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**The key factors driving successful improvement in primary care: A
mixed methods investigation of the determinants of quality
improvement success in Aotearoa New Zealand**

A thesis with publication presented in partial fulfilment of the requirements
for the degree of
Doctor of Philosophy

Massey University, Palmerston North
Aotearoa New Zealand

Jane Cullen

November 2023

Declaration

I, Jane Cullen (Student ID: _____), declare that this thesis entitled “The key factors driving successful improvement in primary care: A mixed methods investigation of the determinants of quality improvement success in Aotearoa New Zealand” is the outcome of my own work. This thesis was produced according to Massey University’s PhD thesis by publications requirements. It is based on research that is published, is in revision following reviewers’ comments, or is in preparation to be submitted. Consequently, the submitted chapters are relatively succinct, there is some repetition (particularly in the literature review and methods sections) and there may be minor stylistic differences between chapters.

Abstract

Primary care is where the population receives most of their health care and where successful quality improvement (QI) can have the biggest impact on health, wellbeing, equity, and health system performance. A better understanding of the factors that influence QI in primary care is urgently needed to support a high-performing primary healthcare system. Most prior studies into the determinants of effective QI have focused on secondary care organisations and large-scale collaborative efforts. Primary care services such as general practice present a different set of challenges. Various key contextual factors have been identified in the literature, but few studies explain how they relate to each other and QI success.

This study sought to answer the following questions:

1. What are the contextual factors influencing primary care improvement interventions?
2. How do the contextual factors, improvement content (topic and planned changes) and the implementation process influence each other and the improvement outcomes in primary care?
3. How applicable for primary care assessment is the Model for Understanding Success in Quality (MUSIQ), a tool for assessing modifiable contextual factors developed in secondary care?

This research was an explanatory sequential mixed methods study based in the Aotearoa, New Zealand (NZ) primary care setting of general practice and Primary Health Organisations (PHOs). A multi-case mixed methods approach was followed in the first stage. Mainly qualitative data were collected from primary care interviews guided by the Consolidated Framework for Implementation Research (CFIR). This was compared with quantitative data from the MUSIQ survey. The second stage consisted of a national survey where emerging theory was tested by partial least squares structural equation modelling (PLS-SEM).

The findings revealed that most teams did not use formal QI methods, instead relying on their people-centred relationship skills and networks to drive QI via distributed leadership. Teams were intrinsically motivated by community and patient need and drew on strengths developed within the complexity and uncertainty of the primary care settings to drive QI. The collaborative skills which are increasingly required in the modern primary care setting support the shared social processes of sensemaking for enacting change.

The key success factors driving QI in primary care are identified and how they relate to each other explained. A primary care adaptation of MUSIQ has been proposed that may aid improvement

practitioners and researchers to assess primary care contexts. The key strengths should be developed and supported across primary care services and capability, capacity and resources supported centrally to increase the ability of primary care to improve services more easily and effectively.

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My journey as a PhD student has been the continuation of a lifelong learning journey. I have been perpetually curious about how to make health care better so that people can live longer and happier lives as they choose to live them, and healthcare workers can be sustained spiritually as well as financially in the work that they do. Many of my work colleagues have never known me when I wasn't

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Jane Cullen

Massey University

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Glossary of terms and abbreviations

Term or Abbreviation	Full name or definition
AHRQ	Agency for Healthcare Research and Quality, an American federal agency working to improve the safety and quality of healthcare for Americans.
BSMC	Better, Sooner, More Convenient: A governmental primary care policy to develop integrated services ‘closer to home’ that involved the idea of Integrated Family Health Centres (IFHCs) (Middleton et al., 2018).
C	Case (e.g., Case 1: C1)
CQI	Continuous quality improvement: “a set of methods for improving the quality of care, through continuous measurement and problem-solving techniques” (Baillie et al., 2021, p. 2).
CFIR	Consolidated Framework for Implementation Research
DHB	District Health Board (now Districts)
Equity	In Aotearoa New Zealand, people have differences in health that are not only avoidable but unfair and unjust. Equity recognises different people with different levels of advantage require different approaches and resources to get equitable health outcomes (Ministry of Health New Zealand, 2019).
GP	General practitioner
HCH	Health Care Home: The Health Care Home model in New Zealand is based on international models using ‘Lean’ quality improvement theory in health and the use of technology to provide co-ordinated and convenient care for patients, improving access and decreasing the use of hospital services (Hefford, 2017). The Collaborative Aotearoa – Health Care Home website (Accessed November 2023) provides the most up-to-date information on the model: https://healthcarehome.org.nz/ .
IFHC	Integrated Family Health Centre: Centres incorporating co-located multi-disciplinary teams and services (Middleton et al., 2018).
Kaupapa	Sir Mason Durie explains that kaupapa can mean different things in different contexts and in “the area of health it has been used to reflect an approach to clinical practice that recognises Māori perspectives” (Durie et al., 2012, p. 66). Beaton et al. (2019) describe “kaupapa Māori” as, “an approach that is by-Māori, for-Māori and guided by Māori worldviews and principles” (p. 2).
Kotahitanga	Unity, strength within solidarity and accord. Source: Documents supplied by Case 1.

Lean	An improvement methodology to increase efficiency and effectiveness through the removal of waste in the organisation and its processes to improve value to the customer (Rodgers et al., 2021; Stamatis, 2011).
LSS	Lean Six Sigma is a synthesis of the Lean and Six Sigma improvement methodologies (Stamatis, 2011).
Manaakitanga	To value and show regard, respect, and care for someone/something. Source: Documents supplied by Case 1.
Māori	The Indigenous people of Aotearoa New Zealand which make up 16.5% of the total population of Aotearoa New Zealand (Statistics New Zealand, 2019).
MUSIQ	Model for Understanding Success in Quality
NZ	Aotearoa New Zealand
Pākehā	Non-Māori or New Zealander of European descent
PDSA	Plan-Do-Study-Act is an iterative cyclical method to guide quality improvement.
Primary care	The professional health care provided in the community, from a general practitioner (GP), practice nurse, pharmacist or other health professional and community health workers working within a professional framework. (Based within a general practice or PHO setting).
PCMH	Patient Centred Medical Home – the term used in America to describe the primary care model of care that aims to achieve whole-person oriented, co-ordinated, quality and safe care with enhanced access (Wagner, et al., 2018).
PHO	Primary health organisations: PHOs ensure the provision of essential primary health care services, mostly through general practices, to people who are enrolled with the PHO. At the time data were collected for this research there were 30 PHOs across Aotearoa New Zealand.
QI	Quality improvement: Defined as, “the combined and unceasing efforts of everyone – healthcare professionals, patients and their families, researchers, payers, planners and educators – to make the changes that will lead to better patient outcomes (health), better system performance (care) and better professional development (learning)” (Batalden & Davidoff, 2007, p. 2).
QII	Quality improvement intervention
QI&IS	Quality improvement and implementation science
Six Sigma	Six Sigma is a project-based improvement methodology that is focused on reducing variation within statistically specified limits and cost reduction (Rodgers et al., 2021; Stamatis, 2011).

RNZCGP	Royal New Zealand College of General Practitioners
Tauiwi	Non-Māori, foreigner
Tikanga	“Māori custom”, “customs and traditions that have been handed down through many generations,” “accepted as the appropriate way of achieving and fulfilling certain objectives and goals” (Marsden, 2003, p. 66).
TQM	Total Quality Management: Different approaches have been taken to defining TQM but at its simplest, it can be described as “set of practices that enable an organization to deliver quality products or services” (Rao et al., 1996, p. 31). These practices are commonly defined by standards such as the International Organization for Standardization (ISO) Standards and quality award systems such as the Malcolm Baldrige National Quality award in the United States (Rao et al., 1996) and the NZ Business Excellence Award in NZ.
VLCA practice	Very Low-Cost Access practice: VLCA practices are contracted general practices that meet the eligibility criteria of 50% high needs population (defined as Māori, Pacific or New Zealand Deprivation Index quintile 5), and agree to keep their fees at a very low rate for adults and free for under 13 years.
Whānau	A noun that describes a social group ranging from nuclear families and household units to large extended families of relatives numbering in the thousands. It is underpinned by the kinship principle and is a fundamental building block of Te ao Māori. In modern times it is also used to describe groups of friends and allies who may not be relatives (Mead, 2003).
Whanaungatanga	Relationships, kinships, connecting, unions. Source: Documents supplied by Case 1.

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Chapter 1: Introduction

1.1 Introduction of the topic

Primary care is where the population receives most of their healthcare (Auraaen et al., 2018; Ministry of Health, 2022; Stange et al., 2023) and where successful quality improvement (QI) can have the biggest impact on health, wellbeing, equity and health system performance (Auraaen et al., 2018; Kringos et al., 2013; OECD, 2017; Stange et al., 2023). However, health care quality concerns and improvement efforts have traditionally centred around hospitals (Auraaen et al., 2018). General practice and other primary care services are unique settings with high degrees of heterogeneity and uncertainty centred around the holistic nature of primary care itself (Crabtree, Nutting, et al., 2011; Fiscella & McDaniel, 2018; Lau et al., 2016; Stange et al., 2023). Internationally and in Aotearoa New Zealand (NZ), they tend to operate on narrow financial margins with minimal capacity and flexibility in use of resources (Crabtree, Nutting, et al., 2011; Matheson et al., 2022). These factors (and others) create an environment where primary care has developed in different ways to larger secondary care services where care is defined by admission and discharge, is often more procedurally based and often easier to standardise (Downs, 2017; OECD, 2017).

International and local concerns about healthcare quality have been raised consistently over several decades (Braithwaite et al., 2020; Institute of Medicine (US) Committee on Quality Health Care in America, 2000; Shuker et al., 2015) and healthcare service providers have responded by utilising a variety of QI methods, approaches, and initiatives (Dixon-Woods et al., 2013; Dixon-Woods & Martin, 2016; Walshe, 2009). Despite many years of QI interventions (QIIs), and some successes across the globe, results are inconsistent (Braithwaite et al., 2020; Dixon-Woods & Martin, 2016). Studies show that only 60 percent of care meets evidence-based guidelines, 30 percent of care is deemed low value or waste, levels of harm remain around 10 percent of healthcare encounters (Braithwaite et al., 2020) and primary care estimates of occurrences of harm are as high as 4 in 10 patients (Auraaen et al., 2018). In NZ there are similar quality problems and rates of harm at the same time as the health system struggles with rising costs (Merry et al., 2017; Shuker et al., 2015), an ageing workforce and high levels of stress and burnout amongst clinicians, with 25 percent of general practitioners (GPs) reporting exhaustion (Goodyear-Smith & Ashton, 2019). There is well-documented data describing unwarranted variation and persistent inequity contributing to Māori amenable mortality (mortality that is amenable to intervention), twice that of non-Māori, and ambulatory sensitive hospitalisations (those that are potentially preventable through primary care interventions), 1.57 times more likely for Māori adults (Reid et al., 2022).

Research to understand the variation in outcomes from improvement efforts has sought answers from a combination of ‘how’ a QII was applied or the mechanisms of change, the QII itself (what), and the impact of context surrounding the QII (Bate et al., 2015; Dixon-Woods & Martin, 2016; Pfadenhauer et al., 2017). Recent studies, particularly from the field of implementation science, have focused on context as a key determinant of effective improvement (Kao, 2014; Nilsen & Bernhardsson, 2019; Subramanian et al., 2021). The topic has generated many theories, frameworks, and models with varied definitions of context, and little consensus on key contextual factors and how they interrelated with the QII and mechanisms of change to achieve successful outcomes (Bate et al., 2015; Nilsen, 2015; Reed, Kaplan, & Ismail, 2018; Subramanian et al., 2021).

While definitions of context vary, it has become clear that context is dynamic, with blurred boundaries and interrelationships with the other determinants of successful QI, the QII and implementation process (Bate et al., 2015; Coles et al., 2017; Pfadenhauer et al., 2015). A simple definition of context is, “all factors that are not part of a quality improvement intervention itself” (Øvretveit, 2011, p. 18). Another definition from Pfadenhauer et al. (2015) defines context as “embracing not only the setting but also roles, interactions and relationships” (2015, p. 110). This definition points towards the people-centred factors such as leadership, teamwork, culture, and social networks as critical aspects of context (Braithwaite et al., 2018; Miller et al., 2010). The varied definitions of context and the purpose and setting of studies mean that lists of contextual factors vary and the enablers in one setting or at one time can be barriers in other settings or even in the same setting at a different time (Coles et al., 2017; Reed, Kaplan, & Ismail, 2018; Stange & Glasgow, 2013).

