
<td>28</td>
<td>20</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>95</td>
<td>61</td>
<td>51</td>
</tr>
<tr>
<td>Don’t usually work with technicians</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>156</td>
<td>79</td>
<td>116</td>
</tr>
</tbody>
</table>

Table 4-7. Question responses from all staff at baseline, mid-point and final data collection, re technicians’ ability to be accurate at their current level of training

<table>
<thead>
<tr>
<th>Q: Please indicate your agreement with the statement, technicians can accurately check a dispensing given their current level of training?</th>
<th>Baseline</th>
<th>Mid-point</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>11</td>
<td>7</td>
<td>5</td>
</tr>
<tr>
<td>Disagree</td>
<td>50</td>
<td>32</td>
<td>24</td>
</tr>
<tr>
<td>Neither disagree or agree</td>
<td>38</td>
<td>24</td>
<td>21</td>
</tr>
<tr>
<td>Agree</td>
<td>36</td>
<td>23</td>
<td>22</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>19</td>
<td>12</td>
<td>7</td>
</tr>
<tr>
<td>Don’t usually work with technicians</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>156</td>
<td>80</td>
<td>116</td>
</tr>
</tbody>
</table>

Table 4-8. Question responses from all staff at baseline, mid-point and final data collection, re technicians’ ability to be accurate after specific extra training

<table>
<thead>
<tr>
<th>Q: Please indicate your agreement with the statement, technicians could accurately check a dispensing after specific extra training?</th>
<th>Baseline</th>
<th>Mid-point</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Disagree</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Neither disagree or agree</td>
<td>5</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Agree</td>
<td>55</td>
<td>36</td>
<td>25</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>88</td>
<td>56</td>
<td>46</td>
</tr>
<tr>
<td>Don’t usually work with technicians</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>156</td>
<td>79</td>
<td>116</td>
</tr>
</tbody>
</table>
Table 4-9. Question responses from all staff at baseline, mid-point and final data collection, re technicians’ competence after specific extra training

<table>
<thead>
<tr>
<th>Q: Please indicate your agreement with the statement, technicians could be competent to do this if they had undertaken specific extra training?</th>
<th>Baseline</th>
<th>Mid-point</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n =</td>
<td>%</td>
<td>n =</td>
</tr>
<tr>
<td><strong>Strongly disagree</strong></td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Disagree</strong></td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Neither disagree or agree</strong></td>
<td>9</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td><strong>Agree</strong></td>
<td>55</td>
<td>36</td>
<td>30</td>
</tr>
<tr>
<td><strong>Strongly agree</strong></td>
<td>83</td>
<td>54</td>
<td>41</td>
</tr>
<tr>
<td><strong>Don’t usually work with technicians</strong></td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>156</td>
<td>79</td>
<td>116</td>
</tr>
</tbody>
</table>

4.4.4.6 Section 2  Impact on workflow

Overall the respondents believed this new role would fit well into their workplaces but that some changes would be needed to accommodate the new role.

Workflow and layout questions

The number and wording of questions in this section varied between surveys.

Baseline questions:

1. Does your pharmacy have a set workflow pattern for accepting and dispensing a prescription?
2. Can you see a CT fitting into the current overall workflow of your pharmacy?
3. Will you need to change the workflow of your pharmacy to accommodate this new role?

Table 4-10. Question responses from all staff at baseline data collection re workplace and layout

<table>
<thead>
<tr>
<th>None defined Not at all (%)</th>
<th>Clearly defined/ Extremely well/ Quite a lot</th>
<th>n =</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>14</td>
</tr>
</tbody>
</table>
mid-point questions:

1. Did your pharmacy workflow pattern for accepting and dispensing a prescription have to change with the introduction of the PACT?
2. Did you expect there would need to be changes to the existing workflow of the pharmacy?
3. Did it change in the way you anticipated?

Table 4-11. Question responses from all staff at mid-point data collection re workplace and layout

<table>
<thead>
<tr>
<th></th>
<th>Not at all (%)</th>
<th></th>
<th>Quite a lot (%)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>24</td>
<td>19</td>
<td>17</td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td>16</td>
<td>14</td>
<td>18</td>
<td>41</td>
</tr>
<tr>
<td>3</td>
<td>16</td>
<td>14</td>
<td>18</td>
<td>41</td>
</tr>
</tbody>
</table>

final questions:

1. Did your pharmacy workflow pattern for accepting and dispensing a prescription have to change with the introduction of the PACT?
2. Has there been any further change to the workflow since the last survey?
3. Did the changes involve a change in physical layout, furnishings or fittings moved or new ones bought etc. at any time?
4. If there have been changes, did these change/s lead to an improvement in workflow?
5. Did you feel these changes were needed?
6. Do you think the current workflow would benefit from further reorganisation to best utilise the PACT role?

Table 4-12. Likert scale question responses from all staff at final data collection, workplace and layout

<table>
<thead>
<tr>
<th></th>
<th>Not at all (%)</th>
<th></th>
<th>Quite a lot (%)</th>
<th>Unable to comment</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>20</td>
<td>13</td>
<td>17</td>
<td>19</td>
<td>20</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>16</td>
<td>16</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td>3</td>
<td>46</td>
<td>17</td>
<td>10</td>
<td>15</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>9</td>
<td>10</td>
<td>13</td>
<td>18</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>4</td>
<td>8</td>
<td>19</td>
<td>25</td>
</tr>
<tr>
<td>6</td>
<td>11</td>
<td>10</td>
<td>12</td>
<td>24</td>
<td>25</td>
</tr>
</tbody>
</table>

Comments on workflow

At baseline the respondents believed they had a set procedure in place for handling a prescription or a medication request. However, the respondents were divided as to the fit of the new role into their workplace and the need for change to the existing pattern. Some of the respondents reported that their workplace was already prepared for the PACT role and would therefore require little change. They believed that their workplace
had been ready for the introduction of this role for some time. There were others who felt that some change would be necessary but commented as their workplace had a supportive environment this change would be easy to put into effect.

There were many comments on ‘the need to establish new processes’, or to reorder tasks, particularly the placement of the pharmacist in the new process. This meant bringing the pharmacist in at the beginning of the process so that the appropriateness check could happen first and ‘to allow the checking tech to check at the end of the flow’. There was recognition that if the PACT was taken out of the assembly side of the dispensing process then additional technicians would be needed to fill this gap.

**New themes identified at mid-point**

There were many comments on the transitional nature of the study at this time in the training process. Many respondents felt that their workflow was yet to change or would need to change again later to accommodate the final version of the new role, once the PACT role was ‘in full swing’.

Some respondents reinforced the need for a change in mind set on the part of the pharmacists and that this could be challenging.

**New themes identified at final**

There were many positive comments about how well the PACT was working. Many respondents commented positively on the benefit to the patients and that the ‘work flow has become more efficient’ and an added benefit was ‘it decreased the errors so it’s a good idea’.

Many of the changes reported at this time had involved the expected changes to staff activities rather than physical changes in their workplace. There was very little reported change in the overall layouts of the pharmacies with many choosing to work within the existing layout. This included moving the PACT or the pharmacist performing the appropriateness check to a designated area within the existing layout.

There were however small purchases reported, e.g. ‘A new basket and peg system’, ‘A new stamp for prescriptions’, ‘More baskets to put prescriptions in for checking’, ‘We had to by a clinically checked stamp’, ‘New files were purchased to place scripts that had been checked.’
Chapter Four: Investigation into role changes that occurred during a pilot study of a CT role

There were a few comments about mind set and workflow, 'when everyone was in the right mind the flow worked very well but we slip back into the "old ways" sometimes.' It was felt that with more time this would become more of a habit and that the new role would be utilised at all times.

4.4.4.7 Section 3 Impact on pharmacists and their ability to spend more time with patients

At the baseline data collection the majority of the respondents agreed that the introduction of the PACT would have a positive impact on pharmacists and patients. They could see the benefits from the change. There were few examples of disadvantages reported at that stage.

Later the respondents were more certain of a positive impact from the introduction of the PACT role. The neutral responses increased at midpoint but decreased at census. Most of these observed changes resulted from a shift into the category 'unable to comment' which was not an option at baseline and mid-point. This may be in part due to the disruption caused by the training process.

Table 4-13. Question responses from all staff at baseline, mid-point and final data collection, re new roles impact on pharmacists

<table>
<thead>
<tr>
<th>Q: What impact do you think this new role will have on the pharmacists?</th>
<th>Baseline</th>
<th>Mid-point</th>
<th>Final</th>
<th>Excluding unable to comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>n =</td>
<td>%</td>
<td>n =</td>
<td>%</td>
<td>n =</td>
</tr>
<tr>
<td>A negative impact</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>4</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>26</td>
<td>18</td>
<td>19</td>
<td>26</td>
<td>9</td>
</tr>
<tr>
<td>36</td>
<td>25</td>
<td>23</td>
<td>32</td>
<td>28</td>
</tr>
<tr>
<td>A positive impact</td>
<td>80</td>
<td>54</td>
<td>26</td>
<td>36</td>
</tr>
<tr>
<td>Unable to comment</td>
<td>16</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>147</td>
<td>73</td>
<td>113</td>
<td>n =97</td>
</tr>
</tbody>
</table>

Themes identified at baseline

At baseline the majority of the comments noted a positive impact on the pharmacist and focused on the pharmacists’ ability to have an increased clinical role. There were
comments that the change would have a positive impact on the pharmacist by reducing interruptions and helping by ‘taking some of the pressure off them.’

Several respondents however, commented that at this point they were unsure exactly how much time the pharmacist would have under the new system and that it would be a case of wait and see. This was seen as being particularly relevant in smaller pharmacies with small numbers of staff. The negative comments raised the concern of job losses for pharmacists and the concern that pharmacy owners might replace a pharmacist with a checking technician.

There were several comments on the impact of the personal attitude of the pharmacist. There was an awareness that not every pharmacist would be comfortable with this change in roles. ‘Some believe that we [technicians] are under qualified and should not be allowed to check…and see this as a threat to their own roles.’

**New themes identified at mid-point**

Once again, the respondents felt that there had been an increase in safety and a decrease in errors. They could appreciate the benefit of a ‘second set of eyes’ and not just to those involved in the checking process. This change ‘has improved everybody’s checking technique and also decreased error rate.’

At this point the participants acknowledged that there was a decrease in efficiency because while the workflow was now more organised the pharmacist was still required to check the prescription.

There was only one purely negative comment that expressed concern for the future employment opportunities for pharmacists ‘as it may be harder for pharmacists to find work.’

**New themes identified at final**

While most of the responses were positive and that this was a positive change for pharmacists there were a couple of comments that the pharmacist had to improve their clinical skills…‘some had to upskill a bit and take more time with this’. And for some they ‘find it a little hard to clinically [sic] check.’

One respondent noted that this change did not meet with universal approval initially with, ‘Some resistance originally from pharmacists but much better now.’
Q: This role may allow pharmacists to spend more time with patients?

At baseline the respondents held strong opinions that the PACT role would allow pharmacists to spend more time with patients. At midpoint this had reduced to less than half (36%) of the respondents. At the final data collection they were asked if they felt the pharmacists were spending more time with patients. At this point the number of positive responses had almost halved, reducing from the baseline 80% to 43%.

The number of respondents who were unsure increased in the final data collection. There was no option to opt out of this question for staff who might not have direct contact with the pharmacist and their role and so those who did not work directly with a pharmacist may have used this option.

The neutral responses increased to nearly double from baseline to midpoint (35%) and remained similar at final data collection (33%).

Table 4-14. Question responses from all staff at baseline, mid-point and final data collection, new role will allow pharmacists to spend more time with patients

<table>
<thead>
<tr>
<th>Q: This role may allow pharmacists to spend more time with patients?</th>
<th>Baseline</th>
<th>Mid-point</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n =</td>
<td>n =</td>
<td>n =</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>2</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>10</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>26</td>
<td>25</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>40</td>
<td>15</td>
<td>23</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>82</td>
<td>15</td>
<td>21</td>
</tr>
<tr>
<td></td>
<td>54</td>
<td>24</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>153</td>
<td>72</td>
<td>111</td>
</tr>
</tbody>
</table>

At baseline many of the respondents were very optimistic that the pharmacist would be able to spend more time with the patients and commented that the increased time with the pharmacist was going to be a benefit to the patients. There were additional comments on the potential for the expansion of the pharmacists' existing role into new roles as well as the increase in clinical roles.

One respondent questioned how much more time would be spent with patients if fewer pharmacists were employed and the possibility that this change ‘may be used as a money-saving exercise and there would just be less pharmacists, rather than extra time to spend with patients’.
New themes identified at mid-point

Once again it was noted on many occasions that this was a work in progress.

There was considerable agreement at this point that the pharmacist would be able to spend more time with patients, but this was not always being seen yet as everyone was still involved in the pilot project and the pharmacist was still involved in the checking process and was busy supervising the trainee.

One respondent raised the question of whether the new formal clinical assessment before dispensing takes place would take up the same amount of time as the previous task of checking the dispensing.

This was the first time that there were specific comments on the differences between the hospital setting and the community setting. It was acknowledged that there was less direct patient contact in the hospital setting as ‘we don’t do patient counselling’ and this was not expected to change but that there were many other areas of ‘patient focused activities’ into which the pharmacist could move, ‘they get to spend longer on other drug queries,’ also this could not be limited to just increased contact with patients ‘…but with other allied health professionals too, such as doctors, nurses, physios etc.’

New themes identified at final data collection

Many respondents felt that the PACT had allowed the pharmacist more time talking to patients. There were examples given of additional services that were being undertaken with this extra time. ‘The pharmacist has more time to do other tasks not just spending time with patients, this included activities such as CPAMs/vaccination/LTC.’

The change was seen to increase the time with patients but again this differs between work settings, ‘this may more apply in community pharmacy as the pharmacist can spend quality time with patients without rushing and going back to checking prescriptions.’

In the hospital setting the pharmacists do not spend as much time directly talking to patients as their community colleagues. This meant the hospital pharmacists spend more time ‘indirectly, not face to face. i.e. clinical review time increased.’

But there were also comments that the new activities might not always be clinical activities… ‘simply freeing up time may not affect that result as the time can be put into non customer focused areas’. One respondent commented that due to a number of reasons ‘I would say that whilst PACT is an enabler, it is not the motivator.’
4.4.4.8 Section 4 Benefits to pharmacy, patients and staff

This includes responses to three questions, benefits to:

1. The pharmacy
2. The patients
3. The staff

At baseline data collection there was very strong agreement with the benefits of the PACT role to the pharmacy, the patients and the staff. Almost none of the respondents disagreed. The greatest benefit was perceived to be to the patients.

There were shifts in the level of agreement across the project, and there was a decrease in the positive responses demonstrated in all three questions. The most significant decrease occurred in the perception of the benefits to patients over time.

There were changes in the number of neutral responses. While these responses decreased from the baseline level at mid-point they increased again at the final date collection, these doubled in most cases.

Table 4-15. Question responses from all staff at baseline, mid-point and final data collection, benefits to the pharmacy

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Mid-point</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n =</td>
<td>%</td>
<td>n =</td>
</tr>
<tr>
<td><strong>Strongly disagree</strong></td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Disagree</strong></td>
<td>3</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td><strong>Neither disagree or agree</strong></td>
<td>14</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td><strong>Agree</strong></td>
<td>57</td>
<td>37</td>
<td>25</td>
</tr>
<tr>
<td><strong>Strongly agree</strong></td>
<td>80</td>
<td>51</td>
<td>41</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>155</td>
<td>74</td>
<td>107</td>
</tr>
</tbody>
</table>

Table 4-16. Question responses from all staff at baseline, mid-point and final data collection, benefits to the patients

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Mid-point</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n =</td>
<td>%</td>
<td>n =</td>
</tr>
<tr>
<td><strong>Strongly disagree</strong></td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Disagree</strong></td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td><strong>Neither disagree or agree</strong></td>
<td>38</td>
<td>25</td>
<td>12</td>
</tr>
<tr>
<td><strong>Agree</strong></td>
<td>53</td>
<td>34</td>
<td>26</td>
</tr>
<tr>
<td><strong>Strongly agree</strong></td>
<td>60</td>
<td>38</td>
<td>32</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>156</td>
<td>74</td>
<td>107</td>
</tr>
</tbody>
</table>
Table 4.17. Question responses from all staff at baseline, mid-point and final data collection, advantage to the staff

<table>
<thead>
<tr>
<th>Q: This role would be an advantage to the staff?</th>
<th>Baseline</th>
<th>Mid-point</th>
<th>Final</th>
</tr>
</thead>
</table>
|                                               | n =      | n =       | n =   |%
| Strongly disagree                             | 1        | 1         | 1     |1 |
| Disagree                                      | 3        | 1         | 1     |2 |
| Neither disagree or agree                     | 19       | 8         | 8     |26 |
| Agree                                         | 61       | 28        | 38    |45 |
| Strongly agree                                | 71       | 35        | 48    |42 |
| Total                                         | 156      | 73        | 107   |

Themes identified at baseline (all three questions)

The benefits to the pharmacy were identified as mainly improved relationships, which were seen as a benefit to the patients. These improved relationships were seen to come from a decrease in time to complete prescriptions, resulting in less waiting. Increased efficiencies were again cited as providing the benefit of speeding up the checking process. This coupled with greater access to the pharmacist for advice on OTC products and prescribed medication would allow for a greater rapport with patients (an important factor in the community setting) and increased clinical input resulting in improved outcomes for the patient (important in both the community and hospital settings). It was also suggested that the increased structure might result in reduced errors.

The respondents could see both positive and negative outcomes for staff. The change in roles, as mentioned before, would allow the technicians to develop a career structure resulting in increased job satisfaction. The change in roles would result in a reorganisation of workload between other staff and concern was expressed as to how this would happen and the fact that the other technicians would have to do more therefore increasing their workload.

This change was seen to benefit staff outside the pharmacy with more support available to junior doctors at ward level in the hospital and support for GP’s by resolving problems and potentially reducing unnecessary visits to the GP’s practice.

Again it was noted that there might be a difference in impact between the two pharmacy settings.
There were also comments from staff who had previously worked with a checking technician. ‘I have worked with checking technicians in the UK. It frees up time for pharmacists to concentrate on clinical issues’.

**Themes identified at midpoint (all three questions)**

There were many comments that there would be benefits to all concerned, ‘Nothing but positive aspects can come out of this for both patients, technicians AND pharmacists!’

Again the respondents commented that this was a work in progress as the PACT trainee is still in training, ‘At the moment it is a little bit messy with everybody trying to get their heads around it but I think it will impact positively in the future.’ There were no negative comments to this question and the respondents still gave many examples of perceived benefits.

There were many comments on the positive impact on the technicians. The new role ‘gives more responsibility to the technicians’, and has the ‘potential for it to lead to new roles for our high-functioning technicians’, alongside an acknowledgement that there will need to be an increase in staff, especially technicians.

There was a perception of improved teamwork brought about by this change and the resulting improved communication. There were positive comments on the impact and improvements in workflow - the new process was seen to be efficient and time saving. It was also suggested that this change was decreasing dispensing errors.

There were a few comments on the impact on the pharmacists, and these are included in the section on impact on pharmacists.

**Themes identified at final data collection**

There was significant overlap in the benefits seen to the pharmacy, patients and staff. Almost all of the comments were positive and the greatest number of responses were those expressing the belief that the greatest benefit was to the patients, as the pharmacist was able to spend more time with them. Even the benefit to the pharmacy of being able to increase the number of services available was seen as a benefit to the patients.

There were several comments on increased efficiencies, ‘Clinical problems fixed before item is dispensed resulting in less re-dispensing and more efficient process,’ Also, the number of errors documented had increased. It was suggested that this not due to an increased number of errors but due to, ‘Pharmacists may have been picking up errors
at same rate as Tech, but they weren't documenting them’. One respondent commented that ‘I suspect that because the PACT is totally focused on just an accuracy check that they are more likely to detect the "smaller errors" e.g. quantity, repeats, correct doctor, address, patient name’, suggesting that these ‘smaller errors’ might not be seen as important enough to document.

There were more comments on this being a work in progress as some sites had not seen the full benefit of the PACT role as the PACT had only just completed their training.

### 4.4.4.9 Section 5 Disadvantages
This includes responses to three questions, disadvantages to:

- The pharmacy
- The patients
- The staff

At baseline data collection the respondents held strong opinions that there would be no disadvantages from the introduction of the PACT role. This number decreased at the mid-point and then increased lightly at the final data collection, with many moving into the neutral responses.

Those anticipating disadvantages remained relatively constant.

Table 4-18. Question responses from all staff at baseline, mid-point and final data collection, disadvantage to the pharmacy

<table>
<thead>
<tr>
<th>Q: This role would be a disadvantage to the pharmacy?</th>
<th>Baseline</th>
<th>Mid-point</th>
<th>Final</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n =</td>
<td>n =</td>
<td>n =</td>
</tr>
<tr>
<td>Strongly disagree</td>
<td>72</td>
<td>48</td>
<td>31</td>
</tr>
<tr>
<td>Disagree</td>
<td>55</td>
<td>36</td>
<td>31</td>
</tr>
<tr>
<td>Neither disagree or agree</td>
<td>20</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>Agree</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Strongly agree</td>
<td>4</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>154</td>
<td>71</td>
<td>102</td>
</tr>
</tbody>
</table>
Themes identified at baseline

At this point there were only a small number of negative comments and these were from only a small number of individuals.

Several comments indicated a perception that a significant part of the pharmacist’s role is the checking of prescriptions. Concern was expressed that the PACT might ‘replace the pharmacist role’, and that there might be conflict between pharmacists and technicians ‘with regards to what their roles are’.

One respondent commented that this new role could be a challenge as some individuals might find it hard to ‘let go the reins’ but some (especially the more experienced) might find ‘it harder to change to these methods’. It was also suggested that this new role might
not be universally accepted and that it ‘may take time and confidence for some pharmacists to accept a checking technician.’

It was also noted that coping with the change itself could be challenging. There was acknowledgment that the training process would be a stressful time for all staff and ‘put pressure on everyone’ but that this might be transient.

As was noted earlier, the issue of a decrease in the number of pharmacists was raised. This potential for pharmacist job losses was obviously of concern to several respondents as they could see the situation in which fewer pharmacists were required. Concern was expressed that community pharmacy owners might take this opportunity to decrease pharmacist numbers as a cost saving exercise and therefore fewer pharmacists would result in a decrease in time spent with patients.

There were respondents who had reservations about the appropriateness of the technicians taking on this role. A couple felt this should always remain the responsibility of the pharmacist.

There was a need to feel confident about safety and liability, that the quality of the training would need to be sufficient to ensure accuracy and who takes responsibility would need to be clearly stated.

**New themes identified at mid-point**

Many of the comments suggested that there were no disadvantages to this change but there were a couple of examples given as potential issues. The shift of the pharmacist from the end of the dispensing process to the beginning was seen as a possible disadvantage especially if they were involved in imputing label data into the dispensing computer. The pharmacists were seen to be a lot slower than a technician.

The change was also seen as a potential disadvantage to some pharmacists, ‘Any pharmacist who has previously been comfortable in a checking role and not taking on the clinical aspects confidently or a little off the pace with processing/labelling will find this change daunting and challenging.’

There was also the increased workload on other staff, ‘the pharmacy and patients won’t be disadvantaged but more work may be put on certain staff members than other.’
New themes identified at final data collection

Several of the comments concerned the need for more technicians. The shift into the PACT role meant that there was an increase in the workload of the remaining technicians as the PACT ‘are taken away from their original jobs’. There was concern expressed that at this point there was no increase in wages for the PACT.

One of the disadvantages identified was the disruption caused by the training process and individual's ability to change. It was argued that some individuals did not cope well with change.

There was a comment about trust, ‘I cannot see how there would be any disadvantage unless the person employed did not have the respect and necessary skills to perform in this role’ implying that they had reservations about the selection and training process for the PACT. However, this respondent did feel their PACT was more than capable.

4.4.4.10 Additional final question, PACT supervision

An additional question about supervision of the trainee was added to the third survey questions. The respondents were asked if they were involved in the supervision or checking of the PACT at any time.

Twenty-nine percent gave a positive response (n=36) and seventy-one percent (n=89) gave a negative response.

4.4.4.11 Respondents’ experiences

This table contains a list of experiences reported by participants during the baseline survey. These are a combination of positive and negative comments obtained from the responses.

The respondents at mid-point and final data collection were asked to indicate if they had experienced any of the examples themselves. The majority of the respondents had experience with some of these examples given.
Table 4.21. Examples of respondents’ experiences (both positive and negative) reported at midpoint and revisited at final data collection

<table>
<thead>
<tr>
<th>18. Have you noticed or experienced any of the following?</th>
<th>Mid-point</th>
<th>Final</th>
<th>Change from midpoint</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples</td>
<td>Yes (%)</td>
<td>No (%)</td>
<td>Count (n=)</td>
</tr>
<tr>
<td>Increase in pharmacist OTC involvement?</td>
<td>20</td>
<td>80</td>
<td>61</td>
</tr>
<tr>
<td>Decrease in waiting times for patients?</td>
<td>21</td>
<td>79</td>
<td>63</td>
</tr>
<tr>
<td>Increased staff stress in coping with the change?</td>
<td>31</td>
<td>69</td>
<td>64</td>
</tr>
<tr>
<td>Any friction between staff members due to the change?</td>
<td>20</td>
<td>80</td>
<td>66</td>
</tr>
<tr>
<td>Initial teething problems to date?</td>
<td>40</td>
<td>60</td>
<td>64</td>
</tr>
<tr>
<td>Streamlining of roles?</td>
<td>50</td>
<td>50</td>
<td>64</td>
</tr>
<tr>
<td>Need for more technicians in the workplace?</td>
<td>49</td>
<td>51</td>
<td>67</td>
</tr>
<tr>
<td>Any problems with PACT telling other techs about filling errors?</td>
<td>3</td>
<td>97</td>
<td>63</td>
</tr>
<tr>
<td>Increased clinical activity for the pharmacist?</td>
<td>46</td>
<td>54</td>
<td>63</td>
</tr>
<tr>
<td>Significant change to the pharmacy layout?</td>
<td>13</td>
<td>87</td>
<td>67</td>
</tr>
</tbody>
</table>

4.4.5 Error reports

4.4.5.1 Baseline

Error data from baseline collection which was performed by the supervising pharmacists:

n=204 errors identified and reported by the pharmacists using the criteria provided. (See methods)

1. Filling error n = 190 93%
2. Near miss n = 11 5%
3. Reportable error n = 3 2%
Table 4-22. Error types identified at baseline data collection

<table>
<thead>
<tr>
<th>Type of error</th>
<th>Number of individual errors (n=)</th>
<th>Total of errors in each group (n=)</th>
<th>Percentage of total errors (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content errors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 Incorrect patient</td>
<td>7</td>
<td>49</td>
<td>49%</td>
</tr>
<tr>
<td>2 Incorrect drug</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Incorrect strength</td>
<td>13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Incorrect form</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Incorrect quantity</td>
<td>38</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Expired/deteriorated drug</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Failure to supply</td>
<td>15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 Other content error</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Label errors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9 Incorrect drug</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 Incorrect strength</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11 Incorrect dosage form</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 Incorrect directions</td>
<td>56</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13 Incorrect quantity</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14 Incorrect ward/prescriber</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 Incorrect label on bottle/pack</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>16 Typos</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17 Other</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Issue error</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 Given to incorrect patient</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19 Incorrectly bagged</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subsidy error</td>
<td>18</td>
<td></td>
<td>9%</td>
</tr>
<tr>
<td>20 Incorrect brand on label</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21 Incorrect patient code</td>
<td>6</td>
<td></td>
<td></td>
</tr>
<tr>
<td>22 Admin error</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>5</td>
<td></td>
<td>2%</td>
</tr>
<tr>
<td>23 Stopped medication dispensed</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24 Repeats missed</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 Incorrect patient details (address)</td>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Incorrect direction on a label produced the largest number of errors in any one category. These errors usually occurred during the preparation phase of the dispensing and were picked up during the checking process.
**Error rates**

The initial proposal to calculate error rates was not possible due to human factors (see discussion). There were difficulties obtaining the total number of prescriptions dispensed in all sites. There were also issues confirming if all the errors had been identified and documented. This made the calculation of overall error rates impossible.

4.4.5.2 Mid-point

The error data collected at this point was incomplete. The trainees were documenting every error they had identified in their error log. This created confusion at this point as the trainee technicians were at the mid-point during their 1000 item check and were very conscious of the need to identify every error that might be present in the prescription items they were checking. This resulted in the other staff not keeping details of any other errors except the reportable ones. As other staff were checking the remaining prescriptions we were made aware that they were not collecting information on the errors they identified. Therefore, it was decided to not include error data from the mid-point data collection.

4.4.5.3 Final Data collection

Due to the previous issues experienced collecting error data, no data was collected at this point.

4.4.5.4 Training Errors - Errors during 1000 item check

As part of the training programme the PACT trainees were required to perform the accuracy check on 1000 dispensed items. There were restrictions surrounding the number of errors that could be made during this time. These were classified as Group A = serious error and Group B = minor error. Penalties were added in the case of some errors, see below.

- The PACTs were permitted to make 1 Group B error without additional penalty.
- If two Group B errors were made, then 250 additional items had to be completed.
- They were permitted to make one Group A error and then 250 additional items had to be completed.
- If two Group A errors were made, then the 1000 items had to be started again from the beginning. (If two group A errors were made on the second attempt then the trainee could not continue and was excluded from the pilot.)
Table 4.23. This table illustrates the number of attempts the trainees from each site required to complete the 1000 item check section of their training. The table includes the number and type of errors made and any additional penalties incurred.

<table>
<thead>
<tr>
<th>Site</th>
<th>No errors</th>
<th>First attempt</th>
<th>Second Attempt</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 x Gp A</td>
<td>2 x Gp B</td>
</tr>
<tr>
<td>A</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>C</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E(1)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E(2)</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>F(1)</td>
<td>✓</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>F(2)</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>G</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>H</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>I</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>J</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>K</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L(1)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L(2)</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

# no additional added, these errors were procedural for the workplace and not considered errors by the study guidelines.

*making two group B errors on the second attempt meant that this trainee could not continue in the project.

4.4.6 Time and motion

4.4.6.1 Time and motion, data collection points

This section compares data collected at baseline (pre) and the final data collection (post). Phone data at mid-point was not included in these results due to human factors and the variation of dates at which the data was collected.