Research is still needed to explain the relationships between the factors that support improvement in specific settings (Bate et al., 2015; Rogers et al., 2021; Subramanian et al., 2021), and particularly in primary care (Auraaen et al., 2018; Fiscella & McDaniel, 2018; Kringos et al., 2010). There are few studies into contextual factors influencing the success of QI in primary care (Auraaen et al., 2018; Balasubramanian et al., 2018; Gosling et al., 2019).

1.2 Research rationale

Internationally and in NZ, the health system and primary health care has been challenged to develop new ways of working, with new models of care, to deliver the sought after gains in population health outcomes, individual patient experience of care, quality, and safety, whilst managing increased demand and limited resources (Middleton et al., 2018; OECD, 2017). Across the world, the primary care system is under pressure to achieve accessible, equitable, quality healthcare, expand services and reduce demand on hospital and specialist services (Auraaen et al., 2018; Stange et al., 2023). This is all within the current local and international primary care environment of constrained resources

(workforce and funding) (Love et al., 2022; Middleton et al., 2018; OECD, 2017), an ageing workforce with rising levels of burnout (Edwards et al., 2018; Kelly et al., 2022; Middleton et al., 2018) and ongoing pressure for change (Middleton et al., 2018; OECD, 2017), which has only increased since the pandemic and the NZ health reforms (Kelly et al., 2022; Matheson et al., 2022; Te Whatu Ora – Health New Zealand, 2022).

1.2.1 Problem statement

Despite the inconsistent results from QI (Braithwaite et al., 2020; Chassin & Loeb, 2011; Dixon-Woods & Martin, 2016), the same QI approaches, tools, and methods are being deployed into the diverse and complex primary care sector without an understanding of applicability and context in primary care (Crabtree et al., 2011; Janamian et al., 2016; Rohrbasser et al., 2018). There is a gap in the literature identifying the key contextual factors in primary care, and research is still needed to explain the relationships between the factors that lead to improvement in specific settings (Bate et al., 2015; Rogers et al., 2021; Subramanian et al., 2021), particularly in primary care (Fiscella & McDaniel, 2018; Kringos et al., 2010; Slawomirski et al., 2018). Building an understanding of what is needed to support QI and achievement of a high-performing healthcare system is critical in the current environment.

1.3 Research questions

The importance of primary care QI research in the current environment for the performance of the health system is increasing as this gap continues to be unaddressed. The research questions are designed to provide answers for primary care researchers, leaders, and improvement practitioners on the strengths available in primary care that will support effective improvement in primary care quality.

The research questions:

1. What are the contextual factors influencing primary care improvement initiatives?
2. How do the contextual factors, improvement content (topic and planned changes) and the implementation process influence each other and the improvement outcomes in primary care?
3. How applicable for primary care assessment is the Model for Understanding Success in Quality (MUSIQ), a tool for assessing modifiable contextual factors developed in secondary care?

1.4 Development of the research model

1.4.1 Literature review

Much of the research into QI, factors influencing success and assessment and measurement instruments, have been developed in large-scale projects, hospitals, and health systems, not in primary care (Blumenthal & Kilo, 1998; Brennan et al., 2012; Crabtree, Nutting, et al., 2011; Fulop &

Robert, 2013; Kaplan et al., 2012; Siriwardena, 2012). Increasingly, QI literature has begun to focus on the impact of context to the success of QI (Bate et al., 2015; Edwards & Barker, 2014; Kaplan et al., 2013; Kringos et al., 2015). Despite the growing attention being given to context, there are several sources that do not separate context from other influencing aspects of the QII (Bate et al., 2015; Burgess & Radnor, 2013; Coles et al., 2017; Fulop & Robert, 2013; Lau et al., 2016; Siriwardena, 2012). The importance of the “fit” between the intervention and the context was highlighted in a systematic review by Fulop and Robert (2013) and the systematic review of reviews by Lau et al. (2016).

Primary care literature studying the determinants of success is sparse, but the United States (US) work associated with the adoption of the Patient Centred Medical Home (PCMH) has generated a significant body of literature (Crabtree, Chase, et al., 2011; Benjamin F Crabtree et al., 2020; Crabtree, Nutting, et al., 2011; Lanham et al., 2016). These studies, of more than six different projects that aimed to improve care quality, led the research team to discover that the complexities in these small but complicated organisations with “challenging relationship systems” required a complexity-informed, relationship-based approach (Crabtree, Nutting, et al., 2011). The consistent finding was the importance of the ‘human infrastructure’ to practice change and what was termed the ‘adaptive reserve’ (Lanham et al., 2016). Adaptive reserve is “the ability of practice to keep up with rapid developments and environmental changes” and the key dimensions are relationships, reflection, sensemaking and learning (Lanham et al., 2016, p. 1490). These dimensions are terms associated with complexity science (Braithwaite et al., 2017) and often referred to as the ‘soft’ side of QI, which is managing the adaptive challenges or human side of QI (Pronovost, 2011).

Another US PCMH retrospective study of the contextual factors influencing transformation success was used to develop a reporting template for context (Tomoaia-Cotisel et al., 2013). This study was informed by other models including the MUSIQ and Consolidated Framework for Implementation Research (CFIR) (Tomoaia-Cotisel et al., 2013). This study found important factors in the five domains of the: (1) practice setting, (2) larger organisation, (3) external environment, (4) implementation pathway, and (5) motivation for implementation (Tomoaia-Cotisel et al., 2013). Here there is some overlap between the context and implementation with the inclusion of the implementation pathway in this tool but, as a contextual assessment tool, there was no inclusion of any intervention factors. The implementation pathway included the PCMH elements implemented, other specific changes, history, a safe place to experiment and patient involvement (Tomoaia-Cotisel et al., 2013). The practice domain predominantly included structural characteristics such as employee mix, practice type and ownership, but also included leadership style (Tomoaia-Cotisel et al., 2013). The larger organisation domain included items such as degree of interaction and contractual arrangements, and

the external environment domain included community characteristics and level of coordination/involvement, political authority, and payment model(s) (Tomoaia-Cotisel et al., 2013).

Brennan et al., (2012) conducted a systematic review of instruments to measure contextual factors for QI in primary care. A conceptual model, Informing Quality Improvement Research (InQuiRe), was developed to define the scope of that review from a synthesis of healthcare Continuous Quality Improvement (CQI) theory, models, and frameworks. This model separated context into the domains of organisational (antecedents and proximal outcomes) and individual level. It included the CQI process but, as a contextual model, did not include the intervention characteristics. Organisational context included QI climate, capability for change, and leadership. Individual level context included knowledge and skills for CQI, motivation and readiness for change and teamwork factors were included at several points in the model (Brennan et al., 2012). Organisational readiness included capability, commitment, and resources (Brennan et al., 2012). Organisational readiness is a consistent feature across the different models and perspectives, as is the importance of leadership and teamwork. However, there is little agreement across the models and no investigation of the relationships between the context, QII, process, and outcomes.

Burgess and Radnor (2013) undertook a review of how Lean is implemented in the NHS secondary care setting using content analysis of annual reports by adopting the view of Pettigrew (1990): “theoretically sound and practically useful research on change should explore change context, content and process together with their interconnections through time” (p. 268). The elements of context, content and change processes are linked in the holistic model by Burgess & Radnor (2013), adapted from Pettigrew (1990), shown in Figure 1.1. In this model, change content means ‘what’ is changed, process means ‘how’ the change is implemented, and context is the ‘why’ of the change effort, being the internal and external environment from which the need for change arose (Burgess & Radnor, 2013; Pettigrew et al., 1992). Fulop and Robert (2013) argue that the Pettigrew (1990) model now needs to be combined with psychological perspectives from the improvement context at the micro-, meso- and macro-level to build a synthesised model, rather than a new model (Bate et al., 2015; Brennan et al., 2012; Fulop & Robert, 2013; Kringos et al., 2015). This thinking and the model shown in Figure 1.1, formed the basis of the research model shown in Figure 1.2.

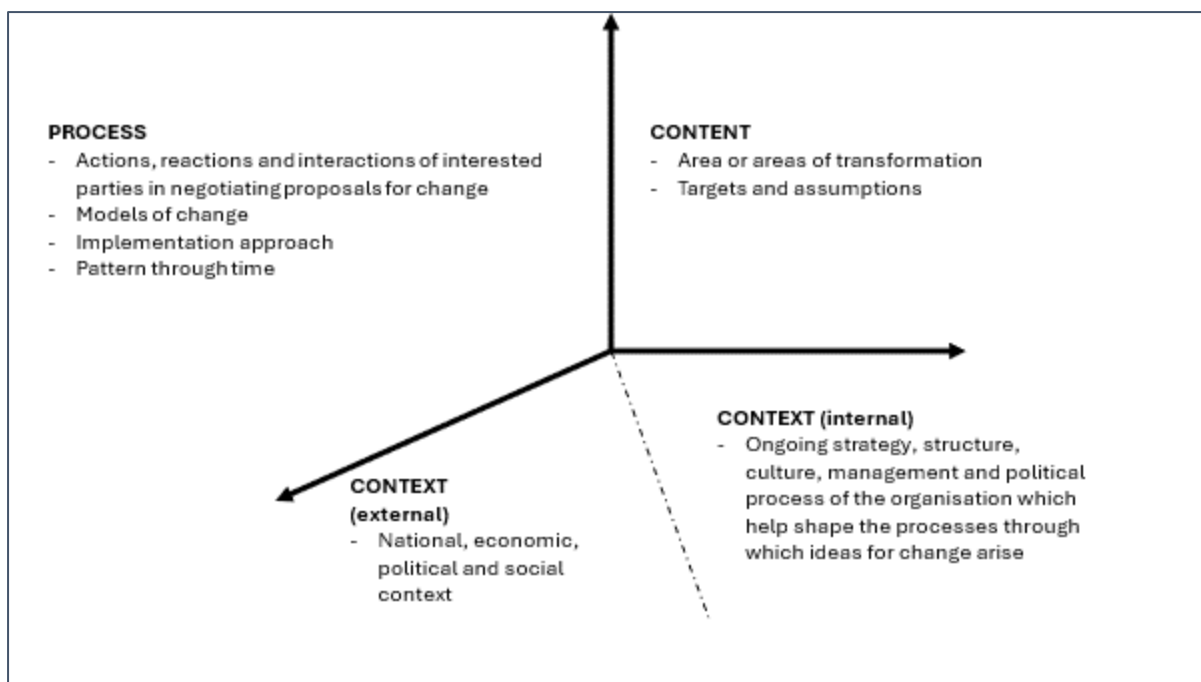


Figure 1.1. Context-Content-Process Framework (Pettigrew, 1990) adapted by Burgess and Radnor (2013, p. 224).

1.4.2 The research model

The lack of agreement and specification on the primary care context and how it relates to other determinants of effective QI is reflected in the initial model for this research shown in Figure 1.2. It is a high-level depiction of the current knowledge domains of contributing factors and interrelationships determining success of primary care QI. The intervention encompasses the improvement topic and planned changes, including factors such as complexity and adaptability (Bate et al., 2015; Damschroder et al., 2009). The process is the implementation process or how the intervention is implemented, including methodology and facilitation (Bate et al., 2015; Brennan et al., 2012; Coles et al., 2017). Context consists of the inner and outer socio-technical setting, including structures, people-related characteristics, and relationships (Bate et al., 2015; Coles et al., 2017; Damschroder et al., 2009). The model depicts the domains of context, intervention, and process as distinct, but with overlap and interrelationships between the three, within the combined whole of the determinants of effective primary care QI. The model lacks detail due to the current state of knowledge in understanding the determinants of effective primary care QI but depicts the importance of the relationships between all model components. It is not a model of 'how to do' QI but a model depicting the high-level concepts determining success.

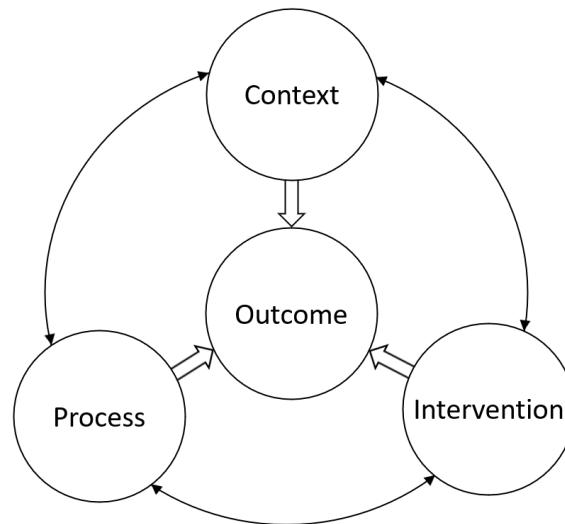


Figure 1.1. Primary care quality improvement research model

1.5 Scope and boundaries of the research

This research is set within the primary care setting of general practice QI in NZ. Primary care is much more than just general practice, but as first-contact, patient-centred and continuing care, general practice is recognised as where most of the population receives their primary care (Tenbensen et al., 2017). The NZ system has similarities to both the United Kingdom and Australian settings (Bourgueil et al., 2009; Seddon et al., 2001) and has also adopted American models of care (Downs, 2017; Middleton et al., 2018), so the findings in this research will have broader implications.

Developed countries are experiencing similar pressures to enhance primary care quality and effective use of resources with limited funding. This means that similar reforms and models of care are being implemented internationally despite differences in funding models and infrastructure (Bourgueil et al., 2009; Maier & Aiken, 2016). The United Kingdom (UK), Australia and NZ have meso-level organisations providing a range of managerial and operational services for groups of general practices, Primary Care Networks (PCNs) in the UK, Primary Health Networks (PHNs) in Australia, and Primary Health Organisations (PHOs) in NZ (Bourgueil et al., 2009; McDonald et al., 2006). In the US, some of the primary care terms differ, as GPs are doctors who did not complete a residency and family practitioners are the role that most closely resembles GPs in NZ and the UK (Bindman & Majeed, 2003). In the US the meso-level is the accountable care organisations which can vary between hospital-owned primary care practices within large integrated systems or independent primary care physician groups (Downs, 2017; McWilliams et al., 2016).

The UK, Australia and NZ all take a population-based approach to primary care providing universal health care (Bourgueil et al., 2009; Huston et al., 2020). In the UK, primary care is free, fully funded through capitation (Devaux, 2015; Papanicolas et al., 2018); in NZ it is funded by a mix of government

capitation-based funding and an additional fee-for-service co-payment from the patient (Middleton et al., 2018; Sheridan et al., 2023). Australia and the US are both fee-for-service systems (Maier & Aiken, 2016; Papanicolas et al., 2018). In Australia this is funded through Medicare, a government insurance scheme and in the US, through a range of public and private insurance schemes (Bindman & Majeed, 2003). A proportion of the US population are uninsured; therefore, the US does not have universal coverage (Devaux, 2015; Downs, 2017; Obama, 2016).

Despite these differences, primary care models internationally are becoming more similar to respond to similar challenges such as an increase in chronic conditions, limited resources, an ageing and reducing workforce, whilst still responding to the call for enhanced and improved primary care (Bindman & Majeed, 2003; Bourgueil et al., 2009; McDonald et al., 2006). Access is an international challenge and advanced models of primary care are increasingly utilising technology and the wider skills of the multidisciplinary team to implement a range of initiatives to improve access, including locally grown and/or adapted versions of the PCMH (Bourgueil et al., 2009; Downs, 2017; Maier & Aiken, 2016; Middleton et al., 2018; Sheridan et al., 2023).

1.5.1 Research terms

Both primary care and QI are terms that have been defined in the glossary and are discussed in the literature review section. In this research, the term primary care is referring to the specific context of general practice QI incorporating the entire QI team. This may involve other organisations and their staff that can support primary care QI such as PHOs, District Health Boards (DHBs) and the Health Care Home Collaborative (HCH).

The definition of QI used in this research does not prescribe any specific method. This ensures that organisations achieving improved outcomes can participate, regardless of method, and allowed this research to determine the primary care strengths that underpin successful QI. Fidelity to improvement methods such as plan-do-study-act cycles is low in healthcare (Dixon-Woods & Martin, 2016; Knudsen et al., 2019; Taylor et al., 2014) and QI methods and approaches tend to wax and wane in popularity over time (Chassin & Loeb, 2011; Walshe, 2009). The QI definition allows participation by primary care organisations that are improving quality in the way they have found successful and enables this research to gain an understanding of how primary care systems improve quality within the current context.

1.6 Literature review key concepts

This section briefly describes the structure and key concepts of the narrative literature review and includes key definitions for the study. A narrative review method was chosen to provide a broad overview of the literature relevant to the research questions. A narrative literature review is

qualitative, provides a synthesis of previously published information, and seeks to identify gaps in the literature (Ferrari, 2015; Greenhalgh et al., 2018; Turnbull et al., 2023). Narrative reviews do not have the standard structure of a systematic review, but descriptions of the structure, process and criteria are increasingly being used in hybrid methodologies and are useful for evaluation of the review (Ferrari, 2015; Greenhalgh et al., 2018; Turnbull et al., 2023).

The electronic literature search used the Massey University Discover, Scopus, and Google Scholar databases. The Discover database (books and articles) was mainly used in the early research until the research proposal was written. Additional support was also provided from the Ministry of Health library and research librarian in conducting this search and maintaining an ongoing search via Scopus to ensure new articles related to the research questions were emailed to me as they were published.

The literature review begins from the broad perspective of quality and QI and how these concepts and methods have been understood studied and developed in general and in healthcare. The focus then narrows to primary care QI and the factors that influence effectiveness through the overlapping lenses of the sciences of improvement, implementation, and complexity. The progression of the review is depicted in Figure 1.3.

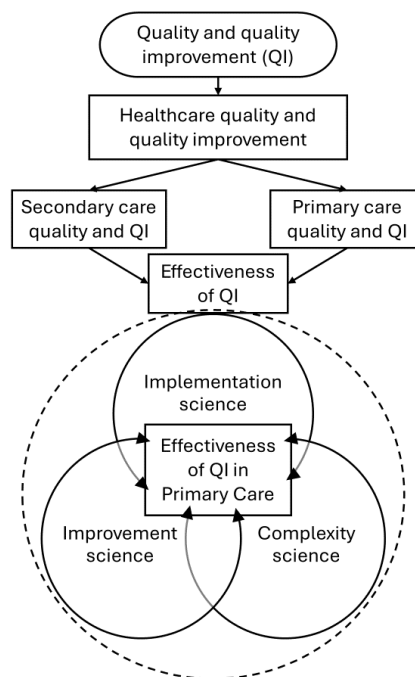


Figure 1.2. Structure of the narrative literature review

The search terms used at each stage are shown in Table 1.1. Stage 1 was a broad search into quality and QI shown at the top of Figure 1.3. Stages 2 and 3 encompass the rest of Figure 1.3 and continued through the entirety of the study, apart from the ‘evolution’ and ‘history’ search terms. During both stages of the review process, secondary literature sources identified within the references of the

primary literature were also reviewed. As the study progressed, small intermittent literature searches were conducted into emerging concepts as they were identified.

Table 1.1. Literature review search terms

Stage	Search terms
Stage 1	<ul style="list-style-type: none"> • Quality AND “Quality improvement” • quality AND evolution • “quality improvement” AND evolution or history • “quality management” AND “quality improvement” • “context” AND “quality improvement” • “contextual factors” AND “quality improvement” • “quality improvement” AND facilitator or barrier or enabler or success
Stage 2	<ul style="list-style-type: none"> • “Healthcare” AND: • quality • “quality improvement” • quality AND evolution • “quality improvement” AND “evolution” • “quality improvement” AND “history” • “quality improvement success” • “quality improvement” AND “success” or “effectiveness” • “contextual factors” AND “quality improvement” • “context” AND “quality improvement” • “quality improvement” AND facilitator or barrier or enabler
Stage 3	<ul style="list-style-type: none"> • “Primary care” AND: • quality • “quality improvement” • “quality improvement success” • “quality improvement” AND success or effectiveness • “quality improvement” AND facilitator or barrier or enabler • “contextual factors” AND “quality improvement” • context AND “quality improvement”

1.6.1 Quality and quality improvement

Throughout the history of quality there has been much effort spent on defining quality, with many experts and industries providing their own definition (Bounds et al., 1994; Dale et al., 2016; Goodwin et al., 2011; Yong & Wilkinson, 2002). Among these experts are some who are acknowledged as quality ‘gurus’ in recognition of their lasting contribution to the understanding and development of quality and its management (Beckford, 2002). All have provided their own widely accepted definitions of quality (Beckford, 2002) and reflect their backgrounds and use. For example, Joseph W. Deming’s

definition, “a function of continuous improvement based on reduction in variation around a desired output” (Beckford, 2002, p. 65), reflects his background as a statistician. Masaaki Imai’s definition, “Quality refers to not only the quality of the finished products or services but also to the quality of the processes that go into those products or services” (Imai, 2013, p. 11), reflects a focus on the work floor internal processes as the path to quality. John Oakland’s (a British guru) definition, “Quality is meeting the customer’s requirements” (Beckford, 2002, p. 116), which grew out of the service industry and became a more widely held definition, highlights the growing awareness of the importance of the end-user or customer (Brown, 2013; Yong & Wilkinson, 2002). This variation in defining quality has been confusing at times, but can be attributed to the different contexts, methods, desired outcomes of QI (Bounds et al., 1994; Dotchin & Oakland, 1992; Yong & Wilkinson, 2002) and the difficulties of defining quality are widely acknowledged (Anderson, 2010; Donabedian, 1966; Dotchin & Oakland, 1992; Seddon, 2006; Yong & Wilkinson, 2002).

The evolution of QI towards the current approaches has moved through similar stages across the globe in manufacturing and service industries, including healthcare, but at different times in different countries and in different industries (Martínez-Lorente et al., 1998; Yong & Wilkinson, 2002). Quality management has moved through the stages of inspection, quality control, quality assurance, and various forms of Total Quality Management (TQM) or CQI that includes QI (Weckenmann et al., 2015; Yong & Wilkinson, 2002). Sanchez and Blanco (2014) note that the “TQM movement integrated the concept of continuous improvement and drove it to the top” (p. 987). After the second world war, triggers for QI have come from competition, market demand, government policy, alongside the development of theory and knowledge (Martínez Fuentes et al., 2000; Weckenmann et al., 2015; Yong & Wilkinson, 2002).

By the early 2000s many were declaring the end of TQM, and an increasing number of different quality models were being used in the west (Dahlggaard-Park, 2011). Recent interest in TQM has declined as it has been replaced by Lean, Six Sigma, and variations and combinations of these (Chiarini et al., 2018; Dahlggaard-Park et al., 2013). Industrial leaders in quality have developed their own versions of quality management systems and methods, such as Toyota with the Toyota Production System (TPS), known in the West as Lean (Chiarini, 2011; Chiarini et al., 2018; Dahlggaard-Park, 2011), Motorola with Six Sigma (Brown, 2013; Dahlggaard-Park, 2011; Snee, 2004) and the combined methodology of Lean Six Sigma (LSS) (Bhuiyan & Baghel, 2005; Dahlggaard-Park, 2011). Lean is focussed on the removal of waste from processes with value defined by the customer (Rodgers et al., 2021). Six Sigma is seen as an evolution of TQM and is focussed on reducing variation within statistically specified limits (Rodgers et al., 2021).

Quality improvement implementation problems experienced over the decades have been attributed predominantly to failures in the 'soft' side (people-related factors) of QI rather than technical failures (Chiarini et al., 2018; Dahlgard-Park, 2011; Weckenmann et al., 2015). Many early Western adaptations of QI sought quick and easy solutions, changing between different approaches only implementing the visible, technical elements (tools) of successful QI without embedding the underpinning principles (Brown, 2013; Chiarini et al., 2018; Dahlgard-Park, 2011). What has remained essential to the success of any method is the core principles underpinning QI approaches, which include leadership, respect for people, teamwork, customer focus and a QI culture (Brown, 2013; Chiarini et al., 2018; Dahlgard, 1999).