4.4.6.2 Missing data

Not all data points were collected: missing data occurred at all sites when the respondents did not indicate which activity they were performing at every time point. Missing data occurred during both pre and post data collections.
**Missing data: Pharmacists**

Table 4-24. Comparison of missing data pre and post for the pharmacists (percentage)

<table>
<thead>
<tr>
<th>Site</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>8</td>
<td>14</td>
<td>6</td>
<td>13</td>
<td>18</td>
<td>30</td>
<td>35</td>
<td>36</td>
<td>49</td>
<td>25</td>
<td>46</td>
<td>$</td>
</tr>
<tr>
<td>Census</td>
<td>*</td>
<td>38</td>
<td>15</td>
<td>16</td>
<td>14</td>
<td>$</td>
<td>54</td>
<td>38</td>
<td>50</td>
<td>43</td>
<td>35</td>
<td>$</td>
</tr>
</tbody>
</table>

$ = data not collected  * = site withdrew from pilot

At Baseline: Missing data ranged from 6% - 49%. Mean = 25%

At Census: Missing data ranged from 14% - 54%. Mean = 34%

**Missing data: technicians**

Table 4-25. Comparison of missing data pre and post for the technicians (percentage)

<table>
<thead>
<tr>
<th>Site</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E1</th>
<th>E2</th>
<th>F1</th>
<th>F2</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>5</td>
<td>6</td>
<td>19</td>
<td>14</td>
<td>$</td>
<td>21</td>
<td>16</td>
<td>6</td>
<td>50</td>
<td>32</td>
<td>24</td>
<td>50</td>
<td>54</td>
<td>20</td>
</tr>
<tr>
<td>Census</td>
<td>*</td>
<td>26</td>
<td>20</td>
<td>12</td>
<td>13</td>
<td>$</td>
<td>70</td>
<td>$</td>
<td>50</td>
<td>21</td>
<td>48</td>
<td>46</td>
<td>57</td>
<td>#</td>
</tr>
</tbody>
</table>

$ = data not collected  * = site withdrew from pilot

At Baseline: Missing data ranged from 5% - 54%. Mean = 23%

At Census: Missing data ranged from 12% - 57%. Mean = 36%

NB. As the amount of missing data increases, the reliability of the data decreases accordingly. For this reason the comparison tables that follow have been constructed using only the data from sites where less than twenty-five percent of the data was missing.

A full summary table of all the data collected (pre vs post) from the pharmacists’ devices is included in Appendix 7.

**4.4.6.3 Pharmacist data (pre vs post)**

The baseline data collection demonstrated that pharmacists are not only involved in patient focused activities (range: 11% - 57%, mean = 28%) but were also involved in both assembling and checking dispensing activities (range: 4%-60%, mean =16%)

After the introduction of the PACT, on average pharmacists in both groups (hospital and community) increased the amount of time spent on patient focused activities and decreased the amount of time spent on dispensing activities.

Example: from pre to post Site C (a hospital pharmacy) the pharmacist increased the amount of time spent in patient focused activities from 57% to 67%. This was not the
largest reported change in total patient focused activities. The biggest change seen at this site was the shift from indirect activities to direct contact with patients (3% to 34%).

Table 4-26. Summary of pharmacist activities for all categories, includes range and means calculated from sites where percentage of missing data was less than twenty-five percent.

<table>
<thead>
<tr>
<th>Pharmacist Activities</th>
<th>Range (%)</th>
<th>Mean (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td>Direct activities</td>
<td>3-11</td>
<td>6-34</td>
</tr>
<tr>
<td>Indirect activities</td>
<td>3-54</td>
<td>25-39</td>
</tr>
<tr>
<td>Supportive activities</td>
<td>0-4</td>
<td>2-33</td>
</tr>
<tr>
<td>Assembling Rx</td>
<td>0-32</td>
<td>0-22</td>
</tr>
<tr>
<td>Checking Rx</td>
<td>5-28</td>
<td>4-6</td>
</tr>
<tr>
<td>Other</td>
<td>6-23</td>
<td>1-11</td>
</tr>
<tr>
<td>Break</td>
<td>6-12</td>
<td>5-12</td>
</tr>
<tr>
<td>Missing</td>
<td>6-25</td>
<td>14-16</td>
</tr>
</tbody>
</table>

The data collected from the pharmacists from each site was grouped into total patient focused activities. This included the total of all direct activities, indirect activities and supportive activities and the means of these collected values, using sites with less than twenty-five percent missing data.

Pharmacists’ Patient Focused Activities summary

At Baseline: Patient focused activities ranged from 11% - 57%. Mean = 29%

At Census: Patient focused activities ranged from 33% - 74%, range = 58%.

The data collected from sites with less than twenty-five percent missing data and all sites was compared. The data showed that the changes demonstrated using all site post data collection mirrored those seen when only sits with less than twenty-five percent of data was used.
Table 4-27: Comparison in reported pharmacist activities (percentage) between pre and post means for activities calculated using those sites with less than twenty-six percent missing data vs values from all sites.

<table>
<thead>
<tr>
<th>Activity</th>
<th>&lt;26% missing data</th>
<th>All data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct activities</td>
<td>11 ↑</td>
<td>6 ↑</td>
</tr>
<tr>
<td>Indirect activities</td>
<td>13 ↑</td>
<td>2 ↑</td>
</tr>
<tr>
<td>Supportive activities</td>
<td>11 ↑</td>
<td>5 ↑</td>
</tr>
<tr>
<td><strong>Total patient focused activities</strong></td>
<td>19 ↑</td>
<td>9 ↑</td>
</tr>
<tr>
<td>Assembling prescription</td>
<td>8 ↓</td>
<td>3 ↓</td>
</tr>
<tr>
<td>Checking prescriptions</td>
<td>13 ↓</td>
<td>10 ↓</td>
</tr>
<tr>
<td><strong>All dispensing</strong></td>
<td>20↓</td>
<td>No change</td>
</tr>
<tr>
<td>Other</td>
<td>8 ↓</td>
<td>8 ↓</td>
</tr>
<tr>
<td>Breaks</td>
<td>1 ↔</td>
<td>1 ↔</td>
</tr>
</tbody>
</table>

4.4.6.4 Technician data

Three of the sites in the project had two technicians collecting data, sites E, F and L.

All technicians’ means indicated a decrease in patient focused activities and assembling prescription activities and an increase in checking prescription activities.

Table 4-28. Summary of technician activities for all categories, includes range and means calculated from sites where percentage of missing data was less than twenty-five percent and one site with twenty-six percent missing data.

<table>
<thead>
<tr>
<th>Technician Activities</th>
<th>Range (%)</th>
<th>Mean (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre</td>
<td>Post</td>
</tr>
<tr>
<td>Direct activities</td>
<td>1-12</td>
<td>0-14</td>
</tr>
<tr>
<td>Indirect activities</td>
<td>1-30</td>
<td>1-17</td>
</tr>
<tr>
<td>Supportive activities</td>
<td>0-17</td>
<td>0-3</td>
</tr>
<tr>
<td>Assembling Rx</td>
<td>11-61</td>
<td>6-46</td>
</tr>
<tr>
<td>Checking Rx</td>
<td>0-2</td>
<td>3-21</td>
</tr>
<tr>
<td>Other</td>
<td>2-54</td>
<td>0-41</td>
</tr>
<tr>
<td>Break</td>
<td>4-13</td>
<td>1-15</td>
</tr>
<tr>
<td>Missing</td>
<td>5-24</td>
<td>12-26</td>
</tr>
</tbody>
</table>

Technicians’ Dispensing Activities summary

At Baseline:  Assembling activities ranged from 11% - 61%. Mean = 34%
Checking activities ranged from 0% - 2%. Mean = <1%.

NB. One site reported 8% of the technician’s time was spent checking at baseline. This was established to be checking prepack medication which did not qualify as ‘checking Rx’ within the criteria of the study. This figure has been excluded from the above calculations.

At Final: Assembling activities ranged from 6% - 46%. Mean = 24%

Checking activities ranged from 3% -21%. Mean =13%
4.4.6.5 Pie charts: comparison of reported time on specific activities - pre and post comparisons from all sites and participants.

**Site A - Community pharmacy**

Site A pulled out of the pilot project therefore no census data was collected from the site.

Pharmacist data

![Pre data](image)

*Figure 4-5. Results of pre data for Site A pharmacist.*

Technician data

![Post data](image)

*Figure 4-6. Results of pre data for Site A technician.*

Legend for all figures on this page:
- Direct Activities
- Indirect Activities
- Supportive Activities
- Assembling Rx
- Checking Rx
- Other
- Break
- Missing data
Site B - Community pharmacy

Pharmacist: this pharmacist’s patient focused activities increased from 14% to 30% with the largest increase in direct activities increasing from 10% to 28%. The amount of time spent on dispensing activities decreased overall from 66% to 30%, with the time spent checking prescriptions decreasing from 28% to 10%. NB. Trend only due to missing data increasing.

Figure 4-7. Pre and post comparisons of reported activities from Site B pharmacist.

Technician: this technician’s patient focused activities remained similar. The dispensing activities decreased from 79% to 69%. The amount of time spent assembling prescriptions decreased from 57% to 46% and checking prescriptions increased from zero to 13% of the reported time.

Figure 4-8. Pre and post comparison reported activities from Site B technician.

Legend for all figures on this page:

- Direct Activities
- Indirect Activities
- Supportive Activities
- Assembling Rx
- Checking Rx
- Other
- Break
- Missing data
**Site C - Hospital pharmacy**

*Pharmacist:* this pharmacist’s patient focused activities increased in total from 57% to 67%, with direct activities increasing from 3% to 34%. Dispensing activities decreased from 27% to 18% with checking prescriptions decreasing from 17% to 4%.

![Pre and post comparison reported activities from Site C pharmacist.](image)

*Technician:* this technician’s total patient focused activities increased from 6% to 7%. The amount of time spent assembling prescriptions decreased from 37% to 15% and checking prescriptions increased from zero to 20% of the reported time.

![Pre and post comparison reported activities from Site C technician.](image)

**Legend for all figures on this page:**
- **Direct Activities**
- **Indirect Activities**
- **Supportive Activities**
- **Assembling Rx**
- **Checking Rx**
- **Other**
- **Break**
- **Missing data**
Site D - Community pharmacy

Pharmacist: this pharmacist’s patient focused activities increased in total from 25% to 33%, with direct activities decreasing from 11% to 6%. Dispensing activities decreased from 55% to 39% with checking prescriptions decreasing from 27% to 6%.

Technician: this technician’s total patient focused activities decreased from 36% to 25%. The amount of time spent assembling prescriptions decreased from 31% to 11% and checking prescriptions increased from zero to 21% of the reported time.

Figure 4-11. Pre and post comparison reported activities from Site D pharmacist.

Figure 4-12. Pre and post comparison reported activities from Site D technician.
Site E - Hospital Pharmacy

Pharmacist: this pharmacist’s patient focused activities increased in total from 4% to 74%, with direct activities decreasing from 4% to 2%. Dispensing activities decreased from 54% to 6% with checking prescriptions decreasing from 30% to 5%.

Figure 4-13. Pre and post comparison reported activities from Site E pharmacist.

Technicians:

Figure 4-14. Results of post data only from Site E technician 1 (two technicians at this site)

Legend for all figures on this page:
- Direct Activities
- Indirect Activities
- Supportive Activities
- Assembling Rx
- Checking Rx
- Other
- Break
- Missing data

No data was collected from this technician at baseline.
Figure 4-15. Results of pre data of reported activities from Site E technician 2 (two techs at this site)

Legend for all figures on this page:
- Direct Activities
- Indirect Activities
- Supportive Activities
- Assembling Rx
- Checking Rx
- Other
- Break
- Missing data

No data was collected from this technician at census
Site F - Community Pharmacy

Pharmacist: the large amount of missing data made comparison of pre and post data too unreliable.

Figure 4-16. Pre and post comparison reported activities from Site F pharmacist.

Technician: the large amount of missing data made comparison of pre and post data too unreliable.

Figure 4-17. Results of pre and post data of reported activities from Site F technician 1 & 2 (two techs at this site)

Legend for all figures on this page:
- Direct Activities
- Indirect Activities
- Supportive Activities
- Assembling Rx
- Checking Rx
- Other
- Break
- Missing data

This trainee failed assessment and withdrew from the pilot.
**Site G - Hospital pharmacy**

**Pharmacist:** the large amount of missing data made comparison of pre and post data too unreliable.

![Pre and post comparison reported activities from Site G pharmacist](image1)

**Technician:** the large amount of missing data made comparison of pre and post data too unreliable.

![Pre and post comparison reported activities from Site G technician](image2)

**Figure 4-18.** Pre and post comparison reported activities from Site G pharmacist

**Figure 4-19.** Pre and post comparison reported activities from Site G technician.

Legend for all figures on this page:

- Direct Activities
- Indirect Activities
- Supportive Activities
- Assembling Rx
- Checking Rx
- Other
- Break
- Missing data
Chapter Four: Investigation into role changes that occurred during a pilot study of a CT role

**Site H - Community pharmacy**

*Pharmacist:* this pharmacist’s patient focused activities decreased in total from 20% to 13%, with direct activities decreasing from 12% to 5%. Dispensing activities increased from 3% to 4% while checking prescriptions increased from 31% to 33%.

![Pre and post comparison reported activities from Site H pharmacist](image1)

*Technician:* this technician’s total patient focused activities increased from 7% to 25%. The amount of time spent assembling prescriptions decreased from 48% to 42% and checking prescriptions increased from zero to 3% of the reported time.

![Pre and post comparison reported activities from Site H technician](image2)

<table>
<thead>
<tr>
<th>Legend for all figures on this page:</th>
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<tbody>
<tr>
<td>Direct Activities</td>
</tr>
<tr>
<td>Checking Rx</td>
</tr>
</tbody>
</table>
**Site I - Community pharmacy**

**Pharmacist:** the large amount of missing data made comparison of pre and post data too unreliable.

%.

![Pie chart for Site I pharmacist pre and post comparison](image1)

![Pie chart for Site I technician pre and post comparison](image2)

**Figure 4-22.** Pre and post comparison reported activities from Site I pharmacist

**Technician:** the large amount of missing data made comparison of pre and post data too unreliable.

![Pie chart for Site I technician pre and post comparison](image3)

**Figure 4-23.** Pre and post comparison reported activities from Site I technician

Legend for all figures on this page:

- **Direct Activities**
- **Indirect Activities**
- **Supportive Activities**
- **Assembling Rx**
- **Checking Rx**
- **Other**
- **Break**
- **Missing data**
Site J - Community pharmacy

Pharmacist: the large amount of missing data made comparison of pre and post data too unreliable.

Figure 4-24. Pre and post comparison reported activities from Site J pharmacist

Technician: the large amount of missing data made comparison of pre and post data too unreliable.

Figure 4-25. Pre and post comparison reported activities from Site J technician

Legend for all figures on this page:
- Direct Activities
- Indirect Activities
- Supportive Activities
- Assembling Rx
- Checking Rx
- Other
- Break
- Missing data
Chapter Four: Investigation into role changes that occurred during a pilot study of a CT role

**Site K - Hospital pharmacy**

*Pharmacist:* the large amount of missing data made comparison of pre and post data too unreliable.

*Technician:* the large amount of missing data made comparison of pre and post data too unreliable.

**Figure 4-26.** Pre and post comparison reported activities from Site K pharmacist

**Figure 4-27.** Pre and post comparison reported activities from Site K technician

Legend for all figures on this page:
- Direct Activities
- Indirect Activities
- Supportive Activities
- Assembling Rx
- Checking Rx
- Other
- Break
- Missing data
Site L - Community pharmacy

Pharmacist

None analysed due to unexplained device error.

Figure 4-28. Pre data for reported activities from Site K pharmacist

Technician (T1)

No data was collected from this technician at census point due to failing assessment.

Figure 4-29. Pre data for reported activities from Site K technician

Technician (T2)

No data was collected from Tech2 at baseline due to date error in device. Tech2 not operating as PACT at time of final data collection.

Legend for all figures on this page:

- Direct Activities
- Indirect Activities
- Supportive Activities
- Assembling Rx
- Checking Rx
- Other
- Break
- Missing data
4.4.6.6 Comparison baseline vs census data, hospital vs community

There was a significant increase in the amount of missing data from the baseline data collection to the final data collection. This resulted in the number of sites that needed to be excluded increasing. The presence of greater than twenty-five percent missing data from this large number of sites resulted in difficulties performing direct comparisons between the two different pharmacy settings, hospital vs community. It was however, possible to establish trends.

Both settings saw an increase in patient focused activities on the part of the pharmacists and an increase in checking on the part of the technicians. The hospital pharmacists appeared to demonstrate a larger increase than their community colleagues.

At baseline the community pharmacists reported spending more time on dispensing activities than their hospital counterparts, both on assembling prescriptions and on checking prescriptions, although these decreased with the introduction of the PACT role. The amount of time spent checking prescriptions almost halved for both groups.

At all time-points during the study the community technicians reported greater amounts of time assembling prescriptions compared to their hospital counterparts and the hospital technicians reported more time spent on patient focused activities in total. At the final data collection both groups of technicians reported increases in checking prescriptions, with the hospital technicians reporting a slightly higher rate.
4.5 Discussion

This section of the thesis looks at an attempt to introduce checking technicians in a planned, anticipated and structured way. This study explored the impact this role introduction had on the time spent on specific dispensing activities by both pharmacists and technicians. It also examined the experiences of the volunteers who agreed to trial the introduction of the checking technician role.

This study demonstrated that the introduction of a checking technician role into New Zealand pharmacies has the potential to provide pharmacists with more time to spend on patient focused activities. The introduction of the PACT into the pilot sites saw a mean increase of nineteen percent in pharmacists’ patient focused activities and a mean twenty percent decrease in dispensing activities.

One of the limitations of the trial was the small sample size. This is a limitation common to all pilot studies and is balanced by the careful selection of participants. The participating sites for the trial were selected with this principle in mind to ensure that the sites were representative of the NZ pharmacy environment, but restricted in number due to resourcing constraints.

The time and motion portion of this study was utilised to determine if there had been an increase in patient focused activities by the pharmacists. Collecting data from individuals while they are working has some limitations. This study utilised self-reporting on the part of the participants to collect data, with the data collection occurring during work hours and taking place during normal working conditions. The participants were required to report their activities at regular intervals. This can be disruptive in the workplace and there can be tasks that occur when data needs to be collected which cannot be interrupted. This results in missing data. This did occur during the study, and the more missing data the less reliable the results. There were, however, several sites with small amounts of missing data, and even from those with a large amount of missing data, it was still possible to deduce trends from the data that was available. The pharmacists were spending more time on patient focused activities and the technicians were now taking on the final accuracy checking role.

This project demonstrated that even with planning, engagement and careful monitoring the changes did not always go according to plan. There were workplace factors that had not been considered by those organising the pilot, as well as human factors that could not be planned for.
There were delays in the completion of training and assessment and variation between individuals and individual sites. Although the initial training occurred mid November 2014 and was anticipated to be completed by the end of May the following year (2015), this did not happen. The final trainee completed her training and assessment in October 2015.

There were significant differences in the length of time taken by the individual trainees to complete the written modules, with a difference of several months between individuals. Some of these delays were due to workloads at different sites; if it was very busy there was no time in the work day to complete the modules and study had to be completed outside work hours.

Initially the participating sites were limited to one trainee only but later three sites were allowed to have two trainees. These sites all experienced delays and were slower to complete the assessments. One of the technicians at one site (a community site) failed the required assessment and dropped out of the pilot. At the hospital site with two technicians, both passed the assessment but took a long time to complete all the assessment tasks. Their supervising pharmacist worked part-time, which slowed progress. The other community site was slow to complete as well, due to the supervising pharmacist (the owner of more than one pharmacy) not being onsite very often.

The absence of the designated supervising pharmacist should not have been an issue as the survey results demonstrated that several different pharmacists at the same site were involved in the supervision of the trainee rather than just their supervising pharmacist. The delays experienced at the sites with two trainees suggested that although supervision was shared the presence of a second trainee created an extra level of disruption. Limiting the number of trainees to one per site in the future would avoid this source of delay.

Another variable was the time it took to perform the thousand item check in the different sites. Three trainees had to repeat the full thousand item check, one of whom failed a second time and was therefore unable to continue. Eight others made errors but were allowed to continue after an additional 250 items were added to their total.

The trainees were unable to check every dispensed item and instead checked only a proportion of those dispensed. During the initial planning, data was collected from each site regarding the average number of items dispensed each day. These figures were used to calculate an approximate time that the trainees would take to complete their training. It was anticipated that they would not be checking every single item but this
section of the training took significantly longer than expected. The need to have the trainee and a pharmacist checking each dispensing resulted in a much slower dispensing process, meaning that during busy times the trainee role was omitted from the process.

Staffing issues resulted in one pharmacy dropping out of the pilot, but the individual technician completed her training. She was unable to work as a PACT because the new pharmacy she moved on to was not involved in the pilot and therefore did not have the contract variation necessary to allow her to be employed as a PACT.

These delays and time over runs resulted in the need for a ‘census’ style final data collection. The initial plan was for this final data collection to take place after the PACT had been in place and working independently for several weeks. This would have allowed any final fine-tuning to the workflow to occur and for the greatest impact on the pharmacist and trainee to be observed at all sites. The delays in implementation resulted in the decision being taken to set a date for the final data collection and to make the best use of the data provided. Late August was chosen to allow time for the staff to collect a week of data and for the data (especially the phone data) to be returned for analysis.

The delays in the pilot project demonstrated that this new type of training with no past history made it impossible to anticipate accurately exactly what changes would be required within the current pharmacy practices to facilitate the new role. The current technician training programme has been in place for many years. The impact of having a trainee in the workplace and the changes required to accommodate the training have been well discussed, and are well understood. This means there is a body of knowledge around the workplace changes and the impact of a technician training. The introduction of a checking technician was a new role within the pharmacy environment and the changes required to accommodate the training were unknown.

This pilot study utilised volunteers who were supportive of this new role, which was reinforced by the results from the surveys. These showed that the respondents held slightly stronger opinions about the ability of the technicians to take on this advanced role than the pharmacists and technicians in the first study in Chapter 2. The participants self-selected into the pilot project and therefore reported greater support for the change than the general pharmacy population. The respondents gave lower levels of support to the technicians’ abilities to check a prescription with their current level of training, indicating that they believed a training process was required in order to take on this advanced role. In spite of this generally high level of support there was a small number of individuals who expressed reservations.
The survey respondents suggested on several occasions that if the checking process was handed over to a technician a pharmacist would no longer be required. This was a theme that appeared several times during the course of this pilot. Many of the comments to this effect came from pharmacists. It became apparent that the pharmacists’ perception of their role was heavily weighted towards the significance and importance of the accuracy of the final dispensed product, and that it is an integral part of their identity. This final dispensing accuracy check made up a significant proportion of their day, and this held huge significance to the individuals concerned.

It was not possible to shift or transfer this portion of the dispensing process over to a specially trained technician without pharmacists feeling a sense of loss. All of the volunteers were enthusiastic about the possibility of a change in roles, but even so there was still an element of reluctance. This may be wariness about change, but it should be noted that some found it challenging to imagine or to plan how they were going to utilize the time that was generated by the transfer of this role to the technician.

There were other indications of reluctance on the part of some of the participants even though they were volunteers. There were only a few direct comments about being uncertain of change, but on several occasions during collecting data for the study it became apparent that some participants were reluctant to unconditionally embrace the change. One of these came in the form of the slowness to change the physical layout or being able to reorganize the way in which the pharmacy operated. On several occasions during the study there were comments about the need for further changes to workflow to make the best use of the new role. Pharmacists were not the only staff members who demonstrated a reluctance to embrace change, and many staff demonstrated this by returning to the previous work patterns if the pharmacy got busy. The staff would revert back to the previous workflow, ignoring the PACT.

The survey reported in Chapter 2 of this thesis shows that there is support in NZ for this new technician role, indicating that there was support in the workplace from both pharmacists and technicians to embrace a change in roles. This support came from both the hospital and community settings and indicates both the desire and confidence of technicians to take on new roles in NZ. In the early phases of the pilot project, there were mixed responses to the question of the need for changes in workflow from the two different settings. The staff were very supportive of the change in roles and although nearly half of the respondents gave positive responses, they demonstrated a level of uncertainty about the ability of the PACT role to fit into their workplace. Conversely, there was a lot more confidence demonstrated in the current readiness of the workplace to
Chapter Four: Investigation into role changes that occurred during a pilot study of a CT role

take on this role, while almost a third of the respondents felt that little change would be needed.

Many of these positive responses came from hospital respondents commenting that their workplace was already set up to cater for the new checking role. They did not anticipate the requirement for any changes at all. This may have been due in part to staffing numbers. With large numbers of staff in a workplace it is easier to allocate individual staff and work stations to set tasks and this seems to be the case in the hospital setting, especially within the larger hospitals where there are designated areas for specific tasks and functions. Many community workplaces are small and the same space can be used for both assembling and checking prescriptions creating the need for more different or subtle changes to workflow. By the time of the census data collection this degree of uncertainty with respect to the new role’s ability to fit into the workflow had decreased but uncertainty surrounding the benefits of the new role had increased.

There continued to be very positive responses to all aspects of the introduction of the new role but the later responses demonstrated an increased level of uncertainty. One of the survey questions that resulted in a significant increase in uncertainty was that of the pharmacists’ ability to spend more time with patients. The results demonstrated a marked shift in respondents from the ‘positive’ to the ‘neutral’ responses in the census survey. Some could be partially attributed to the differences between the two workplace settings. In the hospital setting, there is less direct contact time with patients compared to the community setting. Another factor could be the presence of responses from two sites where the PACT had only just completed the training and was therefore not working in the final PACT role at the time of data collection. This could mean that these sites had yet to see the benefit of the full change in roles.

The pilot project was based around the model of the English checking technician (ACT). This model was introduced to facilitate pharmacists’ move into expanded patient focused roles. Pharmacists’ activities help patients in many ways and these are not just limited to face-to-face counselling activities. One of the survey questions explored by this study was to investigate if the change in roles would allow pharmacists to spend more time with patients. The definition of these activities was expanded for the time and motion study. This definition included activities that were directly related to the patients’ care but not limited to counselling only. For this reason, the additional categories of indirect and supportive activities were included in the data collection for the time and motion section of the study. As mentioned earlier in the hospital setting, the pharmacist does
not always have direct contact with the patient. The hospital pharmacists can spend time on medication reconciliation that may not take place at the patients’ bedside. Checking laboratory results and making recommendations for dosing or drug choices does not always happen in the presence of the patient and this could lead to under-reporting from the hospital setting. This was one of the factors taken into account when the more inclusive term ‘patient focused activities’ was used in this study.

All staff were asked to complete the surveys during the pilot. It was seen as beneficial to gain opinions from all the staff as any change in roles would have an impact on all staff. This was especially so in the community setting as the pharmacist would be able to spend more time talking to patients and answering questions, and this interaction with patients could have an impact on retail staff as well as dispensary staff.

One of the aims of this study was to attempt to discover whether the technicians would identify the same types and number of errors as the pharmacist. This was to be used as a measure of safety, as if it could be shown that the technicians identified the same number of errors (error rate) as the pharmacists, it would add to the argument that this change would not reduce safety. Initially it was planned to calculate the error rate in each site. There were problems with the data collection at baseline as it became apparent that the calculation of an error rate was not going to be possible. The supervising pharmacist and other pharmacists on the sites reported errors differently. The errors identified by the pharmacists and staff other than trainees and the supervising pharmacist may not always have been reported, especially filling errors (for details of error classification see methodology for this section) that were identified and corrected by other staff. It became evident during the analysis of the error data that was collected at the baseline that not all errors were reported. This was reinforced during phone discussions held with individuals involved in the pilot. It was noted that there was different terminology used in different sites which may have contributed to under-reporting of one category and over-reporting in another.

Counting the number and category of identified errors without trying to calculate the error rate became the most useful option from the data we were able to collect. Incorrect directions on a label produced the largest number of errors in any one category. These errors usually occurred during the preparation phase of the dispensing and were picked up during the checking process. Franklin (2007) when investigating the incidence, type and causes of dispensing errors noted that almost half of the identified errors were labelling errors, and in a review by Jones (2009) this was also a common finding in other works.\textsuperscript{105, 107}
There was a sense that when the trainees were identifying errors they were more thorough than the pharmacists. The trainees identified the same range of errors as the pharmacists, but it appears that they were more pedantic in their recording. As previously noted not all errors were reported during the baseline collection but it may be that some of the errors were identified by the pharmacist, then corrected but not reported especially if this was the usual practice before the pilot.

An increase in identification of errors was noted by some of the respondents, who felt that this new role was leading to a decrease in the number of errors, and although not clearly detailed mirrored similar results reported from Rutter’s UK research. This was seen partly as a result of the redefining of roles, but also as a result of the increased awareness and focus on error identification.

The use of the phrase ‘a clinical check’ created its own issues in the study in Chapter 2, therefore a clearer definition of the term was included in this study. The assessment and release of the prescription for dispensing was defined as an assessment of appropriateness.

Some of the respondents, however, seemed to suggest that they did not perform a ‘clinical check’ or at least they did not seem to think that they performed any level of clinical assessment of a prescription. There were concerns expressed about being held responsible for the appropriateness of the prescription, especially as this new model introduced a formal assessment into the process and the pharmacist would have to signal that a prescription was deemed appropriate for the patient prior to it being sent for dispensing. In fact, prior to the change in roles, pharmacists were already responsible for this. If there was a problem with the dose, or an interaction that could be life threatening, or if a medication was deemed inappropriate for a patient and the pharmacist dispensed it as written, they would be held responsible for any resulting problems for the patient.

The reason for pharmacists’ discomfort with the new system seemed to be the initiation of a formal process. The reassigning of this assessment to the beginning of the dispensing process caused its own issues as some of the pharmacists felt more comfortable when this was part of the checking process as had previously been the case.

This pilot identified some of the potential issues around the introduction of this role, many surrounding the training process. Many of these issues can be overcome by a degree of flexibility in the training process but how this new role could potentially be utilised in
the workplace is a longer discussion that will require audacity to embrace change on the part of the pharmacy profession. There were suggestions throughout this study that in spite of agreement in principal, accepting change is not an easy process for the pharmacy profession and some of the individual staff.