1.6.2 Health care quality

To be able to improve quality, it is important to understand what quality means in healthcare. Definitions and descriptions of healthcare quality have evolved over time and vary depending on context and perspective, without one agreed definition (Busse et al., 2019). The US Institute of Medicine (IOM) defined healthcare quality in 1990 as, "The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge" (Busse et al., 2019, p. 5). This definition has remained widely used internationally (Busse et al., 2019) and here in NZ, (Seddon, 2006) but the international debate continues (Busse et al., 2019). This definition is supported by specification of domains of healthcare performance, or "aims for improvement" (Institute of Medicine (US) Committee on Quality Health Care in America, 2001, p. 39) against which quality can be operationalised and measured (Busse et al., 2019; M. Seddon, 2006). The six domains, which are well known and widely used are: safety, patient-centredness, timeliness, efficiency, effectiveness, and equity (Institute of Medicine (US) Committee on Quality Health Care in America, 2001).

Aotearoa New Zealand has nationally specified dimensions appropriate to the NZ context but does not otherwise define quality (Seddon, 2006). The NZ dimensions were stated to be founded on the principles of the Treaty of Waitangi (partnership, participation, and protection) and centred on people and whānau. The NZ quality dimensions include access, equity, safety, effectiveness, and efficiency at the different levels of the system (M. Seddon, 2006). NZ followed international examples and set a Triple Aim to guide healthcare improvement that was again adapted to the NZ context (Merry et al., 2017; Shuker et al., 2015). The NZ Triple Aim is: improved quality, safety and experience of care; improved health and equity for all populations; and, best value for public health system resources, which includes the six aims of: safety, patient experience, effectiveness, equity, access, and efficiency within the 'improved quality' aim (Merry et al., 2017).

More recently international jurisdictions have called for the explicit inclusion of equity and the provider experience and wellbeing within health care quality Triple Aim frameworks (Itchhaporia, 2021; Mery et al., 2017; Nundy et al., 2022). This is in response to two factors: first, recognition of growing levels of provider burnout and the relationship between clinician engagement and burnout with patient satisfaction and outcomes, that was first proposed as the quadruple aim (Itchhaporia, 2021; Sikka et al., 2015). Secondly, recognition that “quality improvement without equity is a hollow victory” (Nundy et al., 2022, p. 521) and evidence that without a specific focus on equity, many QI efforts either have no effect on reducing disparities or may even unintentionally increase them (Nundy et al., 2022; Weinick & Hasnain-Wynia, 2011). The definition of quality used in this study is shown below in Table 1.2 and is a NZ adaptation of the quadruple aim (Bodenheimer & Sinsky, 2014; Merry et al., 2017; Sikka et al., 2015) specifying value rather than cost, and using the NZ quality dimensions (which include equity and access) within the aim of improving individual quality, safety and experience of care (Ministry of Health, 2003; Seddon & Buchanan, 2006; Shuker et al., 2015).

Table 1.2. Research definition of health care quality, the quadruple aim (adapted for NZ)

Improved quality, safety, and experience of care for individuals	Improved health and equity for all populations
Includes improving one or more of: <ul style="list-style-type: none"> • Patient-centredness (patient preferences, values and goal-centred care). Safety (errors and harm). Access (to services and treatments). Equity (disparities), Effectiveness (provide evidence-based care) and Efficiency (productivity). • Patient experience of care. 	Includes improving: <ul style="list-style-type: none"> • Amenable mortality and reducing the burden of chronic disease. • Population health outcomes and equity for disadvantaged population groups such as Māori and Pacific peoples.
Best value for public health system resources	Improved experience of providing care (Provider)
<ul style="list-style-type: none"> • Providing patient benefits without wasting resources. • Reducing resource wastage. 	<ul style="list-style-type: none"> • Provider experience of providing care. • Improved wellbeing and reduced burnout.

1.6.3 Healthcare quality improvement

A commonly used phrase in healthcare improvement is, “Not all change is an improvement, but all improvement is change” (Berwick, 1996, p. 619) and similarly to other industries, QI has many definitions within healthcare (Øvretveit, 2009; The Health Foundation, 2011). Healthcare definitions vary between open definitions including any change that improves quality and those with a narrower focus on change made using a specific approach or method (Øvretveit, 2009). Recently, the term

'improvement science' has been used to define both research into improvement methods and structured improvement methods where a theory of change is developed, tested by plan-do-study-act cycles, measured over time based on methods such as those developed by W. Edwards Deming and aiming to produce generalisable knowledge (Leeman et al., 2021; Marshall et al., 2013). The benefits of this scientific approach to QI are the practical knowledge and evidence developed that supports effective implementation and spread (Leeman et al., 2021; Marshall et al., 2013).

This study used a widely cited definition, "the combined and unceasing efforts of everyone—healthcare professionals, patients and their families, researchers, payers, planners and educators—to make the changes that will lead to better patient outcomes (health), better system performance (care) and better professional development (learning)" (Batalden & Davidoff, 2007, p. 2). This definition does not prescribe a particular method. It aligns with the quadruple aim and team-based, consumer co-designed, learning-based approaches to healthcare QI that are gaining increasing prominence (Braithwaite et al., 2017; Crabtree et al., 2020; Ferlie & Shortell, 2001).

Healthcare quality systems have developed separately to manufacturing, due to perceived and real differences between the sectors creating some reluctance which was balanced against the impact of significant events such as significant quality failures and legislation driving the development of QI approaches (Anderson, 2010; Brashier et al., 1996; Powell et al., 2009). Early healthcare quality management was based on the pre-industrial revolution craft model, "Train the craftspeople (e.g., physicians, nurses, technicians), license or certify them, supply them with an adequate structure (e.g., facilities, equipment), and then let them provide health services" (Spath, 2013, p. 20). This model supports the physician providing a unique service depending on their view of the patient's presentation and still exists to varying degrees in healthcare today (Berwick, 2016; Mannon, 2014; Spath, 2013).

Despite initial scepticism, the industrial concepts of quality management began to influence healthcare quality management throughout the 1980s and 1990s (Anderson, 2010; Blumenthal & Kilo, 1998; Chassin & Loeb, 2011; Øvretveit, 2000; Rodgers et al., 2021; Spath, 2013). During the 1990s, Lean became popular in healthcare and has been successfully implemented by several organisations such as Virginia Mason (with the Virginia Mason Production System) and ThedaCare in the United States, Flinders Medical Centre in Australia, and the National Health Service (NHS) in the UK (Aherne & Whelton, 2010; Burgess & Radnor, 2013; D'Andreamatteo et al., 2015; Scoville & Little, 2014). Despite the reports of success from Lean implementation (Poksinska, 2010), some studies in the UK NHS have raised questions about the success of Lean, describing implementation as patchy and

fragmented, with any improvement gained not sustained over time (Burgess & Radnor, 2013; D'Andreamatteo et al., 2015; Daultani et al., 2015).

It was not until the publication of the landmark report, *To Err is Human* (Institute of Medicine (US) Committee on Quality Health Care in America, 2000), when preventable death from medical error was identified as the seventh leading cause of death in the US, that a worldwide interest in healthcare quality and QI was triggered (Anderson, 2010; Reynolds & Granger, 2023; Seddon & Buchanan, 2006). Similar rates of harm were identified by studies in British, European, Australian, and NZ hospitals (Seddon, 2006). Due to this identification of harm in hospitals, and the more readily available hospital data, healthcare improvement efforts are more developed in the hospital environment compared to primary care (Auraaen et al., 2018; OECD, 2017; Seddon et al., 2001). The existing evidence suggests that similar rates of harm and care that does not meet accepted standards are also present in primary care (Auraaen et al., 2018; Seddon et al., 2001).

Quality measurement and improvement in hospitals is supported by the characteristics of secondary care where most treatment, procedures, and interventions are delivered within predominantly single diagnosis episodes of care that are defined by admission and discharge and are amenable to process standardisation (Auraaen et al., 2018; Downs, 2017; OECD, 2017; Young et al., 2017). This is not the case in primary care where care is continuous, focused on the whole person, their health needs, values, and preferences (Fiscella & McDaniel, 2018; OECD, 2017; Starfield, 2011). Primary care clinicians deal with health problems that are difficult to diagnose and present as interdependent comorbid conditions that are not amenable to a single disease standard of care pathway (Crabtree et al., 2011; Fiscella & McDaniel, 2018; OECD, 2017; Young, et al., 2017). Additionally, most primary care settings lack the infrastructure, time, and capacity to undertake the formal data collection, analysis, and record keeping associated with formal QI methods (Bailie et al., 2016; Casalino, 2018; Crabtree et al., 2011; Gosling et al., 2019).

The US IOM responded to the *To Err is Human* report by proposing a national approach consisting of error prevention through system safety design and moving from quality assurance to CQI (Anderson, 2010). Underpinning this change were the “key CQI principles of providing leadership, respecting human limits in process design, promoting effective team functioning, anticipating the unexpected, and creating a learning environment” (Anderson, 2010, p. 69). Following this was the creation of the Institute for Healthcare Improvement (IHI) to lead improvement of healthcare worldwide, focused on the six IOM aims of: safety, effectiveness, patient-centredness, timeliness, efficiency, and equity (Anderson, 2010). The worldwide presence of the IHI has popularised their Breakthrough Series, a collaborative improvement approach that is driven by the Model for Improvement (Edward et al.,

2017; Kilo, 1998). The Model for Improvement was developed by Associates in Process Improvement and is based on the work of W. Edwards Deming (Langley et al., 2009; Scoville & Little, 2014).

Alongside the healthcare systems' interest in Lean, interest has grown in Six Sigma and combinations of Lean and Six Sigma methodologies (Antony et al., 2018; Chassin & Loeb, 2011; Patel & Patel, 2021; Rodgers et al., 2021). Six Sigma has mainly been implemented in hospitals and is most popular in the US (Antony et al., 2018; Rodgers et al., 2021). The systematic review by Antony et al. (2018) found that close to 70 percent of Six Sigma projects focused on, in decreasing order: (1) patient satisfaction; (2) process speed; (3) revenue enhancement; (4) cost savings; and (5) defect reduction, but that the focus area varied between international jurisdictions. The use of Lean and Six Sigma together (LSS) is the fastest growing methodology of recent years combining the methods and tools from both to support a stronger organisational quality management system (Patel & Patel, 2021; Rodgers et al., 2021).

It can be clearly seen that healthcare, similarly to the industrial sector, has had varied success with QI leading to some questioning the effectiveness and applicability of QI in healthcare (Auerbach et al., 2007; Blumenthal & Kilo, 1998; Marshall et al., 2014; Shojania & Grimshaw, 2005; Solberg et al., 2000). This has continued in recent years as, despite decades of QI efforts, quality problems persist alongside high levels of harm and waste and poor uptake of evidence-based practice (Braithwaite et al., 2020; Chassin & Loeb, 2013). This has led to studies attempting to understand when, where and why quality improvement methods are most effective (Burgess & Radnor, 2013; Dixon-Woods et al., 2011; Robert et al., 2011). Studies have identified problems in fidelity to specific methods (McNicholas et al., 2019; Taylor et al., 2014; Wackerbarth et al., 2021), intervention compatibility and execution (Damschroder et al., 2009; Longenecker & Longenecker, 2014) and the unforeseen impact of the local and broader context, its history, leadership, and culture (Braithwaite et al., 2014; Dixon-Woods et al., 2013; Longenecker & Longenecker, 2014). A significant number of implementation science and QI studies have suggested that understanding context is central to understanding the conditions for successful QI initiatives (Berwick, 2008; Best et al., 2012; Burgess & Radnor, 2013; Edwards & Barker, 2014; Evans et al., 2017; Fulop & Robert, 2013; Marshall et al., 2016; Øvretveit, 2011). Contextual factors within the social-technical systems of healthcare include human-centred and relational factors such as culture, communication, engagement (leadership and staff), tension for change and self-efficacy but also structural characteristics and available resources (Coles et al., 2020; Damschroder et al., 2009; Kaplan et al., 2013).

1.6.4 Primary care

This section on primary care commences with an explanation of the importance of primary care before discussions on definitions of primary care and the key attributes and principles of primary care. The following section discusses primary care QI.

Internationally, healthcare costs continue to rise, and the population is living longer with more chronic health conditions and higher expectations (Cornwall & Davey, 2004; Imison et al., 2017; OECD, 2017). Health systems are increasingly focused on the primary health care sector as critical for an integrated model of care, capable of delivering universal access, equity and 'health for all' (Imison et al., 2017; OECD, 2017; Seddon et al., 2001; Zarbailov et al., 2017). It is well accepted that a health system built around a high-performing primary health system is needed to deliver person-centred, high value and effective health care with equitable access (Bodenheimer et al., 2014; Imison et al., 2017; OECD, 2017; Starfield et al., 2005; Ward, 2015; World Health Organization, 2008).