This study demonstrated that the introduction of the PACT was seen as a positive experience for participants and that this introduction could facilitate the move, on the part of the pharmacist, to a more patient focused role. While this study did not examine the exact nature of the new activities being undertaken by the pharmacist, the PACT taking over the accuracy check of the dispensed prescription, resulted in a reduction in the amount of time spent on the mechanical side of the dispensing process. This change was seen as a benefit to patients by increasing their access to the pharmacists, allowing the pharmacists to spend more time interacting with patients. The new role was seen as a benefit to the technicians by providing increased responsibility and a career path with a clear structure. It was also seen as a benefit to the pharmacists by allowing them to utilise their medicine knowledge and training resulting in increased job satisfaction.
Chapter 5 : Final Discussion
5.1 Final Discussion

The aim of this thesis was to investigate the introduction of an advanced technician role, a Pharmacy Accuracy Checking Technician (PACT) into the New Zealand (NZ) pharmacy setting. This new role would see the specially trained technician take over the accuracy checking portion of the dispensing process resulting in time being made available for the pharmacists to move to a more patient focused model. This included investigating opinions on the acceptability to pharmacy staff and the identification of potential facilitators and barriers to the introduction of this role.

The idea that the redistribution of the tasks performed in the pharmacy will allow pharmacists’ the time to undertake a variety of patient focused activities is not a new one. The delegation of some specific tasks to technicians has been argued for decades as a practical solution for facilitating the move of pharmacists into more clinical roles.37 38,39 There is some work investigating the advanced checking technician role in the UK (ACT) and the USA (Check-tech-check), these roles are similar in training, supervision and responsibility to the PACT role.62,115 These studies have endeavoured to investigate the impact of the introduction that this new role on both pharmacists and patients, especially in light of some of the criticisms voiced during the planning stages and during implementation.45,116,117

During the first study (chapter 2) in this thesis the aim was to ascertain whether NZ pharmacists and technicians would support this new role, the level of support was substantial. Both pharmacists and technicians held very positive views on technicians’ abilities to take on this advanced role. The level of support for the new role was even higher with those staff in the first study who had worked with a CT in the past and had seen the role in action in the workplace. This higher level of support was also evident in the overall results from the participants in the later pilot study in Chapter 4.

Across Chapters 2, 3 and 4 of this thesis a common thread that emerged through the studies, that of a willingness on the part of the technicians to be involved in additional activities and to take on more responsibility. The technicians demonstrated that they were aware that this was possible, that they could do it, but that current limitations of their role restricted what they were able to do. The first survey demonstrated a significant number of the technicians’ willingness to take on more responsibility and to undertake more training if it was necessary to take on the advanced role. This is supported by both the local 47,118 and the international literature in which the examples of new roles for technicians demonstrates a willingness to be involved and signalling a belief that they felt they were capable of taking on advanced roles outside of dispensing prescriptions.119 120 53
In Chapter 3, the Christchurch interviews reiterated the willingness to take on additional activities. The technicians clearly felt that they were doing everything they possibly could within the limitations of their role. The technicians were assuming more responsibility, more patient contact time and they were taking on a lot of the overlap jobs that the pharmacist had been involved with prior to the quakes. The technicians relieved the pharmacists of any role with which both technicians and pharmacist had previously been involved. They did this to allow the pharmacist to focus on the activities that were solely their responsibility or tasks that only they were allowed to perform.

The technicians commented about these limitations and the fact that they were only able to perform tasks within a specific set of parameters, defined by what the pharmacist felt comfortable with. Resulting in one of the restrictions not always being the definition of what is a technician’s role, but the pharmacists’ interpretation of the role. Some pharmacists felt some tasks, although included in the overlap between the technician and pharmacist role, should only be performed by themselves.

Many workplaces define the tasks completed by each staff member differently. In some workplaces in NZ the technician is only responsible for the assembly of prescription items and in others a technician may be the dispensary manager responsible for stock control and ensuring funding restrictions are met with respect to all the dispensed prescriptions. At times this may depend on the number of technicians in a workplace but at others it may depend on the comfort level of the pharmacist to delegate. The LEAN study conducted in Christchurch demonstrated that pharmacists can often be involved in tasks that would be better delegated to support staff. Lea’s work in 2015 noted that community pharmacists are reluctant to delegate and that there is a difference between what they think they do and what they actually do. These researchers also noted that the pharmacists were reluctant to relinquish the responsibility for the accuracy check of a dispensing, that it was seen as a part of their identity. Respondents during all parts of this thesis commented on the pharmacists’ reluctance to relinquish any part of what they regard as their role and that they don’t delegate well. It has been suggested that some of this may be attributable in part to an element of ‘role ambiguity’ and wide variety of ‘types’ of pharmacists and the roles they perform. In 2010 Rosenthal suggested that pharmacists themselves may be the barrier to change, that the pharmacy ‘culture’ may impede the introduction of advanced roles for advanced roles for pharmacists. This work suggested that pharmacists are risk averse, this is borne out by the studies in this thesis alongside some NZ and USA work.
There is a substantial body of literature on the roles of pharmacists but a much smaller amount of work with respect to pharmacy technicians as the development of new roles for technicians has been slow. Much of the pharmacist literature however, has focused on the economic impact and health outcomes resulting from pharmacists’ interventions as they move into more clinically focused roles.\textsuperscript{12, 13} There is only a small amount of material on the pharmacist and their work patterns or their image of self.\textsuperscript{108, 126, 122}

The largely under-researched area of the changes in technicians’ roles is starting to expand with more research appears as internationally technicians move into more advanced roles.\textsuperscript{61} Many of the new technicians roles have been workplace specific, with the selection and training of an individual staff member to take on a specific support role.\textsuperscript{70} There have been only a few examples of a new global role for technicians, these include the UK checking technician and the US tech-check-tech.\textsuperscript{127, 62} Each of these roles has a training programme and the potential to be utilised in a variety of workplaces, whereas with the specific roles these have been restricted to individual workplaces and sometimes individual staff. The introduction of the PACT is an extension of the existing NZ pharmacy technician role and could be utilised in many different workplaces.

The studies in this thesis demonstrated the technicians’ desire to take on more responsibility. This has been further illustrated in NZ over the last few years where there have been a number of examples of increased technicians’ roles. Technicians are becoming more involved in medication compounding, stock control and health team communication. As seen overseas however these roles have been developed to facilitate technicians taking on specific tasks with a more patient focus. Examples of these roles in NZ include warfarin counselling, medicine reconciliation at patient discharge from hospital and post MI medication counselling prior to hospital discharge. These roles do not provide a platform for expansion of the technicians’ role nor do they facilitate more pharmacist time with patients. They delegate a small amount of the pharmacist counselling role to the technician at times when there was insufficient time available for a pharmacist to perform these tasks.\textsuperscript{128} Once again as with the international examples, these roles are not global but specific to a workplace and in some cases individuals. Only a small number of these roles have been incorporated into any site other than the initial site in which they were developed.

As a result of the success of the pilot study for the PACT reported on in this thesis, this new role has been opened up to the wider NZ pharmacy community. At the time of writing, another cohort of hospital technicians were undertaking the PACT training. There are plans to enrol a cohort of community technicians in the following year. The introduction of the PACT role in NZ provides a structured career path for technicians and enhanced job satisfaction. It provides an
opportunity for advancement, the ability to take on extra responsibility and contribute significantly to the workplace. The recognition from within the pharmacy profession that the technicians are capable of taking on an advanced role opens the door for other future roles. These role could expand into areas where the technician is not currently seen.

It was pointed out in Chapter 2 that this new role would not suit all technicians nor would it suit all pharmacy situations. Chapter 4 demonstrated that not all candidates will pass the required assessments to complete the PACT training. The work on Chapter 2 demonstrated that although a majority of the technician respondents said they would like to take on the additional responsibility there were a number who were not interested at all. As the PACT is unable to check their own work, in small pharmacies with only one technician this model in that setting would be unworkable and impractical.

Heraclitus stated that “change is the only constant in life”, but human beings are creatures of habit and although very adaptable many people find change a challenge. Change can be difficult and stressful and much easier in theory than in practice.

Several respondents to the surveys in chapter 4 noted that this change may be a challenge for some individual staff. There was strong support in theory from the first survey but reluctance to change out of old patterns was observed during the pilot itself. This divergence of findings is noted by Elvey and others when investigating pharmacists’ perceptions of their roles. There appears to be a mismatch between what the pharmacists think is possible and what they actually do. This was also reported in chapter 2, in which overall the respondents strongly agreed with the principle, but several respondents commented that some pharmacists would not be able to accept this new role.

These new roles entail significant changes to how both pharmacists and technicians work, which requires a significant change in mind-set for all involved. For the technicians to take over the checking portion of the dispensing process requires them to take responsibility for checking the accuracy of another staff members dispensing. In the past this has been the responsibility of the pharmacist and although technicians have been capable of being very accurate they have always had the backup of knowing that the pharmacist would perform one further check. To take over the final responsibility for the accuracy of a dispensing is a significant step up.

For the pharmacists to take on an increase in clinical roles also requires a change in mind set and it involves a redefinition of how pharmacists see themselves and what is viewed as a pharmacist. It was apparent throughout this thesis that many pharmacists define their role to include the need to perform the final accuracy check of a dispensing. To move to a more
clinical role would require pharmacists to be confident in their support staff alongside confidence in their own clinical knowledge.

The new process requires the pharmacist to perform a pre-dispensing assessment check. There was uneasiness expressed about the level of clinical knowledge of pharmacists as evidenced in Chapter 4 section 4.5.5. There was an acknowledgement that not all pharmacists have the same level of clinical training. This may contribute to the disquiet over the need for a clinical assessment of a prescription before handing over to the dispensers and the checking technician. There was unease expressed about taking responsibility for the appropriateness check of a prescription. As mentioned earlier in the discussion in Chapter 4, this is part of the current pharmacist role even if they are unaware of it. This unease suggests that not all pharmacists are confident in their own or others clinical skills but this is work that will need to be followed in the future.

As outlined earlier in Chapter 2 pharmacists appear to find reassurance in known processes and procedures. This was demonstrated in this chapter by their questioning how this role would work in practice. They also wanted reassurance as to who would be liable for errors. This need for clear processes was echoed throughout Chapter 3 where the Christchurch pharmacists felt they needed to stick to the rules. In spite of enormous amounts of extra work, the pharmacy staff tried to stick to the rules in very stressful times. The legal interpretation of who was able to perform the final accuracy check of a prescription resurfaced in Chapter 4. A legal interpretation was required to ensure that the pilot study could get under way. This illustrated the difference between what the law requires and how this is interpreted by the pharmacy profession. Although a pharmacist is legally required to ‘supervise’ pharmacy activities, there was no specific legislation that required the pharmacist to perform the final accuracy check. This is an interpretation developed over the years by the profession itself. It must be noted however that the pharmacist would be held responsible by the disciplinary bodies for any error that occurs in the pharmacy.

In this thesis it was demonstrated in the pilot study that even with the high level of support for the introduction for the checking technician role there was an observed tendency to revert back to previous work patterns. This was particularly noticeable at busy times when the PACT may not be utilised and previous work patterns were used. It is possible that some of these practices could be attributable to a workplace needing more time to imbed the PACT role, many of the pilot sites had only had a few months to adapt to the changes in roles and establish the new work pattern into habit. Follow up work would be needed to establish if this is the case.
At several times during the work in Chapter 4 the participants reported that there was potential for further changes to be made to the workplace environments, hinting at an element of reluctance to step outside of the usual practices. Even though some sites felt their current physical layout would easily accommodate the PACT, there were many suggestions that the workplace would benefit from further change. Many of the changes reported over the course of the pilot had involved the expected changes to staff activities rather than physical changes in their workplace. There was very little reported change in the overall layouts of the pharmacies with many choosing to work within the existing layout and to move staff around and redistribute them within the dispensary. This included moving the PACT or the pharmacist performing the clinical check to a designated area within the existing layout. Small changes were made, e.g. a new stamp to signal that the pharmacists had performed a clinical check on a script and that it was now ready to be dispensed.

Although reporting strong support for this new role there were many written comments that expressed hesitation. This was expressed in terms of concerns surrounding safety. The pharmacists needed reassurance that this new role would work and that there would be no decrease in the standard of care received by patients and that the number of errors would not increase. The first study (Chapter 2) suggested that the separation of the mechanical process of dispensing from the clinical or appropriateness assessment of a prescription would lead to increased not decreased safety, but included in the pharmacists’ comments was concerns about the safety of the change in roles. The pilot study (Chapter 4) demonstrated that the technicians were extremely diligent in their identification of errors. It was noted by several respondents that they believed that the introduction of the new role had resulted in an increase in the number of errors being identified and corrected. Some respondents suggested that this change had a positive impact on safety, where the focus on accuracy was seen to improve overall safety in the dispensary, this mirrored previous studies.62,115

Lack of time has been frequently stated as a reason for pharmacists’ slowness to embrace advanced clinical services.33 28 92 The LEAN study, demonstrated that there are many ways to increase the amount of time that a pharmacist has to dedicate to patient focused activities.107 This can be achieved by a redistribution of roles among the current staff in the dispensary. However, even with the time gains demonstrated by the LEAN study it was unable to address the significant amount of time a pharmacist spends each day performing the final accuracy check of a dispensed prescription. The PACT introduction, however, will not address every barrier to increased clinical activities but it does go some way to addressing the issue of lack of time.
The pilot study looked at the amount of time that the pharmacist spent on patient focused activities and demonstrated that with the removal of the responsibility for the accuracy check of a prescription the pharmacists can spend more time on patient focused activities. It was possible to, on average, to double the amount of time that pharmacists had available. This figure varied between sites and might be larger as the PACT role becomes more imbedded in the pharmacy workflow.

There was resistance expressed from some of the NZ pharmacists to the introduction of advanced role for technicians. There were concerns raised that they may not be as accurate as a pharmacist. The accuracy of technicians was questioned overseas by pharmacists when the checking technician role was introduced in the UK, there was also concern expressed in the US with the introduction of the tech-check-tech role. It has been evidenced by the work of several groups of researchers Grogan (1978), Becker (1978) and Ness (1994).

These researchers have demonstrated that technicians are capable of being very accurate. It has been suggested that one of the factors that allows technicians to be very accurate is the lack of interruptions and the ability to focus solely on the checking of the prescriptions. Even though there were problems with the error section of the pilot study, it became apparent that the trainees and later the PACT were extremely diligent in identifying and documenting errors. As their role is primarily focused on the accuracy of the dispensing process there is a significant amount of time spent on error identification, allowing them to focus on identifying errors in exclusion of other distractions. Several of the respondents reported that the PACT was identifying more errors than had been the rate in the past. This was not limited to the PACT, the respondents suggested that this new role had made all staff more aware of the potential for errors and therefore all staff were being more careful and documenting more errors. This might be a behavioural change limited to the time training was taking place but further research would be needed.

A concern expressed in both the US and the UK was the impact on the number of pharmacist jobs when the new roles for technicians were introduced. This was a concern expressed by our respondents in both Chapters 2 and 4. Conversely this new checking technician role was seen to require more technicians (Chapter 4 section 4.5.4.4) to take over the roles relinquished by the technicians who moved up to the checking technician role. It is difficult to predict at this point if it will result in less pharmacist jobs.

Chapters 2 and 4 demonstrated that there is a great appreciation on the part of the pharmacists of the potential to be able to spend more time with patients. The pharmacist’s throughout this thesis demonstrated strong support for the change to the roles in the two
different surveys in chapters 2 and 4. These survey results demonstrated significant support in theory with a move to spending more time with patients undertaking more patient focused activities. These increased clinical activities were seen as the greatest positive outcome that could be achieved by the introduction of the checking technician (Chapters 2 and 4). Even so, there was an element of reluctance and uncertainty. In the responses to the survey from Chapter 2 the pharmacists demonstrated a need to be sure that this change would not compromise patient safety. The pharmacists offered their own solutions to this concern by recommending robust candidate selection, in-depth training and the requirement for clear processes and procedure to be in place. The pharmacists demonstrated that they find security in processes and procedures therefore when change is suggested they question how this would work in practice.