Primary health care has a variety of definitions, and this can have significant impact depending on the context. The definitions listed in Table 1.3 are headed by the Alma Ata Declaration definition, one of the most widely referenced definitions of primary health care with the vision of "health for all by the year 2000" (World Health Organization, 1978). This is the most comprehensive definition and the beginning of a conversation about the difference between 'primary health care' and 'primary care' (Lawn et al., 2008). The NZ Ministry of Health definition shown below, which was used throughout this study, is no longer current or available online, the original reference is given and then beneath that the current information available. While the current background information does describe a more inclusive community-oriented way of working, both definitions exclude community health organisations and Iwi/Māori health providers outside of general practice and (to me), do not reflect the current reality. This is followed by two definitions which explain the difference between 'primary health care' and 'primary care' and shows that the Ministry definition is more correctly viewed as 'primary care' (Lawn et al., 2008; Ward, 2015). This is followed by the definition that will be used for the purposes of this study and is chosen for simplicity rather than comprehensiveness. I have chosen to use an adaptation of the Ministry of Health definition that does not exclude community health workers working within a professional framework. When the term primary care is used in this study, this refers to the general practice setting but includes the wider team of multi-professional and non-professional staff. The term secondary care refers to hospital and specialist services.

The primary health care conversation triggered by the 1978 Alma Ata declaration has continued throughout the subsequent years as definitions and descriptions of primary health care characteristics

were developed (Lawn et al., 2008; Rifkin, 2018; World Health Organization, 2008). There is some consensus that the key features of primary care are person-centredness, comprehensiveness, integration, continuity of care and participation of patients, families, and communities (Hashim, 2016; Mutter et al., 2018; OECD, 2017; Starfield et al., 2005; Stigler et al., 2013; World Health Organization, 2008). High-functioning primary care is person-focused rather than disease-focused, with a long-term relationship between clinician and patient that incorporates their family and community and aims to respond to “patient’s problems as they experience them, not only as professionals define them” (Starfield, 2011, p. 67). This holistic person and population focus rather than a disease focus means that traditional narrow, disease-specific, biomedical, and process-oriented measures may not reflect the holistic quality and improved patient outcomes of effective primary care (Mutter et al., 2018). These defining characteristics underline the complexity that exists within primary care that contribute to the complexity of measurement, management, and improvement of primary care quality (Auraaen et al., 2018; Downs, 2017; Mutter et al., 2018). These characteristics, combined with structural features of primary care that includes less resource (capacity and funding), overall governance, performance data and system fragmentation are some of the factors that need to be considered when approaching QI in primary care (Auraaen et al., 2018; Downs, 2017; Starfield et al., 2005).

Table 1.3. Definitions of primary health care and primary care

Source	Definition:
Alma Ata Declaration (World Health Organization, 1978)	Primary health care is essential health care based on practical, scientifically sound, and socially acceptable methods and technology made universally accessible to individuals and families in the community through their full participation and at a cost that the community can afford to maintain at every stage of their development in the spirit of self-reliance and self-determination. It forms an integral part of both the country’s health system, of which it is the central function and main focus, and of the overall social and economic development of the community. It is the first level of contact of individuals, the family and community with the national health system bringing health care as close as possible to where people live and work and constitutes the first element of a continuing health care process.
(Ministry of Health)	The professional health care provided in the community, usually from a general practitioner (GP), practice nurse, pharmacist or other health professional working within a general practice.
(Te Whatu Ora - Health New Zealand, 2023)	Most primary health care services are provided by health practitioners such as general practitioners, nurse practitioners and registered nurses working within a general practice team.
(Ward, 2015, p. 3).	‘Primary health care’ is a political concept widely defined as “the mobilization of various forces in society (health professionals, institutions, lay people)

Source	Definition:
	around an agenda of transformation of health systems that is driven by the social values of equity, solidarity and participation”; ‘primary care’ instead refers more specifically to technical aspects of the care and services delivered by the health system, more toward evidence-based medicine (van Weel 2012, WHO 2008, Kruk 2010).
(Lawn et al., 2008, p. 921)	The term primary care was used to describe first-line health services, while the term primary health care was used to describe the wider construct of social justice based on the Alma-Ata philosophy.
Research definition of primary care	The professional health care provided in the community, from a general practitioner, practice nurse, pharmacist or other health professional and community health workers working within a professional framework.

In NZ, the meso-level in primary care consists of PHOs. PHOs are responsible for ensuring the provision of primary health care services to the population enrolled with the PHO and were funded through DHBs. PHOs are multidisciplinary, non-profit organisations, tasked with developing a primary health care service that is patient-focused and actively working to improve access, reduce inequalities, and improve the health of the population (King, 2001). PHOs contract general practices for their services through back-to-back agreements and provide a range of meso-level management functions for practices that vary between PHOs (Middleton et al., 2018). Just prior to commencement of this research (December 2016) there were 20 DHBs, 32 PHOs, 1,013 general practice facilities, and 991 community pharmacies. Currently, the health system is experiencing significant reform under the Pae Ora (Healthy Futures) Act 2022. There are, as of November 2023, 30 PHOs contracted through Te Whatu Ora – Health New Zealand, the single national entity that has replaced all 20 DHBs. PHOs have been an important contributor to improvement initiatives in primary care (Middleton et al., 2018). PHOs have supported (supplied resource for and/or funded) or incentivised various initiatives, including the Better, Sooner, More Convenient (BSMC) initiatives, the Canterbury Clinical Networks and the more recent HCH initiative which had its NZ genesis in the BSMC initiatives (Middleton et al., 2018).

General practice models in NZ vary and have recently been defined by Sheridan et al., (2023) to include recent developments. Most practices are termed ‘traditional’ and are a small business usually made up of GP owners and nurses and, in many cases this model forms the foundation of the other models such as the HCH and corporate practices (Sheridan et al., 2023). The current general practice models in NZ (slightly amended) are described by Sheridan et al. (2023) as the:

- traditional practice, a small business centred upon the GP with nursing support, owned by one or more doctors
- corporate practice, a group of practices run as a for-profit entity
- HCH practices, those that are certified as meeting the HCH maturity matrix criteria
- PHO/DHB owned practices, usually taken over by a PHO or DHB to ensure continuation of primary care services, often in an underserved and/or rural area
- Trust/NGO practices, one or more practices owned by a not-for-profit trust or NGO
- Māori practices, owned and serving Māori and non-Māori patients
- Pacific practices, owned and governed by Pacific organisations, serving mostly Pacific patients (p. 4).

The Kaupapa Māori provider is an important feature of NZ primary care. Māori are the Indigenous people of NZ. Despite signing a treaty, Te Tiriti o Waitangi, that guaranteed the rights of Māori including the active protection of health and equity, the impact of colonisation has resulted in significantly worse health outcomes and widespread inequity (Came et al., 2020; Eggleton et al., 2022; Rolleston et al., 2020; Sheridan et al., 2023). Kaupapa Māori providers are a diverse group of health and social care providers with the basic principle of delivering health care that reflects Māori perspectives (Durie et al., 2012; Rolleston et al., 2020) and is strongest when it is “by-Māori, for-Māori and guided by Māori world views and principles” (Beaton et al., 2019, p. 2). Māori providers are community-driven organisations with varied models of community trust, hapū, iwi (tribal) ownership, and governance models that are contracted to deliver health (and often social) services to, predominantly but not exclusively, Māori communities (Waitangi Tribunal, 2019). In general practice, within the NZ health system, if they receive capitation funding this is defined by their enrolled population (Waitangi Tribunal, 2019).

1.6.5 Primary care quality improvement

General practice has a long history of working to improve quality in individual practice, informed by clinical audit and peer review mechanisms for GPs, but little knowledge of process and system improvement (Apekey et al., 2011; Bowie & De Wet, 2014; Gosling et al., 2019; Marshall et al., 2014). Although there has been QI success reported in primary care (Asch et al., 2005; Houston & Bowie, 2015), there has also been mediocre results and failure (O’Connor et al., 2005; Solberg, 2007; Solberg et al., 2000). A postal survey of UK general practice quality leads in one county found clinical audit and significant event review quality methods the most common method applied (Apekey et al., 2011). A recent UK national survey had similar findings with only 21 percent of GP and 31 percent of practice managers familiar with Plan-Do-Study-Act cycles (Gosling et al., 2019).

In NZ, the Royal New Zealand College of General Practitioners (RNZCGP) developed the Cornerstone Standards in 2001 for voluntary practice accreditation (Buetow & Wensing, 2008). Participation attained 80 percent coverage (Goodyear-Smith et al., 2012) before a regulatory framework requiring general practice quality assurance and external audit against the Foundation Standards was mandated for general practice in 2016 (RNZCGP, 2016). Cornerstone remains a voluntary programme and has two modules that are additional to the Foundation Standards: Continuous Quality Improvement and Te Mana Taurite – Equity module (RNZCGP).

Many primary care improvement efforts have been system transformation efforts based on new models of care, such as the PCMH, or HCH in NZ, and other team-based care models that are aimed at improving the systems by which care is delivered to improve healthcare quality (Jones, 2017; Middleton et al., 2018; Pandhi et al., 2018). Internationally, primary care has until recently focused more on ‘what’ to improve rather than ‘how’ to improve (Bowie & De Wet, 2014; Peek et al., 2014). Similarly, NZ based QI research is scant, tending to focus on models of care (Downs, 2017; Middleton et al., 2018; Sheridan et al., 2023) and clinical improvement results rather than the mechanisms of change (Fawcett et al., 2013) and context surrounding change. Internationally, QI capability and capacity is considered low in small-to-medium sized general practices, with between 1-19 physicians (Balasubramanian et al., 2018; Gosling et al., 2019; Parchman et al., 2019) which is the size of most NZ practices, and little is known about successful improvement strategies in these practices (Balasubramanian et al., 2018; Scholle et al., 2013).

Most studies on improvement and implementation methods in healthcare have centred on secondary care (Brennan et al., 2012; Fulop & Robert, 2013; Kaplan et al., 2012). However, research from a 15-year programme of primary care transformation towards the PCMH model, including a national demonstration project in the US, strongly suggested that a complexity-informed approach should be used for primary care QI (Crabtree, et al., 2011). This research found an adaptive reserve centred on relationships was required for primary care QI and developed a relationship-centred model tested by path analysis (Lanham et al., 2009; Lanham et al., 2016). Adaptive reserve was described as the ability of practices to keep up with environmental developments and changes and pivotal dimensions included relationships, reflection, sensemaking and learning (Lanham et al., 2016), all elements drawn from complexity science (Braithwaite et al., 2017). The results found strong associations between relationships, sensemaking and learning when there was higher degrees of trust and reflection without establishing any causal link to improved quality or outcomes (Lanham et al., 2016).

This US primary care research has continued so that there is now a history of 30 years of primary care-based research (Crabtree et al., 2020). The research team developed a model of primary care practice

leadership to drive QI based on complexity science that includes foundational, second order and third order leadership attributes, with each order building on the previous (Crabtree et al., 2020). The foundational attributes include: developing formal processes, motivating others to engage in change, and enhancing communication and information sharing (Crabtree et al., 2020). The second order attributes of instilling a collective mind, cultivating teamwork, assuring psychological safety, and generating a learning organisation have much in common with the 'soft' factors and 'core principles' identified as essential for successful QI by industrial experts (Brown, 2013; Chiarini et al., 2018; Dahlgard, 1999). These second order attributes lead to encouraging boundary spanning which feeds back into instilling a collective mind (Crabtree et al., 2020).

A large US-based implementation research effort by the Agency for Healthcare Research and Quality (AHRQ), entitled EvidenceNOW, was commenced in 2015 and the results of this are now being seen in the literature. EvidenceNOW is focused specifically on the impact of external QI support to drive primary care practice improvement and increase practice capacity (Meyers et al., 2018). The implementing cooperatives were required to undertake measurement and dedicate evaluation resource to this (Meyers et al., 2018). Measures included the change process capacity questionnaire (Solberg et al., 2008) and measurement of adaptive reserve from the PCMH work of Nutting et al. (2010) and were evaluated using the CFIR (Damschroder et al., 2009) (Meyers et al., 2018). Early findings support the key role people or staff play in the success of QI efforts and the importance of team-based care models (Cuellar et al., 2018). However, even providing free technical assistance was not always enough to support practice capacity to undertake primary care transformation work, or the 'unpaid labor' of QI (Casalino, 2018).

In the UK, the literature is sparse and there has been a greater focus on secondary care QI rather than primary care (Gosling et al., 2019; Houston & Bowie, 2015). The most recent large-scale effort to improve primary care in the UK was driven by funding incentives associated with the Quality and Outcomes Framework (Doran & Roland, 2010; Mutter et al., 2018). The results of this programme are described as modest (Checkland, 2023; Mutter et al., 2018) and in Scotland there was reversion to previous levels of performance once the incentives were withdrawn (Checkland, 2023). In Scotland, a large-scale national collaborative improvement programme, described as the world's first nationally co-ordinated primary care patient safety programme, was launched in 2013, the Scottish Patient Safety Program (de Wet et al., 2018; Houston & Bowie, 2015). A qualitative study was conducted to describe perceptions and experience of safe care from practice team members, identify and describe the issues contributing to patient safety incidents, and identify improvement actions and strategies for future interventions (de Wet et al., 2018). The main finding from this study relevant to this research topic (factors contributing to the success of QI in primary care) was the lack of practice capacity and

that “for future interventions to be feasible, additional resources would first have to be provided” (de Wet et al., 2018, p. 7). Capacity issues and competing demands were barriers to QI that were also noted in the learnings shared by Houston and Bowie (2015).

Australian jurisdictions are also developing programmes to support QI in primary care. The Australian Improvement Foundation began delivery of a series of QI collaboratives focused on the priorities of coronary health disease, chronic obstructive pulmonary disease, chronic disease prevention and management, diabetes, and access and redesign (Hespe et al., 2018). In 2012, support changed to the meso-level organisations, PHNs. and from 2019 PHNs were required to provide support for QI and data (Hespe et al., 2018). A perspective paper on the QI collaborative programme reports “generally positive effects on change topics” and “positive effects in care processes, teamwork and motivation” and increased knowledge and skills for QI, whilst calling for future-focused QI collaboratives (Knight et al., 2022, p. 438).

Another Australian programme that worked with primary health care organisations caring for Aboriginal and Torres Strait Islander people across Australia has decades of research knowledge on the implementation of a CQI programme to improve the quality of care with Indigenous communities (Bailie et al., 2021). Bailie et al., describe the need for action at different levels of the system to close the evidence-practice gaps in child and chronic-illness care and identified five primary drivers developed from phased participant quantitative, qualitative data and iterative feedback as: “staff capability to deliver high-quality care; availability and use of clinical information systems and decision support tools; embedding of quality improvement processes/systems and data-driven decision-making; appropriate and effective recruitment and retention of staff; and community capacity, engagement, and mobilization for health” (Bailie et al., 2016, p. 9).

In NZ, the primary care QI research is sparse but an evidence synthesis by Middleton, et al., (2018) mainly based on evaluations by the Health Services Research Centre (Victoria University) into enablers and barriers to primary care innovation. The study and definition of innovation is based on the model of health service innovation implementation and diffusion developed by Greenhalgh et al., (2004). Greenhalgh et al. define “innovation in service delivery and organization as a novel set of behaviours, routines, and ways of working that are directed at improving health outcomes, administrative efficiency, cost effectiveness, or users’ experience and that are implemented by planned and coordinated actions” (2004, p. 582). This definition aligns to the definition for QI used in this research and with elements of the quadruple aim for quality. This synthesis notes the scarcity of NZ research but describes enablers and barriers that include policy drivers, including the BSMC business cases for integrated care, PHOs as facilitators of innovation, and the implementation and spread of the HCH

model with some less-certain evidence for the HCH characteristics as enablers for primary care success. Stronger evidence was found for system stability, some PHOs with capability as facilitators, and collaborative networks developing between PHOs and DHBs to support HCH implementation (Middleton et al., 2018).

Recently, implementation science research has carried out work to improve the implementation of interventions in chronic conditions by Māori health providers. The He Pikinga Waiora Framework (Enhancing Wellbeing; HPW) was developed to address implementation challenges in Indigenous settings (Beaton et al., 2019; Harding & Oetzel, 2019). The framework, shown in Figure 1.4, recognises that interventions in health settings require more than an effective intervention; they also require understanding and addressing the surrounding contextual and cultural features including social determinants of health (Harding & Oetzel, 2019). Using the HPW framework, means that implementation is centred on Kaupapa Māori self-determination and guided by the four elements of: culture-centred approach, community engagement, systems thinking, and knowledge translation (Beaton et al., 2019; Harding & Oetzel, 2019).

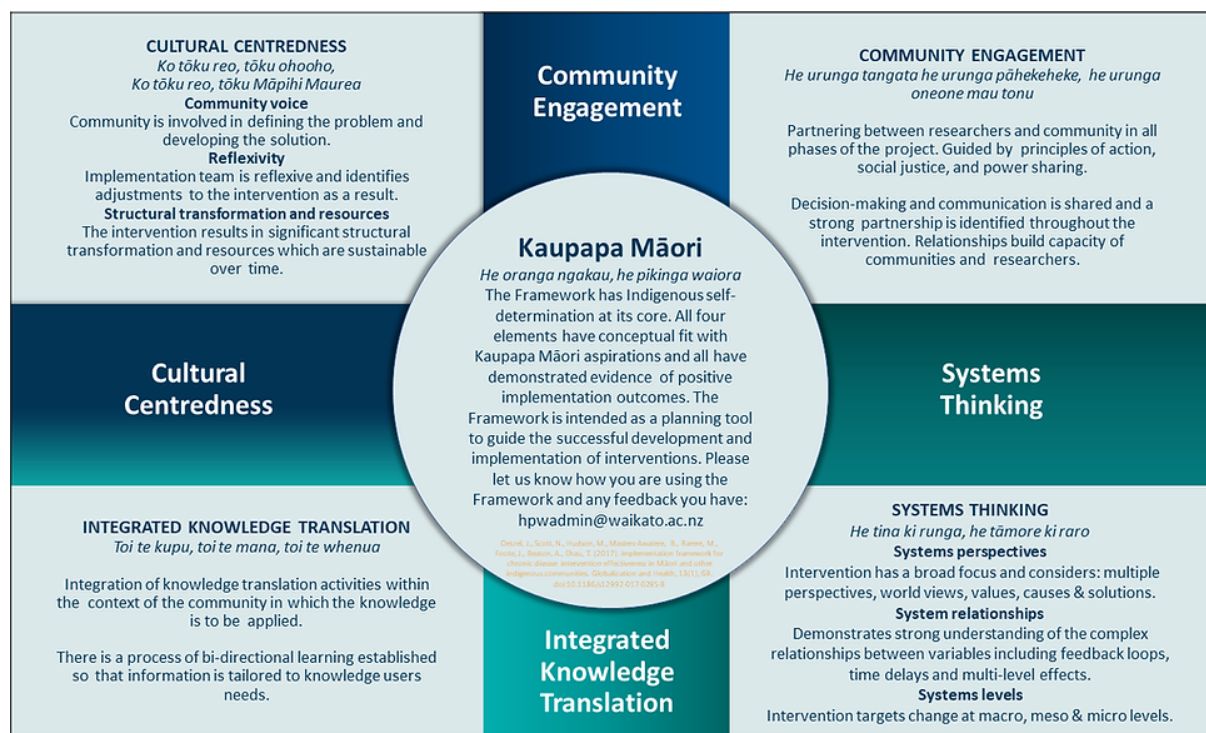


Figure 1.4. He Pikinga Waiora Framework
 (Source: <https://www.hpwcommunity.com/applying-the-framework>)

The HPW framework has been applied in Māori communities and shown success in improving health measures in Māori participants with high programme retention rates (Masters-Awatere et al., 2021; Oetzel et al., 2020). Success factors were the ability to reflect and adapt to local needs, community engagement, and co-design (Masters-Awatere et al., 2021; Oetzel et al., 2020). The Oetzel et al.,

(2020) case study described challenges that included major disruptions to participating organisations and the lack of PHO structural resources and influence compared to DHBs.

These examples show the international interest in improving the quality of primary care, but they also highlight some of the different approaches and difficulties experienced. There was an early tendency to focus on 'what' to improve across jurisdictions that was supported by training and supports in the US and Australia and by incentives in the UK. The work of the US research team has moved to a more complexity-informed approach, the NZ work is focused on Māori health, driven by a Kaupapa Māori-centred approach and across all jurisdictions, capacity and capability in personnel and infrastructure is a recognised challenge.

1.6.6 Determinants of effective quality improvement

This section of the literature review specifically focusses on what is known about the factors that influence or determine the success of quality improvement in healthcare and specifically primary care. These factors are collectively labelled determinants.

Internationally, success has been demonstrated in large-scale healthcare QI programmes (Baker, 2008; Haraden & Leitch, 2011; Lukas et al., 2007), microsystem/organisational improvement projects (Hutchins et al., 2009; Shortell et al., 1998; Siracusa et al., 2014) and collaborative improvement projects (Pronovost et al., 2006; Wells et al., 2018). There are examples of high-performing hospitals (Taylor et al., 2015) and healthcare systems that are internationally acknowledged such as Jönköping County Council in southern Sweden, Intermountain Healthcare and Veterans Affairs Healthcare in the US, and Southcentral Foundation in Alaska (a community and primary care organisation), amongst others (Baker, 2011; Baker, 2008; Charlesworth et al., 2016). All these cases provide examples of what QI success looks like, how they achieved success and the lessons learned along the journey towards success (Baker, 2011; Charlesworth et al., 2016; Taylor et al., 2015). Despite these examples, there have also been several less successful efforts (Blumenthal & Kilo, 1998; Dixon-Woods et al., 2011; Scott, 2009), large-scale system failures (Francis, 2013; Walshe & Offen, 2001), and a lack of sustained improvement and culture change from some early successes in healthcare (Burgess & Radnor, 2013; Chassin, 2013; Dixon-Woods et al., 2012; Klinga et al., 2018; Radnor et al., 2012).

Healthcare has largely adopted QI in the search to improve the quality and safety of health care and achieve its aims (Dixon-Woods & Martin, 2016; Ferlie & Shortell, 2001; Powell et al., 2009). Nonetheless, adoption is incomplete as some healthcare sources are yet to be convinced regarding applicability to healthcare (Auerbach & Shojania, 2007; Walshe, 2007), whether QI has been able to demonstrate measurable success (Dixon-Woods, 2019b; Knudsen et al., 2019; Shojania & Grimshaw,

2005), and others lack the resources required for implementation (Alexander & Hearld, 2011; Balasubramanian et al., 2018; Dixon-Woods, 2019a).

Implementation problems

Implementation problems have been noted across many different QI strategies and methodologies (Dixon-Woods & Martin, 2016; Rodgers et al., 2021; Scott, 2009). Most Lean healthcare studies were conducted in secondary care services and early implementation was criticised for a tools-based approach that neglected a strategic approach to build the culture along with training and full participation of staff (Burgess & Radnor, 2013; Koeijer et al., 2014; Poksinska, 2010). Despite these Lean implementation problems, Lean has a sustained presence in healthcare improvement today where it is commonly used as an improvement methodology rather than a guiding philosophy (Wackerbarth et al., 2021). Perhaps this continued lack of the overarching Lean philosophy is why, despite the longevity of Lean, similar implementation problems are still encountered. This can be seen in a recent systematic review of the inhibitors to Lean implementation across all sectors which identified the following six barriers: (1) behavioural and cultural influence; (2) organisational strategy and alignment; (3) leadership commitment; (4) technical limitation; (5) process-based; and (6) resource constraints (Leite et al., 2022).