This role is new to the NZ setting therefore there is considerable scope for further research.

The opinion survey in Chapter One was conducted prior to the full implications of the new community pharmacy contract became apparent. The full implementation took several years to roll out. This meant the understanding and implications of the full impact of the contract changes were not being seen at that time. Repeating the survey would ascertain if there has been any shift in the opinions expressed since the initial survey. There is also scope to investigate if there has been any change in attitudes to increased clinical roles due to these funding changes. The new contract has an increased clinical focus which may put additional pressure on pharmacists’ limited time. This possible increased pressure may have an influence on the pharmacists’ opinions of the PACT role, either positive or negative.

Christchurch pharmacy staff were excluded from the initial survey (see Chapter 2, Section 2.4.7), for completeness, it would be advantageous to perform this survey with the Christchurch staff to establish if this location mirrored the national picture or presented a different picture all together.

The pilot study in Chapter 4 provided large amounts of data but it also provided many unanswered questions. The nature of a pilot study means that only a small sample is available for investigation, limiting the data that is produced. To obtain a more detailed picture a follow up on all staff involved in the pilot one year later may illicit more data and fill in some of the gaps.

The new process requires the pharmacist to perform a pre-dispensing assessment check. There were uneasiness expressed about the level of clinical knowledge of pharmacists as evidenced in Chapter 4 section 4.5.5. There was an acknowledgement that not all pharmacists have the same level of clinical training. This may contribute to the disquiet over the need for a
clinical assessment of a prescription before handing over to the dispensers and the checking technician. There was unease expressed about taking responsibility for the appropriateness check of a prescription. As mentioned earlier in the discussion in Chapter 4, this is part of the current pharmacist role even if they are unaware of it. This unease suggests that not all pharmacists are confident in their own or others clinical skills but this is work that will need to be followed in the future. How pharmacists feel about their own clinical skills is unknown and an area for future research, do they feel well prepared to provide a clinical assessment or to take on a more clinical role?

The ‘census’ style final data collection resulted in some of the participating sites not having a PACT operating in their full capacity at the time of the final data collection. Many respondents (almost half of final respondents) felt that further changes should happen in the workplace and that additional changes could result in improvements and better utilisation of the PACT role. These comment signalling that the PACT was not operating at an optimal level at the time. The general review suggested earlier could assist in providing additional information as illustrated in the specific topics below, these topics would lend themselves to further study.

Delegating the checking function of the dispensing process has been shown to allow more time for the pharmacist to shift their activities as mentioned earlier. There is no guarantee that additional time would be spent on clinical activities and this was demonstrated in the pilot study. As shown in Chapter 4, Section 4.6.1, the time and motion study demonstrated a reduction in the time pharmacist were spending on the dispensing process but this was not always reflected in a corresponding shift to patient focused activities, there was a discrepancy of time. This suggests that not all of the time made available was being spent on clinical or patient focused activities. This is another area for further research.

However, repeating the investigation of the time gains several months to a year after the PACT has been undertaking their full role may provide a clearer picture of the extent of the time gains. As not all PACTs were working independently it would be worthwhile investigating if the time gained increase as the PACT role bedded in.

In addition, further investigation of how the pharmacists used their additional time would assist in understanding the full impact of the change in roles. Did the pharmacists take on new roles? What exactly did they do with the time? This work investigated if there was a change in overall patient focused activities but was unable to delve into the actual activities that were being performed once the pharmacist moved away from the final accuracy checking role. Some pharmacists reported still being involved in some dispensing processes, this raises the question of why? Why did they not leave it totally, why were there times when they were still
involved in the checking process? Were there situations in which the pharmacists felt they needed to be involved?

This work was also unable to quantify the amount of work being performed by the PACT themselves, an investigation of their role in the workplace including workload may allow for extrapolation for future workforce requirements.

A follow up study on recommendations for workplace changes, changes to layout would allow for an investigation of what worked and what didn’t, which workplace changes worked as facilitators?

Differences in responses between the two main workplace settings were noted in both chapter 2 and 4. Follow up work to the pilot study should include further comparison between these two settings with respect to the PACT workload and the time utilisation by the pharmacist of the made available by the PACT introduction.

Delving deeper into the technicians’ experiences has very little coverage in the literature and is another area for investigation. Collecting data from the pilot sites to include what do the other technicians feel about working with PACT, may identify additional barriers or facilitators for further expansion of support staff roles. Would they take on the role if the opportunity arose? Do they believe their site could use another PACT?

There have been suggestions that this role would be useful in the Australian pharmacy setting and some work is underway at this time investigating the possibility for implementation there. If this potential role out in Australia does occur, there would be an opportunity for comparison between the two countries experiences, examining the experiences of the participants and if the role change resulted in additional time for the Australian pharmacists to move into a more patient focused role,

**Conclusion**

This change in the way pharmacists and technicians do their jobs in the NZ setting is ground breaking and not without its challenges. This is a shift in professional practice that has benefits for the patients, the technicians and the pharmacists. It is a move, for the pharmacist, away from the mechanical process of dispensing a prescription and facilitating a move to a more patient focused model. Lack of time has been identified as a barrier to the increase in clinical roles for pharmacists, this introduction of a checking technician role is clearly a facilitator for this shift. The pilot study demonstrated that this role, modelled on the UK checking technician, will provide significant amounts of time for an increased clinical role. In the hospital setting this could result in more time for the pharmacist to expand their current clinical role and the ability
to spend more time on the wards. Changes to the current NZ community pharmacy funding model mean that the community pharmacists are now being funded to increase their clinical role which has been slow in its incorporation into the NZ setting. Increases in available time and these changes to the funding model would allow more time to be spend talking to patients, and in some cases to commence clinical activities that currently do not exist.


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Appendices.
Appendix 1: Information sheet and consent forms for participants of survey investigating the introduction of a Checking Technician

**Interviews investigating stakeholders and experienced individuals attitudes to the introduction of an accredited checking technician and mandatory registration.**

**INFORMATION SHEET FOR PARTICIPANTS**

Thank you for showing an interest in this project. Please read this information sheet carefully before deciding whether or not to participate. If you decide to participate we thank you. If you decide not to take part there will be no disadvantage to you of any kind and we thank you for considering our request.

**What is the Aim of the Project?**

The aim of this project is to collect information on stakeholders and other experienced individuals thoughts and opinions on the feasibility of the introduction into New Zealand pharmacy of the equivalent of the UK health professional, the accredited checking technician (ACT).

This new technician role would allow an ACT to check and release a prescription to a patient in some defined situations, these may include:-

- A repeat that is unchanged from the initial dispensing’
- A weekly or monthly tray that is unchanged since the first dispensing
- A three monthly prescription for regular or ongoing medication that is unchanged since the last time it was dispensed

The introduction of this new role into the New Zealand pharmacy setting has implications for pharmacists’, technicians and also administrative and educational bodies. This group of interviews will collect information on previous work that has been done by others and include their knowledge and experiences to aid in the development of the future parts of this study. They will be used to assist in the development of future focus groups, whose feedback will lead to the development of surveys that will facilitate the collection of data for the main theme of this study, the attitudes of the pharmacists and technicians towards the introduction of a checking technicians’ role.

**What Type of Participants are being sought?**
We are asking for individuals with relevant experience or knowledge with the role of the checking technician. These individuals will include administrators, overseas qualified checking technicians and pharmacists who have worked with or have experience of checking technicians.

**What will Participants be Asked to Do?**

Should you agree to take part in this project, you will be asked to participate in either a telephone or face-to-face interview. Your thoughts and opinions on the possible introduction into New Zealand of an ACT and the introduction of mandatory registration for technicians will be explored.

This interview will be recorded, this recording will be reviewed later with notes being taken and the original recording will be destroyed. The interview notes will be stored securely and every effort will be made to ensure your anonymity.

**Can Participants Change their Mind and Withdraw from the Project?**

You may withdraw from participation in the project at any time and without any disadvantage to yourself of any kind.

**What Data or Information will be Collected and What Use will be Made of it?**

All the information collected from these interviews will be carefully catalogued with themes identified and this information securely stored. To ensure individual participants anonymity no comments made by individuals will be identified or referred to later, but every effort will be made to ensure that any reference to current policies of any group or organisation will be attributed to the appropriate group or organisation.

This information will allow the researchers to gain greater understanding of the background and issues surrounding the study topic.

The results of the project may be published and will be available in the University of Otago Library (Dunedin, New Zealand).

You are most welcome to request a copy of the results of the project should you wish.

The data collected will be securely stored in such a way that only those mentioned below will be able to gain access to it. At the end of the project any personal information will be destroyed immediately except that, as required by the University’s research policy, any raw data on which the results of the project depend will be retained in secure storage for five years, after which it will be destroyed.

Reasonable precautions will be taken to protect and destroy data gathered by email. However, the security of electronically transmitted information cannot be guaranteed. Caution is advised in the electronic transmission of sensitive material.

**What if Participants have any Questions?**

If you have any questions about our project, either now or in the future, please feel free to contact either:-

Patti Napier BPharm  or  Dr Rhiannon Braund  
School of Pharmacy—University of Otago  
School of Pharmacy—University of Otago  
Phone 03 479 7321  
Phone 03 479 7240
Email. patti.napier@otago.ac.nz            Email. rhiannon.braund@otago.ac.nz

This study has been approved by the Department stated above. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (ph 03 479-8256). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.
Focus Group investigating Pharmacists and Technicians attitudes to the introduction of an accredited checking technician and mandatory registration.

INFORMATION SHEET FOR PARTICIPANTS

Thank you for showing an interest in this project. Please read this information sheet carefully before deciding whether or not to participate. If you decide to participate we thank you. If you decide not to take part there will be no disadvantage to you of any kind and we thank you for considering our request.

What is the Aim of the Project?

The aim of this project is to collect information on pharmacists and technicians’ thoughts and opinions on the feasibility of the introduction into New Zealand of the equivalent of the UK health professional, the accredited checking technician (ACT).

This new technician role would allow an ACT to check and release a prescription to a patient in some defined situations, these may include:-

- A repeat that is unchanged from the initial dispensing’
- A weekly or monthly tray that is unchanged since the first dispensing
- A three monthly prescription for regular or ongoing medication that is unchanged since the last time it was dispensed

Also, the checking technician would only be allowed to check work dispensed by another staff member, they would not be able to dispense, check and release their own work.

All prescriptions would have to have a clinical review by a pharmacist.

A standard operating procedure would be put in place to clearly define when the checking technician can check and release a prescription and also clearly spell out when a prescription must be referred back to a pharmacist.
What Type of Participants are being sought?

We are asking a small group of currently employed pharmacists and pharmacy technicians in New Zealand to participate.

What will Participants be Asked to Do?

Should you agree to take part in this project, you will be asked to participate in a focus group meeting. The focus group will involve only pharmacists or pharmacy technicians. Your thoughts and opinions on the possible introduction into New Zealand of an ACT and the introduction of mandatory registration for technicians will be explored.

This focus group meeting will be audio taped. This recording will be reviewed later with notes being taken and the original recording destroyed. The interview notes will be stored securely and every effort will be made to ensure your anonymity.

Can Participants Change their Mind and Withdraw from the Project?

You may withdraw from participation in the project at any time and without any disadvantage to yourself of any kind.

What Data or Information will be Collected and What Use will be Made of it?

All the information collected from the focus group will be kept anonymous and no effort will be made to identify individual voices from the audio recording.

This information will allow the researchers to gain an understanding of the thoughts and opinions of a group of currently employed pharmacists and pharmacy technicians. Surveys will be developed as a result of the focus groups. These surveys will then be sent out to half of the currently employed pharmacists and technicians to gain a wider selection of thoughts and opinions.

The results of the project may be published and will be available in the University of Otago Library (Dunedin, New Zealand) but every attempt will be made to preserve your anonymity.

You are most welcome to request a copy of the results of the project should you wish.

The data collected will be securely stored in such a way that only those mentioned below will be able to gain access to it. At the end of the project any personal information will be destroyed immediately except that, as required by the University’s research policy, any raw data on which the results of the project depend will be retained in secure storage for five years, after which it will be destroyed.

Reasonable precautions will be taken to protect and destroy data gathered by email. However, the security of electronically transmitted information cannot be guaranteed. Caution is advised in the electronic transmission of sensitive material.

What if Participants have any Questions?

If you have any questions about our project, either now or in the future, please feel free to contact either:-

Patti Napier BPharm or Dr Rhiannon Braund
School of Pharmacy—University of Otago School of Pharmacy—University of Otago
This study has been approved by the Department stated above. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (ph 03 479-8256). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.
Surveys of Pharmacist and Technicians attitudes to the introduction of an accredited checking technician and mandatory registration.

INFORMATION SHEET FOR PARTICIPANTS

Thank you for showing an interest in this project. Please read this information sheet carefully before deciding whether or not to participate. If you decide to participate we thank you. If you decide not to take part there will be no disadvantage to you of any kind and we thank you for considering our request.

What is the Aim of the Project?

The aim of this project is to collect information on pharmacists and technicians’ thoughts and opinions on the feasibility of the introduction into New Zealand of the equivalent of the UK health professional, the accredited checking technician (ACT), and the possible mandatory registration of pharmacy technicians.

This new technician role would allow an ACT to check and release a prescription to a patient in some defined situations, these may include:

- A repeat that is unchanged from the initial dispensing’
- A weekly or monthly tray that is unchanged since the first dispensing
- A three monthly prescription for regular or ongoing medication that is unchanged since the last time it was dispensed

Also, the ACT would only be allowed to check work dispensed by another staff member, they will not be able to check and release their own work.

All prescriptions would have to have a clinical review by a pharmacist.

A standard operating procedure would be put in place to clearly define when the checking technician can check and release a prescription and also clearly spell out when a prescription must be referred back to a pharmacist.

This new role could result in the requirement for mandatory registration of technicians.

What Type of Participants are being sought?
We are asking currently employed pharmacists and pharmacy technicians in New Zealand to participate.

**What will Participants be Asked to Do?**

Should you agree to take part in this project, you will be asked to complete a short survey on your thoughts and opinions on the possible introduction into the New Zealand pharmacy setting of an ACT and the introduction of mandatory registration.

Completed surveys should be posted back to the researchers in the reply paid envelope supplied. (If you are completing this as a technician and there is more than ONE technician in your workplace, please feel free to copy this survey and return all copies in the same envelope)

Please be aware that you may decide not to take part in the project without any disadvantage to yourself of any kind.

Completion of the survey is regarded as consent to participate.

All responses received by xx will be entered into a draw to win XX. To enter the draw, please complete contact details on the separate form provided. This information will be separated from the responses and will be used for the prize draw ONLY.

**Can Participants Change their Mind and Withdraw from the Project?**

You may withdraw from participation in the project at any time and without any disadvantage to yourself of any kind.

**What Data or Information will be Collected and What Use will be Made of it?**

All the information collected from the survey will be kept anonymous so that the source of any or all comments will not be able to be identified. Surveys will be coded and only the researcher will have access to this code.

This information will allow the researchers to gain an understanding of the thoughts and opinions of a group of currently employed pharmacy technicians to the proposed changes in their workplace. Additionally this information may generate an understanding and identification of any possible barriers to both the introduction of the ACT role and the possibility of mandatory registration.

The results of the project may be published and will be available in the University of Otago Library (Dunedin, New Zealand) but every attempt will be made to preserve your anonymity.