Six Sigma has experienced similar challenges in healthcare implementation. In the systematic review by Antony et al., (2018), the following eight challenges accounted for 80 percent of the total challenges in the literature: (1) availability of data; (2) cultural issues; (3) resistance to change; (4) sustainability of results; (5) insufficient resources; (6) inadequate knowledge of Six Sigma; (7) complexity of current practice; and (8) lack of leadership commitment (Antony et al., 2018). The critical review of LSS by Patel and Patel (2021) echoes the work of Antony et al. (2018) and Leite et al. (2022) finding top management involvement and support, education and training, culture, linkage to strategy and customer and employee involvement are critical for LSS success. Failure factors were also similar, identifying lack of resources, lack of top management commitment, resistance to change, and lack of effective training (Patel & Patel, 2021). Insufficient resources and leadership commitment are identified as challenges in all three of these papers about three different QI methodologies. Cultural issues are identified as a barrier in two of the studies and as a success factor in the other. Regardless of the method, these contextual barriers remain important and the lack of a strategic approach to build the culture of continuous improvement is holding back effective implementation (Rodgers et al., 2021).

Plan-Do-Study Act (PDSA) implementation fidelity

PDSA is a popular QI method in healthcare (Knudsen et al., 2019; Taylor et al., 2013) and is beginning to be used in primary care (Gosling et al., 2021; Manandi et al., 2023). This is likely due in part to its seeming simplicity and the work of the Institute of Healthcare Improvement (IHI) to popularise the Model for Improvement within the Breakthrough Series of QI collaboratives (Edward et al., 2017; Kilo, 1998; McNicholas et al., 2019). PDSA cycles are used as a standalone method and are also often included within other methods such as Lean (where it is Plan-Do-Check-Act), Six Sigma (Stamatis, 2011) and the Model for Improvement (Langley, et al., 2009).

Despite the seeming simplicity of PDSA, there are noted methodological fidelity problems which also limits the ability to assess the effectiveness of the method (McNicholas et al., 2018; Taylor et al., 2013). An Australian primary care study also observed a low rate of method application and completion (Manandi et al., 2023). Five barriers were identified to completion of high-quality cycles from interprofessional engagement, time constraints, patient engagement, an organisational QI focus and unforeseen circumstances (Manandi et al., 2023). The collaborative improvement structure has been used as a method to improve fidelity of the method through training and support in both primary and secondary care (Manandi et al., 2023; McNicholas et al., 2019). McNicholas et al., (2019) identified challenges to implementation from intention to use, understanding how to use, and practical application challenges such as gathering the team together and retrospective documentation rather than prospective. Over the three years of the collaborative the support team iteratively revised support strategies implemented with project teams and improved PDSA fidelity through closer working relationships between the support team and the project team (McNicholas et al., 2019). They recognised the high technical skill required for methodological fidelity and that this “is a gradual and negotiated process” that requires “sufficient time and support” to achieve (McNicholas et al., 2019, p. 364).

Primary care implementation

As primary care has implemented QI methods, studies are emerging on the contributing factors to success or failure in primary care. The Australian Indigenous primary care research programme undertook a multi-case comparative case study to study high-improving services in this group and identify the factors that affected the CQI process and outcomes (Larkins et al., 2019). This study identified a total of ten factors across different levels of the system: (1) linkages and partnerships with external organisations; (2) supportive external health service policies; (3) health service CQI supports; (4) teamwork and collaboration; (5) prepared workforce; (6) consumers engaged with the service; (7) caring staff; and the novel factors of: (8) understanding and responding to the historical and cultural

context; (9) communities driving health improvement; and (10) two-way learning between health professionals and communities (Larkins et al., 2019).

The QPulse Quality Improvement Collaborative was conducted in Central and Eastern Sydney in 2015-2018. The QI collaborative multi-wave programme conducted several qualitative evaluations finding that there was a need for better funding and support and focus on culture and readiness for change and leadership training (Hespe et al., 2022). These findings are supported by studies from the US and UK. In 2017, UK researchers carried out a national survey of general practices to find out what GPs and practice managers thought about QI, enablers, and barriers (Gosling et al., 2021). The findings of the survey showed that most services became aware of the need for QI through internal activities such as significant event audits, practice discussions, and patient problems rather than any externally generated activity (Gosling et al., 2021). The most common kinds of QI activity were prescribing, access to appointments, chronic disease management, collaboration with other practices, end of life care, and health promotion (Gosling et al., 2021).

The US studies identified primary care transformation as “hard work” and adapted their efforts to encompass a complexity-informed approach (Crabtree et al., 2011) that focused on facilitative leadership, a learning culture, psychological safety, the importance of relationships, trust, reflection and sensemaking (Crabtree et al., 2020; Lanham et al., 2016; Meyers et al., 2024). They also encountered funding and infrastructure deficiencies and these, along with capacity and capability in personnel, are recognised challenges across international boundaries.

The stocktake of primary care innovation by Middleton et al. (2018) identified a range of enablers and barriers to innovation in NZ. Enablers with the strongest evidence were the stability of the NZ health care system, capability of PHOs to facilitate change, and the emerging collaborative network between PHOs and partner DHBs that formed under the alliance model developed for the BSMC business cases in the mid-2000s (Middleton et al., 2018). Stability as an enabler mirrors recent findings identifying major organisational disruptions as a barrier to QI in NZ and the US (Mold et al., 2018; Oetzel et al., 2020). PHO capability can vary, the US and Australian research shows that external resources can be an enabler, but it is not a simple solution (Casalino, 2018; Larkins et al., 2019; Meyers et al., 2024). This is also described by Middleton et al. (2018) in the performance of alliances being reliant on the strength of the relationships developed over time and this can be a barrier and yet, collaborative networks are an enabler. The identified barriers and facilitators to QI from these studies are shown in Table 1.4. The enablers and barriers identified reflect the heterogeneity of primary care through the different perspectives, contexts, and aims of the projects and research in which they were identified. There are some common elements and overlapping themes, but no real agreement and they are not

described in the same way, apart from a few factors such as leadership and teamwork as enablers and funding, capacity, and capability as barriers to improvement.

Table 1.4. Primary care QI enablers and barriers

	United States	United Kingdom	Australia	New Zealand
Enablers	<ul style="list-style-type: none"> • Culture of learning • Facilitative leadership • Sensemaking • Psychological safety • Positive work environment • Teamwork • Flexibility and real-time adaptation • People and relationships • Boundary spanning • Time • External infrastructure • Funding <p>(Crabtree et al., 2020; Lanham et al., 2016; Meyers et al., 2024; Miller et al., 2010)</p>	<ul style="list-style-type: none"> • Teamwork • Clinical leadership • Quality assessment skills • Routine monitoring of services and care provided • Staff trained in improvement <p>(Gosling et al., 2021)</p>	<ul style="list-style-type: none"> • CQI processes/systems • Data-driven decision-making • Community capacity, engagement, and mobilization for health <p>(Bailie et al., 2016)</p> <ul style="list-style-type: none"> • Linkages and partnerships with external organisations • Supportive external health service policies • Health service CQI supports. • Teamwork and collaboration • Prepared workforce • Consumers engagement • Understanding and responding to the historical and cultural context • Communities driving health improvement • Two-way learning <p>(Larkins et al., 2019)</p>	<p>Strong evidence</p> <ul style="list-style-type: none"> • Health system stability • PHO capability to facilitate change • Collaborative networks between PHOs and DHBs <p>Less certain evidence</p> <ul style="list-style-type: none"> • Light touch policy directions • Injections of funding support • HCH model <p>(Middleton et al., 2018)</p>
Barriers	<ul style="list-style-type: none"> • Information systems, declining financial margins, ownership changes, high burnout <p>(Meyers et al., 2024).</p>	<ul style="list-style-type: none"> • Capacity issues and competing demands <p>(Houston & Bowie, 2015)</p>	<ul style="list-style-type: none"> • Inadequate staffing • Staff capability in clinical skills and CQI tools and processes, including data management 	<p>Strong evidence</p> <ul style="list-style-type: none"> • Primary care patient co-payments • History – strength of relationships between PHOs and DHBs

	United States	United Kingdom	Australia	New Zealand
	<ul style="list-style-type: none"> Major disruptions (Mold et al., 2018). 	<ul style="list-style-type: none"> Inadequate time and resources with increasing workloads (de Wet et al., 2018) High patient demand, external demands, staff shortages, lack of change management skills, lack of data analysis and management skills (Gosling et al., 2021) 	<ul style="list-style-type: none"> Information systems (and internet access for remote rural centres) (Bailie et al., 2016) Interprofessional engagement Time constraints Patient engagement Supportive QI environment Unforeseen circumstances (Manandi, et al., 2023) 	<p>Less certain evidence</p> <ul style="list-style-type: none"> Lack of evidence to assess benefits of innovations Plurality of general practice types and PHO ownership structures (Middleton et al., 2018)

As this review shows, interest in the underpinning factors driving successful QI has grown as results continue to vary (Dixon-Woods et al., 2012; Reed, Kaplan, & Ismail, 2018) and achieving quality aims proves elusive (Braithwaite et al., 2020). This interest in understanding the determinants of effective QI has driven the rise of implementation science and improvement science research (Nilsen et al., 2022; Øvretveit et al., 2017), and the development of many models, frameworks, and tools to aid understanding of the factors that determine QI success (Damschroder et al., 2009; Kaplan et al., 2012; Nilsen et al., 2022; Øvretveit et al., 2017). Two such models are discussed next, the CFIR from implementation science and MUSIQ from QI science.

There are many implementation science theories, models and frameworks and the CFIR was chosen because of its broad coverage, conceptual fit with the research model (Figure 1.2), suitability to collect data to answer the research questions, generic conceptual applicability (Ilott et al., 2013; Keith et al., 2017), demonstrated applicability to primary care (Ilott et al., 2013; Keith et al., 2017; Kowalski et al., 2018) and availability of online resources to support its use. MUSIQ was chosen to provide a quantitative tool due to its popularity with QI advisors, use in the IHI improvement advisors programme (Dewan et al., 2021; Douglas et al., 2019; Kaplan et al., 2012), personal familiarity (as an IHI improvement advisor) and clear construct definitions. MUSIQ provided alignment with the CFIR contextual factors (Kaplan et al., 2012), descriptions of relationships between contextual factors (Kaplan et al., 2012; Kaplan et al., 2013; Wilson et al., 2018), and the opportunity to determine its sometimes questioned applicability in primary care (Douglas et al., 2019; Kaplan et al., 2012; Siriwardena (2012).

CFIR is a popular implementation science framework frequently used in healthcare studies (Breimaier et al., 2015; Kirk et al., 2015; Nilsen & Birken, 2020; Skolarus et al., 2017). CFIR was developed due to the Veteran's Health Administration recognition of the difficulties associated with implementing evidence-based practice and the desire for practical guidance on how to succeed with implementation efforts supported by a coherent theoretical framework (Damschroder et al., 2009). It was one of the most frequently cited dissemination and implementation research frameworks in the citation network assessment undertaken by Skolarus et al. (2017). Developed from a synthesis of 19 published models (Damschroder et al., 2009), CFIR is used to identify contextual, process and intervention related factors influencing QI success in many settings, particularly healthcare (Breimaier et al., 2015; Damschroder et al., 2022; Kirk et al., 2017; Skolarus et al., 2017). The CFIR consists of five domains, the intervention, inner and outer setting (context), individuals involved, and the process of implementation with several constructs and sub-constructs within each domain. CFIR has been used in primary care QI in the stages of pre-, during- and post-implementation (Ilott et al., 2013; Keith et al., 2017; Kirk et al., 2015; Kowalski et al., 2018; McHugh et al., 2018; Meyers et al., 2018) and to adapt interventions and improve their effectiveness during primary care improvement efforts (Keith et al., 2017; Kowalski et al., 2018). CFIR is most often used as a mixed methods or qualitative tool (Kirk et al., 2015).

MUSIQ is another model used in healthcare to assess the context factors thought to be themselves amenable to improvement surrounding QI projects (Douglas et al., 2019; Kaplan et al., 2013). In this model, context is defined as everything that is not part of the clinical intervention and QI process and includes organisational, environment characteristics and those of the individuals involved (Kaplan et al., 2013). MUSIQ provides a quantitative analysis of the relationship between key contextual factors based on data from large and predominantly hospital-based health service studies (Kaplan et al., 2013). MUSIQ has well-defined theory-based constructs built from a systematic review and structured expert opinion (Kaplan et al., 2012; Reed, Kaplan, & Ismail, 2018; Tomoia-Cotisel et al., 2013) and is one of few models where the relationships between contextual factors and improvement outcomes has been explored (Kaplan et al., 2013; Wilson et al., 2018).