You are most welcome to request a copy of the results of the project should you wish.

The data collected will be securely stored in such a way that only those mentioned below will be able to gain access to it. At the end of the project any personal information will be destroyed immediately except that, as required by the University's research policy, any raw data on which the results of the project depend will be retained in secure storage for five years, after which it will be destroyed.

Reasonable precautions will be taken to protect and destroy data gathered by email. However, the security of electronically transmitted information cannot be guaranteed. Caution is advised in the electronic transmission of sensitive material.
**What if Participants have any Questions?**

If you have any questions about our project, either now or in the future, please feel free to contact either:

- Patti Napier BPharm  
  School of Pharmacy–University of Otago  
  Phone 03 4797321  
  Email. [patti.napier@otago.ac.nz](mailto:patti.napier@otago.ac.nz)

- Dr Rhiannon Braund  
  School of Pharmacy–University of Otago  
  Phone 03 479 7240  
  Email. [rhiannon.braund@otago.ac.nz](mailto:rhiannon.braund@otago.ac.nz)

This study has been approved by the Department stated above. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (ph 03 479-8256). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.
Study investigating attitudes to the introduction of an accredited checking technician.

CONSENT FORM FOR PARTICIPANTS

I have read the Information Sheet concerning this project and understand what it is about. All my questions have been answered to my satisfaction. I understand that I am free to request further information at any stage.

I know that:

1. my participation in the project is entirely voluntary;

2. I am free to withdraw from the project at any time without any disadvantage;

3. the audio tapes will be destroyed at the conclusion of the project but any raw data on which the results of the project depend will be retained in secure storage for five years, after which it will be destroyed;

4. The results of the project may be published and available in the University of Otago Library (Dunedin, New Zealand) but every attempt will be made to preserve my anonymity.

I agree to take part in this project.

............................................................................
(.................................................................)
(Signature of participant)  (Date)
Appendix 2: Survey into Pharmacists attitudes towards the possible introduction of the role of a checking technician.

Please feel free to add any other comments to your answers.

Gender: M/F Age _____ Years of pharmacy experience _____

Do you work in a Retail or Hospital pharmacy? (please circle) or Other

What is the total number of pharmacy technicians employed in your workplace? _____

How many full time? _____ How many part time?____

---

Are you aware of the role of a checking technician? Y / N (please circle)

Have you ever worked with a checking technician? Y / N (please circle)

How much do you know about the role?

Nothing 1 2 3 4 5 Quite a lot

---

An accredited checking technician would only be able to check and release a prescription under certain circumstances, they would not be responsible for clinical assessment but for checking for correct drug, quantity, strength and brand, also for typing errors on a label.

In your experience, do you feel that some technicians are capable of accurately checking a dispensed prescription to give out to a customer?

Strongly disagree 1 2 3 4 5 Strongly agree

Comment.

---

Would you be comfortable with a technician, with their current level of training, checking a dispensing?

Very uncomfortable 1 2 3 4 5 Extremely comfortable

Comment

Would you be comfortable with a technician, who has had specific extra training, checking a dispensing?

Very uncomfortable 1 2 3 4 5 Extremely comfortable

Comment

If it was a repeat where the initial dispensing was checked by a pharmacist?

Very uncomfortable 1 2 3 4 5 extremely comfortable

A weekly tray that is unchanged since the initial dispensing?

Very uncomfortable 1 2 3 4 5 extremely comfortable

A regular three monthly script for regular and ongoing medication that had not changed since the last three monthly dispensing?

Very uncomfortable 1 2 3 4 5 extremely comfortable
Can you give any other example/s that you feel maybe appropriate?

The checking technician would only be allowed to check work dispensed by another staff member, do you agree with this?

| Strongly disagree | 1 | 2 | 3 | 4 | 5 | strongly agree |

All prescriptions would have to have a clinical review by a pharmacist, do you agree that this is important?

| Strongly disagree | 1 | 2 | 3 | 4 | 5 | strongly agree |

A standard operating procedure would clearly define when the technician can check and release a prescription and also clearly spell out when a prescription must be referred back to the pharmacist, do you agree with this?

| Strongly disagree | 1 | 2 | 3 | 4 | 5 | strongly agree |

Do you feel that technicians would be competent to do this if they had undertaken extra training?

| Strongly disagree | 1 | 2 | 3 | 4 | 5 | Strongly agree |

Would the separation of the clinical check and the mechanical process of dispensing have an impact on public safety? Y/N

| Very negatively | 1 | 2 | 3 | 4 | 5 | Very positively |

Because..........

Do you feel the introduction of a checking technician role would impact on the role of the pharmacist? Y/N

| Very negatively | 1 | 2 | 3 | 4 | 5 | Very positively |

Because..........

Can you see a checking technician fitting into the workflow in your pharmacy? Y/N / possibly

Would you employ a checking technician if it fitted into your workflow? Y/N / possibly

Comment

It has been suggested that technicians should have to be registered with the Pharmacy Council as health professionals do you agree....

That this should be happening now for all technicians?

| Strongly disagree | 1 | 2 | 3 | 4 | 5 | strongly agree |
That this should only happen if they take on the role and increased responsibility of checking technicians?

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
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<th>strongly agree</th>
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Appendix 3: Survey into Technicians attitudes towards the possible introduction of the role of a checking technician.

Please feel free to add any extra comments to your answers.

Gender: M / F  Age ______  Years of pharmacy experience ______

Do you work in a Retail or Hospital pharmacy? (please circle)

What is the total number of pharmacy technicians employed in your workplace? ______

How many full time? ______  How many part time? ______

Are you aware of the job description/ responsibilities of a checking technician?  Y / N (please circle)

How much do you know about the role?

Nothing 1 2 3 4 5  Quite a lot

In your experience, do you feel that some technicians are capable of accurately checking a dispensed prescription to give out to a customer?

Strongly disagree 1 2 3 4 5  Strongly agree

An accredited checking technician would only be able to check and release a prescription under certain circumstances, they would not be responsible for clinical assessment but for checking for correct drug, quantity, strength and brand, also for patient details or typing errors on a label.

Would you be comfortable, given your current level of training, checking such a dispensing?

Very uncomfortable 1 2 3 4 5  Extremely comfortable

Would you be comfortable, after specific extra training, checking such a dispensing?

Very uncomfortable 1 2 3 4 5  Extremely comfortable

Do you feel technicians would be competent to do this if they had undertaken extra training?

Very uncomfortable 1 2 3 4 5  Extremely comfortable

Would you be interested in taking part in extra training to become a checking technician?

Very disinterested 1 2 3 4 5  Extremely interested

Would you be interested in taking on the extra responsibility involved with becoming a checking technician?

Very disinterested 1 2 3 4 5  Extremely interested
The following are examples of situations where a checking technician may perform the final check. Would you be comfortable with the situation....?

If it was a repeat where the initial dispensing was checked by a pharmacist?

<table>
<thead>
<tr>
<th>Very uncomfortable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Extremely comfortable</th>
</tr>
</thead>
</table>

A weekly tray that is unchanged since the initial dispensing?

<table>
<thead>
<tr>
<th>Very uncomfortable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Extremely comfortable</th>
</tr>
</thead>
</table>

A regular three monthly script for regular and ongoing medication that had not changed since the last three monthly dispensing?

<table>
<thead>
<tr>
<th>Very uncomfortable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Extremely comfortable</th>
</tr>
</thead>
</table>

Can you give any other example that you may feel would be appropriate?

The checking technician would only be allowed to check work dispensed by another staff member, do you agree with this?

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>strongly agree</th>
</tr>
</thead>
</table>

All prescriptions would have to have a clinical review by a pharmacist, do you agree that this is important?

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>strongly agree</th>
</tr>
</thead>
</table>

A standard operating procedure would clearly define when the technician can check and release a prescription and also clearly spell out when a prescription must be referred back to the pharmacist, do you agree with this?

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>strongly agree</th>
</tr>
</thead>
</table>

Can you see a checking technician fitting into the workflow in your pharmacy? Y / N / possibly.

Comment

It has been suggested that technicians should have to be registered with the Pharmacy Council as health professionals do you agree:-

That it should be happening now for all technicians?

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>strongly agree</th>
</tr>
</thead>
</table>

Only if they take on the role and increased responsibility of checking technicians?

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>strongly agree</th>
</tr>
</thead>
</table>
Appendix 4: Information sheet and consent form for participants taking part in Christchurch Study

Reference Number 13/280
Jan 2014

An investigation of the roles and responsibilities of pharmacists and pharmacy technicians before and after the February 2011 Christchurch earthquake.

INFORMATION SHEET FOR PARTICIPANTS or PARENTS / GUARDIANS ETC.

Thank you for showing an interest in this project. Please read this information sheet carefully before deciding whether or not to participate. If you decide to participate we thank you. If you decide not to take part there will be no disadvantage to you and we thank you for considering our request.

What is the Aim of the Project?

The aim of this study is to investigate the roles and responsibilities of pharmacists and pharmacy technicians before and immediately after the February 2011 earthquake. The focus of this study is how individuals did their jobs prior to the earthquake and did this change during this time of crisis.

What Type of Participants are being sought?

Participants will be selected from those individuals who are or were pharmacists or pharmacy technicians who were working in a pharmacy in the Christchurch area at the time of the earthquakes commencing February 2011.

A selection of pharmacies in the Christchurch area will be identified; some from the hardest hit areas, some from areas of moderate damage and some from the periphery where minimal damage was sustained. From this pool of pharmacies permission will be obtained to approach the staff who will be invited to participate in this study.

It is hoped to collect information from nine to twelve pharmacies and interview approximately thirty individual staff.

What will Participants be Asked to Do?

Should you agree to take part in this project, you will be asked to take part in a semi-structured interview. It is anticipated that this should take approximately one hour.
As this interview will cover a time of stress for the participants you may end the interview at anytime and the researchers have details for access to counselling should you wish. There will be no cost for you to access this service.

As this interview covers a time of crisis where unusual events occur, it is possible that revelations of non-adherence to rules or regulations during this time may be reported during the interview. The researchers have been reassured that possible revelations of this nature will not result in any action being taken against the respondent.

Please be aware that you may decide not to take part in the project without any disadvantage to yourself of any kind.

**What Data or Information will be Collected and What Use will be Made of it?**

The interviews will be audio recorded. These recordings may contain personal information about where respondents work and their position in their workplace. These audio recordings of the interviews will be transcribed into written form and the original audio recording erased. A person will be employed to transcribe the audio recordings, this person will be subject to a confidentiality agreement.

The transcribed copy will be assigned a unique number and any individual information that could identify you will be removed at this time. The initial transcribed copy and the codes for the unique numbers will be held in secure storage during the project and these codes will only be available to the researcher.

The de-identified copies only will be used for further study and will be accessible to the researcher and supervisors only. These de-identified copies will be analysed to establish any common themes between the individual responses. Every effort will be made to ensure that individuals will not be able to be identified during any presentation or publication of the study results.

The data collected will be securely stored in such a way that only those mentioned below will be able to gain access to it. Data obtained as a result of the research will be retained for at least 5 years in secure storage. Any personal information held on the participants [such as contact details, audio or video tapes, after they have been transcribed etc.] may be destroyed at the completion of the research even though the data derived from the research will, in most cases, be kept for much longer or possibly indefinitely.

The results of the project may be published and will be available in the University of Otago Library (Dunedin, New Zealand) but every attempt will be made to preserve your anonymity.

A copy of the report on this study will be available to you on request. Please let the researchers know if you would like a copy.

This project involves an open-questioning technique. The general line of questioning includes your role in the pharmacy and did this change over the time of the emergency. The precise nature of the questions which will be asked have not been determined in advance, but will depend on the way in which the interview develops. Consequently, although the University of Otago Human Ethics Committee is aware of the general areas to be explored in the interview, the Committee has not been able to review the precise questions to be used.
In the event that the line of questioning does develop in such a way that you feel hesitant or uncomfortable you are reminded of your right to decline to answer any particular question(s) and also that you may withdraw from the project at any stage without any disadvantage to yourself of any kind.

**Can Participants Change their Mind and Withdraw from the Project?**

You may withdraw from participation in the project at any time and without any disadvantage to yourself of any kind.

**What if Participants have any Questions?**

If you have any questions about our project, either now or in the future, please feel free to contact either:-

<table>
<thead>
<tr>
<th>Name of Student</th>
<th>Name of Supervisor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patti Napier BPharm</td>
<td>Assoc Prof Rhiannon Braund</td>
</tr>
<tr>
<td>School of Pharmacy</td>
<td>School of Pharmacy</td>
</tr>
<tr>
<td>University Telephone: 03 4797321...</td>
<td>University Telephone: 03 4797240...</td>
</tr>
<tr>
<td>Email: <a href="mailto:stipa989@student.otago.ac.nz">stipa989@student.otago.ac.nz</a></td>
<td>Email: <a href="mailto:rhiannon.braund@otago.ac.nz">rhiannon.braund@otago.ac.nz</a>...</td>
</tr>
</tbody>
</table>

This study has been approved by the University of Otago Human Ethics Committee. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (ph 03 479 8256 or email gary.witte@otago.ac.nz). Any issues you raise will be treated in confidence and investigated and you will be informed of the outcome.
An investigation of the roles and responsibilities of pharmacists and pharmacy technicians before and after the February 2011 Christchurch earthquake.

CONSENT FORM FOR PARTICIPANTS

I have read the Information Sheet concerning this project and understand what it is about. All my questions have been answered to my satisfaction. I understand that I am free to request further information at any stage.

I know that:-

1. My participation in the project is entirely voluntary;

2. I am free to withdraw from the project at any time without any disadvantage;

3. Personal identifying information from audio recordings will be destroyed at the conclusion of the project but any raw data on which the results of the project depend will be retained in secure storage for at least five years;

4. This project involves an open-questioning technique. The general line of questioning includes individual roles and responsibility of pharmacists and pharmacy technicians. The precise nature of the questions which will be asked have not been determined in advance, but will depend on the way in which the interview develops and that in the event that the line of questioning develops in such a way that I feel hesitant or uncomfortable I may decline to answer any particular question(s) and/or may withdraw from the project without any disadvantage of any kind.

5. The results of the project may be published and will be available in the University of Otago Library (Dunedin, New Zealand) but every attempt will be made to preserve my anonymity.

I agree to take part in this project.

...............................................................

(Signature of participant) (Date)

...............................................................

(Printed Name)

This study has been approved by the University of Otago Human Ethics Committee. If you have any concerns about the ethical conduct of the research you may contact the Committee through the Human Ethics Committee Administrator (ph 03 479 8256 or email gary.witte@otago.ac.nz). Any
issues you raise will be treated in confidence and investigated and you will be informed of the outcome.
Appendix 5: Pilot Project Survey ONE

An investigation of the opinions of pharmacists and technicians participating in the pilot project evaluating the introduction of a pharmacy accuracy checking technician (PACT).

Please feel free to add any extra comments to your answers.

Pharmacy Project Identifying Number or Pharmacy name…………………………………………

Are you the PACT supervising pharmacist? Y /N (please circle)

Will you be the PACT trainee? Y /N (please circle)

Gender: M / F (please circle) Age_____ Years of pharmacy experience ______

Job Title

________________________________________________________________________

Qualifications___________________________________________

________________________

Do you work in a Community or Hospital pharmacy? (please circle)

________________________

A checking technician (PACT) would only be able to check and release a prescription under certain circumstances, they would only be checking for correct drug, quantity, strength and brand, also for identifying typing errors on a label. The pharmacist will be responsible for a clinical assessment of the prescription.

In your experience, do you feel that some technicians are capable of accurately checking a dispensed prescription to give out to a customer?

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly agree or</th>
</tr>
</thead>
</table>

Technicians can accurately check a dispensing given their current level of training.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly agree or</th>
</tr>
</thead>
</table>

Technicians could accurately check a dispensing after specific extra training.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly agree or</th>
</tr>
</thead>
</table>

Technicians would be competent to do this if they had undertaken specific extra training.

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly agree or</th>
</tr>
</thead>
</table>
Some questions on workflow…….

Does your pharmacy have a set workflow pattern for accepting and dispensing a prescription?

- None defined
- Clearly defined

Can you see a checking technician fitting into the current overall workflow in your pharmacy?

- Not at all
- extremely well

Will you need to change the workflow in your pharmacy to accommodate this new role?

- Not at all
- Quite a lot

Comments:-

Some questions on the impact on staff……

What kind of impact do you think this new role will have on the pharmacy staff?

- A negative impact
- A positive impact

Briefly explain in what way…..

What kind of impact do you think this new role will have on the role of the pharmacist?

- A negative impact
- A positive impact

Briefly explain in what way…..

This new role may allow pharmacist to spend more time with patients.

- Strongly disagree
- Strongly agree

Comments:-
Some questions on potential **benefits** arising from the project….

Do you agree that this new role would be a benefit to the pharmacy?....

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

To the patients?.....

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

To the staff? .....

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

Briefly explain in what way:-


---

Some questions on any potential **disadvantages** arising from the project…….

Do you agree that this new role would be a disadvantage to the pharmacy?....

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

To the patients?.....

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

To the staff? .....

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

Briefly explain in what way...
Appendix 6: Pilot Project Survey TWO

An investigation of the opinions of pharmacists and technicians participating in the pilot project evaluating the introduction of a pharmacy accuracy checking technician (PACT).

Please feel free to add any extra comments to your answers.

Pharmacy Project Identifying Number or Pharmacy name………………………………………

Are you the PACT supervising pharmacist? Y /N (please circle)

Will you be the PACT trainee? Y /N (please circle)

Gender: M / F (please circle) Age_____ Years of pharmacy experience ______

Job Title

________________________________________________________________________________

Do you work in a Community or Hospital pharmacy? (please circle)

________________________________________________________________________________

A checking technician (PACT) would only be able to check and release a prescription under certain circumstances, they would only be checking for correct drug, quantity, strength and brand, also for identifying typing errors on a label. The pharmacist will be responsible for a clinical assessment of the prescription.

In your experience, do you feel that some technicians are capable of accurately checking a dispensed prescription to give out to a customer?

Strongly disagree 1 2 3 4 5 Strongly agree or

Technicians can accurately check a dispensing given their current level of training.

Strongly disagree 1 2 3 4 5 Strongly agree or

Technicians could accurately check a dispensing after specific extra training.

Strongly disagree 1 2 3 4 5 Strongly agree or

Technicians would be competent to do this if they had undertaken specific extra training.

Strongly disagree 1 2 3 4 5 Strongly agree or

Dont usually work with technicians.
Some questions on workflow….

Did your pharmacy workflow pattern for accepting and dispensing a prescription have to change with the introduction of the PACT?

Not at all 1 2 3 4 5 Quite a lot

Did you expect there would need to be changes to the existing workflow of the pharmacy?

Not at all 1 2 3 4 5 extremely well

Did it change in the way you anticipated?

Not at all 1 2 3 4 5 Quite a lot N/A

Comments:-

Some questions on the impact on staff………

What kind of impact do you think this new role has had on the pharmacy staff?

A negative impact 1 2 3 4 5 A positive impact

Briefly explain in what way…..

What kind of impact do you think this new role has had on the role of the pharmacist?

A negative impact 1 2 3 4 5 A positive impact

Briefly explain in what way…..

This new role has allowed the pharmacist to spend more time with patients.

Strongly disagree 1 2 3 4 5 Strongly agree

Comments:-
Reported impact.

Some of the respondents have reported both positive and negative issues arising from the project so far.

Have you noticed or experienced any of the following?

- Increase in pharmacist OTC involvement? [Y / N]
- Decrease in waiting times for patients? [Y / N]
- Increased staff stress in coping with the change? [Y / N]
- Any friction between staff members due to the change? [Y / N]
- Initial teething problems to date? [Y / N]
- Streamlining of roles? [Y / N]
- Need for more technicians in the workplace? [Y / N]
- Any problems with PACT telling other technicians about filling errors? [Y / N]
- Increased clinical activity for the pharmacist? [Y / N]
- Significant changes in the pharmacy layout? [Y / N]

Some questions on potential benefits arising from the project.

Do you agree that this new role would be a benefit to the pharmacy?

- Strongly disagree 1 2 3 4 5 Strongly agree

To the patients?

- Strongly disagree 1 2 3 4 5 Strongly agree

To the staff? ..... 

- Strongly disagree 1 2 3 4 5 Strongly agree

Briefly explain in what way:-
Some questions on any potential *disadvantages* arising from the project………

Do you agree that this new role would be a disadvantage to the pharmacy?.....

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

To the patients?.....

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

To the staff? .....

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Strongly agree</th>
</tr>
</thead>
</table>

Briefly explain in what way:-

Any additional comments…..
Appendix 7: Pilot Project Survey THREE

Welcome back

This is the third of the three surveys that will be conducted during the pilot project.

Thank you for taking the time to complete this survey.

If you have any questions regarding the survey please contact the researcher Patti Napier at patti.napier@otago.ac.nz

Demographics

Some demographic questions...

1. What is your Pharmacy Project Identifying Number or pharmacy name?

2. What is your role in the pharmacy?
   ○ Retail staff
   ○ Technician
   ○ Pharmacist
   ○ Other

Supervision

Supervision of the PACT during their training.

3. Were you involved in the supervision/checking of the PACT at any time?
   ○ Yes
   ○ No

Demographics

4. Years of pharmacy experience?
5. Do you work in a community or hospital pharmacy?
- Community
- Hospital

6. How many pharmacists are there in your workplace?
   - Total: 
   - Full-time: 
   - Part-time: 

7. How many technicians are there in your workplace?
   - Total: 
   - Full-time: 
   - Part-time: 

**Technicians ability**

A checking technician (PACT) would only be able to check and release a prescription under certain circumstances, they would only be checking for correct drug, quantity, strength and brand and also for identifying typing errors on the label. The pharmacist will be responsible for a clinical assessment of the prescription.

8. Please give your opinion on the questions below...

   |                        | Strongly disagree | Disagree | Neither disagree or agree | Agree | Strongly agree | Don't usually work with technicians |
---|------------------------|-------------------|----------|---------------------------|-------|---------------|-----------------------------------|
In your experience, do you feel that SOME technicians are capable of ACCURATELY checking a dispensed prescription to give out to a customer? | ![Options](image1) | ![Options](image2) | ![Options](image3) | ![Options](image4) | ![Options](image5) | ![Options](image6) |
Technicians can accurately check a dispensing given their current level of training. | ![Options](image1) | ![Options](image2) | ![Options](image3) | ![Options](image4) | ![Options](image5) | ![Options](image6) |
Technicians could accurately check a dispensing after specific extra training. | ![Options](image1) | ![Options](image2) | ![Options](image3) | ![Options](image4) | ![Options](image5) | ![Options](image6) |
Technicians would be COMPETENT to do this if they had undertaken specific extra training. | ![Options](image1) | ![Options](image2) | ![Options](image3) | ![Options](image4) | ![Options](image5) | ![Options](image6) |

**Workflow**
Now some questions on workflow...

9. Did your pharmacy workflow pattern for accepting and dispensing a prescription have to change with the introduction of the PACT?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Quite a lot</th>
<th>Unable to comment</th>
</tr>
</thead>
</table>

Comments

10. Has there been any further changes to the workflow since the last survey?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Quite a lot</th>
<th>Unable to comment</th>
</tr>
</thead>
</table>

Comments

11. Did the changes involve a change in physical layout, furnishings or fittings moved or new ones brought in etc at any time?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Quite a lot</th>
<th>N/A</th>
</tr>
</thead>
</table>

Comments

12. If there has been changes, did those change/s lead to an improvement in workflow?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Quite a lot</th>
<th>Unable to comment</th>
</tr>
</thead>
</table>

Comments
13. Did you feel these changes were needed?

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Totally</th>
<th>Unable to comment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Comments...


14. Do you think your current workflow would benefit from further reorganisation to best utilise the PACT role??

<table>
<thead>
<tr>
<th>Not at all</th>
<th>Totally</th>
<th>Unable to comment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

Comments...


Impact

Some questions on the impact on staff...

15. Did the new PACT role have an impact on the pharmacy staff?

<table>
<thead>
<tr>
<th>A negative impact</th>
<th>A positive impact</th>
<th>Unable to comment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Briefly explain in what way...

16. What type of impact did this new role have on the pharmacist.

<table>
<thead>
<tr>
<th>A negative impact</th>
<th>A positive impact</th>
<th>Unable to comment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Briefly explain in what way...
17. The pharmacist is now spending more time with patients?

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please give details

---

**Reported impact**

Some of the respondents have reported both positive and negative issues arising from the project so far.

18. Have you noticed or experienced any of the following?

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

- Increase in pharmacist OTC involvement?
- Decrease in waiting times for patients?
- Increased staff stress in coping with the change?
- Any friction between staff members due to the change?
- Initial teething problems to date?
- Streamlining of roles?
- Need for more technicians in the workplace?
- Any problems with PACT telling other techs about filling errors?
- Increased clinical activity for the pharmacist?
- Significant change to the pharmacy layout?

---

Benefits
## Appendices

### Some questions on the potential benefits arising from this project.

19. Please indicate your agreement with the questions below...

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you aware of any benefit to the pharmacy from introducing the PACT role?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To the patients?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To the staff?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please give examples, if any:-

### Disadvantages

### Some questions on the potential disadvantages arising from the project.

20. Please indicate your agreement with the questions below...

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are you aware of any disadvantage to the pharmacy from introducing the PACT role?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To the patients?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>To the staff?</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Please give examples, if any:-

### Additional comments
Please add any further comments you may have.

21. Any additional comments.....

Thank you

Thank you for taking the time to complete our survey. Your input is greatly appreciated. You may now exit out of the survey browser.
Appendix 8: Data cleaning protocol

This process was applied to all three of the data collections using the smart phones.

The data from the phones was downloaded and saved as an Excel file. It was saved as ‘raw data’ file.

A second copy of each set of data from each phone is saved as ‘{file number|clean| in separate file. This version is the version that will be used for any further analysis and the ‘raw data’ keep in case of disasters.

Ordering columns

Rename ‘version’ column into ‘order’, number data points in column 1,2,3,4,...etc. to ensure whatever sorting is done that the file can be restored to the original time sequence.

Rename column ‘parent name’ to Activity.

Add three new columns after ‘Id’ column, label ‘site’, ‘H vs C’ and ‘P vs T’.

Coding columns.

These columns need to be coded numerically for the transfer to SPSS for analysis, therefore

Site column coded to correspond to site number ie. 001 becomes 1.

H vs C column is coded hospital = 0 and community =1

P vs T column is coded pharmacist = 0 and technician = 1

First sort

Sort file using column H or name into alphabetical order. Number the corresponding activities into the ‘Activity’ column. (4=assembling Rx, 1=direct activities etc)

Sort back into numerical order using ‘order’ column.

Time sort

Handling odd time values.

Handling less than 3 minutes time blocks.

Identify all time blocks less than 3 minutes, delete each of these row unless they are run on times (where the previous time is over thirteen minutes and for the same activity) in this case leave as they are and do not add missed time to the first value.

Handling Greater than 10 minute time blocks.

For all values greater than 13 minutes add an extra row/s as needed.

Where time duration is greater than 10 minutes ie. if time data indicates this is a 30 minute period but there is only one not three time points, add in extra 10 minute time points (rows) so that the full
amount of time is accounted for. Code all missing rows as 8 in the activity column except for breaks, see below.

**Breaks**

If data point is a ‘break’ tidy to 10 minute intervals from beginning to end of break. ie. if time data indicates this is a 30 minute lunch hour but there are one/two not three time points, add in extra 10 minute time point/s so that the full amount of time is accounted for. Code all missing rows as 7 in the activity column.

**Overnight values**

‘overnight’ data points will be reallocated to one data point. This is the point that the time period started at. This is the activity that the participant last selected as the final activity for their day.

Identify and code any ‘overnight’ values. Those where hours are large time blocks in multiple hours and occur around the change over of dates. If run time is past the hour or half hour delete, if not then make up to the closest half hour. Change the finish time to exactly ten minutes after the start time, change duration time to ten minutes (0:10:00).

**Final sort**

Sort the file by ‘activity’ code
Appendix 9: Pilot project data from all sites, in table format.

**Appendix 7: Time and Motion Data**

*Pharmacist data pre and post. In percentages. Including missing data.*

<table>
<thead>
<tr>
<th>Activity</th>
<th>Site A</th>
<th>Site B</th>
<th>Site C</th>
<th>Site D</th>
<th>Site E</th>
<th>Site F</th>
<th>Site G</th>
<th>Site H</th>
<th>Site I</th>
<th>Site J</th>
<th>Site K</th>
<th>Site L</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pre</td>
<td>post</td>
<td>pre</td>
<td>post</td>
<td>pre</td>
<td>post</td>
<td>pre</td>
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<td>pre</td>
<td>post</td>
</tr>
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<td>3</td>
<td>34</td>
<td>11</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>9</td>
<td>*</td>
<td>3</td>
<td>2</td>
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<td>36</td>
<td>39</td>
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<td>7</td>
</tr>
<tr>
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<td>5</td>
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<td>0</td>
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<td>33</td>
<td>0</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>28</td>
<td>*</td>
<td>32</td>
<td>18</td>
<td>0</td>
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<td>18</td>
<td>17</td>
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<td>27</td>
<td>6</td>
<td>5</td>
<td>5</td>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
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<td>*</td>
<td>6</td>
<td>2</td>
<td>10</td>
<td>9</td>
<td>23</td>
<td>11</td>
<td>16</td>
<td>1</td>
<td>24</td>
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</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*baseline data only as pharmacy pulled out of project.  
# No data collected

Activities: 1 = direct activities, 2 = indirect activities, 3 = supportive activities, 4 = assembling Rx, 5 = checking Rx, 6 = other, 7 = break, 8 = missing data
Appendix 7: Time and Motion Data

Technician data pre and post. In percentages. Including missing data.

<table>
<thead>
<tr>
<th>Site</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E1</th>
<th>E2</th>
<th>F1</th>
<th>F2</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>K</th>
<th>L2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>pre</td>
<td>post</td>
<td>pre</td>
<td>post</td>
<td>pre</td>
<td>post</td>
<td>pre</td>
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</tr>
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<td>2</td>
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<td>1</td>
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<td>17</td>
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<tr>
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<td>8</td>
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<td>≠</td>
<td>16</td>
<td>70</td>
</tr>
</tbody>
</table>

*baseline data only as pharmacy pulled out of project.  | $ no data collected

Site L second technician had no data collected at baseline and failed the assessments so no census data collected.

Activities: 1= direct activities, 2= indirect activities, 3= supportive activities, 4 = assembling Rx, 5 = checking Rx, 6 = other, 7 = break, 8 =missing data
The End