MUSIQ has been used at various levels, including a qualitative evaluation within secondary care (Griffin et al., 2017; Wilson et al., 2018), the health system (Barson et al., 2017), a mixed-methods evaluation of a collaborative multi-site initiative (Dewan et al., 2021) and as a categorisation framework for a systematic review (Kringos et al., 2015). It is also one of the 12 frameworks suggested by Stange and Glasgow (2013) to identify relevant contextual factors for assessment during primary care practice change programmes. Despite this, questions have been raised regarding its applicability in primary care (Douglas et al., 2019; Kaplan et al., 2012; Siriwardena, 2012). The protocol for a realist review by Coles et al. (2017) includes a summary of key published healthcare improvement frameworks which

also includes MUSIQ along with CFIR, demonstrating their continuing influence. The difference in the CFIR framework is that, rather than studying either implementation or context on their own, it attempts to assess them together in an integrated way.

1.6.7 Implementation science and improvement science

Implementation science and improvement science are parallel and relatively new disciplines with different foundations, both seeking to understand the factors that support efforts (or ‘how’) to improve healthcare outcomes (Bauer et al., 2015; Koczwara et al., 2018). Implementation science takes a top-down approach to increase the application of evidence-based knowledge in practice with a foundation from behavioural sciences and seeks generalisable knowledge (Bauer et al., 2015; Koczwara et al., 2018; Nilsen & Birken, 2020). It is “commonly defined as the scientific study of methods to promote the systematic uptake of research findings and other evidence-based practices into routine practice and, hence, to improve the quality and effectiveness of health services and care” (Nilsen & Birken, 2020, p. 2). Another term commonly used to describe this field is ‘knowledge translation’ or ‘translational research’ in acknowledgement of the translation gap, or the years between the availability of new research knowledge and when it is implemented into practice (De Brún & McAuliffe, 2021; Jackson et al., 2014; Mold & Peterson, 2005; Nilsen & Birken, 2020).

QI science is a relative new term that grew from the wider healthcare QI movement (Nilsen & Birken, 2020). QI seeks practical local healthcare improvement (Nilsen & Birken, 2020). The term ‘improvement science’ has been used to define both research into improvement methods and structured improvement methods, such as those developed by W. Edwards Deming, that aim to produce generalisable knowledge alongside local improvement (Leeman et al., 2021; Marshall et al., 2013; Nilsen & Birken, 2020). QI science, with industrial foundations takes a pragmatic, bottom-up, problem-solving, and cyclical testing approach to resolve problems in the quality, safety, and value of healthcare (Bauer et al., 2015; Koczwara et al., 2018; Nilsen & Birken, 2020).

Implementation science has generated a wide range of theories, models, and frameworks, to understand or explain the determinants of implementation outcomes with subsequent attempts to provide consolidated models, taxonomies, templates, checklists, and selection guides (Balasubramanian et al., 2017; Birken et al., 2018; Damschroder et al., 2009; Flottorp et al., 2013; Nilsen, 2015; Stange & Glasgow, 2013; Tabak et al., 2012). Context is a key factor across these theories, models, and frameworks but one that is also variably defined and described (Nilsen & Birken, 2020; Pfadenhauer et al., 2015). Context has a key role in influencing improvement outcomes and as Pfadenhauer et al., (2015) explain, it is much more than the setting, “but also roles, interactions and relationships” (p. 110). Several sources call for an adaptive approach to improvement and using

knowledge of context, observed, and monitored over time, to adapt the improvement approach to the current context (Bateman et al., 2014; Dahlgaard-Park, 2011; Ferlie & Shortell, 2001; Lau et al., 2016; Lukas et al., 2007; Sanchez & Blanco, 2014).

It has been proposed that an understanding of the context surrounding QII can identify contextual factors that are modifiable to strengthen the likelihood of QII success (Kaplan et al., 2013; Øvretveit et al., 2017). Some suggest that implementation science has achieved better understanding of the context surrounding QIIs (Koczwara et al., 2018; Nilsen et al., 2022; Øvretveit et al., 2017) and that improvement practice has much to offer improvement science in engaging local leadership and support through rapid cycle learning processes (Koczwara et al., 2018; Leeman et al., 2021). There are calls to apply implementation and improvement science together to improve the success of QIIs (Koczwara et al., 2018; Leeman et al., 2021; Melder et al., 2022; Nilsen & Birken, 2020; Nilsen et al., 2022; Øvretveit et al., 2017).

1.6.8 Complexity science

Alongside implementation science and improvement science there has been a growing interest in complexity science (Braithwaite et al., 2018; Carroll et al., 2023). All three are sometimes seen as seemingly disparate approaches to achieving system change or improvement, yet calls are also being made to combine complexity science with implementation science (Braithwaite et al., 2018; Junghans, 2018; Reed, Howe, et al., 2018) and improvement science (Junghans, 2018; Leykum et al., 2014; Reed, Howe, et al., 2018; Stroebel et al., 2005). The importance of complexity science in healthcare has received growing interest since the early 2000s, along with some scepticism (Junghans, 2018; Kannampallil et al., 2011). In QI, systems thinking, and complexity are key concepts but there is disagreement on whether they are entirely different, interrelated or the same (Kannampallil et al., 2011; Rusoja et al., 2018). The terms complexity, complexity science, and complex adaptive systems are often used interchangeably which can be confusing, yet the theories and concepts that inform complexity thinking are useful when acting within systems to understand the behaviour of certain types of systems (Braithwaite et al., 2018; Greenhalgh et al., 2023; Greenhalgh & Papoutsis, 2018; Junghans, 2018; Preiser et al., 2018; Rusoja et al., 2018).

Complexity has many definitions dependent on the context (Carroll et al., 2023; Kannampallil et al., 2011) but there is some agreement from some healthcare scholars that complexity is “a dynamic and constantly emerging set of processes and objects that not only interact with each other, but come to be defined by those interactions” (Cohn et al., 2013; Greenhalgh et al., 2023; Greenhalgh & Papoutsis, 2018; Rapport et al., 2022). Complexity science also has numerous definitions (some by the same author) and this definition of complexity science from Braithwaite et al. shows the overlap between

systems thinking, complexity science, and complex adaptive systems, “A discipline drawing on the study of systems sciences, accounting for and describing the core features and behaviours of different kinds of complex adaptive systems” (2020, p. 2).

My pragmatic position supports this way of thinking about systems and complexity. Systems thinking encompasses an appreciation for the different types of systems (simple, complicated, complex, or chaotic) with an awareness of special concepts and considerations that relate to complex or complex adaptive systems (Braithwaite et al., 2018; Rusoja et al., 2018). The addition of ‘adaptive’ highlights a characteristic of complex systems – that of learning and adapting to the environment and an understanding that a complex system is not merely (or always) *more* complicated (Braithwaite et al., 2018; Kannampallil et al., 2011; McElroy, 2000; Urry, 2005). Complex systems are defined by their interrelatedness and non-decomposability, in that the system cannot be understood by examining each separate component in isolation and effects emerge that are not always predictable (Braithwaite et al., 2018; Carroll et al., 2023; Kannampallil et al., 2011; Urry, 2005). From a QI perspective an understanding and appreciation for systems and complexity is useful as the effectiveness of implementation science and QI approaches may be dependent on the complexity of the challenge being addressed and its context (Carroll et al., 2023; Crabtree, Nutting, et al., 2011; Greenhalgh & Papoutsis, 2018; McElroy, 2000; Storkholm et al., 2019).

1.7 Research methods overview

This thesis is based on publications and each paper contains its own introduction, literature review, research methodology, results, discussion, and conclusion. Published literature requirements mean these articles are succinct and may lack detail. This section provides more detail of the research methodology and methods used in the four papers. The research paradigm is discussed followed by a description of the design methods. A figure depicting the mixed methods research design is shown in Figure 1.5.

1.7.1 Research paradigm

Taken together, the ontological, epistemological, research methodology (strategy) and methods make up the ‘research paradigm’ (Creswell, 2014; Tashakkori & Teddlie, 1998; Wahyuni, 2012). This research takes a pragmatic approach underpinned by constructionism. Understanding different ontological and epistemological approaches is important in research as one naturally follows the other and defines the methodological approach taken towards the research (Bryman & Bell, 2015; Grix, 2002; Scotland, 2012). Pragmatists argue that the researcher can be both subjective and objective and it is the research question (solving the problem) which guides the approach (Creswell, 2014; Tashakkori & Teddlie, 1998). Epistemology or the theory of knowledge is how we learn about the world, and this is

underpinned by our view of what we think constitutes reality, or our ontological perspective (Bryman & Bell, 2015; Creswell, 2014; Grix, 2002).

1.7.2 The quantitative qualitative divide, a personal perspective

The researcher’s way of viewing and thinking about the world (their ontological ‘how things are’ and epistemological ‘how to learn, theories of knowledge’ perspective) should be explained, as it will contain philosophical assumptions which influence the approach to research design (Bryman & Bell, 2015; Creswell, 2014; Wahyuni, 2012). Research design can be influenced by a combination of the researcher’s ontological and epistemological preference and experience, the type of research question being asked, and the intended audience (Bryman & Bell, 2015; Creswell, 2014).

The two most common ontological perspectives are objectivism and constructionism. The fundamental differences between objectivism and constructionism and associated epistemology and research methods are shown in Table 1.5 below. My personal ontological views tend to be constructionist as I prefer a more in-depth and holistic view of the topic of interest. I want to understand quantitative data by asking what people ‘said’ about the item being measured, to develop a more in-depth picture and to understand the world from multiple participant perspectives, believing the world to be socially constructed by different perspectives, worldviews, dynamic, and constantly evolving (Bryman & Bell, 2015; Creswell, 2014).

Table 1.5. Fundamental differences between quantitative and qualitative research strategies

	Quantitative	Qualitative
Principal orientation to the role of theory in relation to research	Deductive; testing of theory	Inductive; generation of theory
Epistemological orientation	Natural science model, in particular positivism	Interpretivism
Ontological orientation	Objectivism	Constructionism
Source: (Bryman & Bell, 2015, p. 38).		

The epistemological approach here is interpretivism. Interpretivism seeks to create an understanding of why people act the way that they do and to see events from their point of view using qualitative methods (Bryman & Bell, 2015; Creswell, 2014). Interpretivism seeks to understand the research participants’ context, including the researcher, and generate a theory through inductive, qualitative study (Bryman & Bell, 2015; Creswell, 2014). This approach seems applicable for the topic being studied where the “richness of contextual information” (Tomoaia-Cotisel et al., 2013, p. 121) is a key

variable of the study and fits with my personal need to understand more about the different views participants have of the topic.

An objectivism perspective sees the world as an objective reality which can be defined, observed, and measured using quantitative methods (Bryman & Bell, 2015; Creswell, 2014). This view follows a positivism or post-positivism epistemological approach where knowledge is gained through objective observation of reality that can be compared with a theory and hypotheses (Bryman & Bell, 2015; Creswell, 2014). The research approach is deductive and aims to identify cause and effect relationships using quantitative methods (Bryman & Bell, 2015; Creswell, 2014; Tashakkori & Teddlie, 1998). While I tend towards interpretivism and constructionism, I also like to see quantitative data that supports any narrative seeking signposts to potential answers and applicable cause and effect relationships. The simplification inherent within quantitative variables has appeal as it can reduce the burden of data collection, analysis and aid understanding through statistical examination of relationships (Choy, 2014; Queirós et al., 2017).

1.7.3 Pragmatism

This personal appreciation for the different strengths of both qualitative and quantitative methods leads to a pragmatic worldview, looking for the data that best tells the story and seeking triangulation of data, being interested in not only 'what works' to solve the problem but also 'why' it works (Clark & Ivankova, 2015; Creswell, 2014; Tashakkori & Teddlie, 1998).

Pragmatism is an approach that evolved out of the dichotomy of objectivism and constructionism ontologies (Creswell, 2014; Tashakkori & Teddlie, 1998; Wahyuni, 2012). A pragmatist's approach is not focused on any one ontology but rather is focused on the research problem and using available methods that are useful to answer the research question (Creswell, 2014; Tashakkori & Teddlie, 1998; Wahyuni, 2012). The pragmatism worldview finds meaning in actions, context, and consequences and is concerned with problem-solving and 'what works' (Creswell, 2014; Tashakkori & Teddlie, 1998; Wahyuni, 2012). This fits well with the QI perspective associated with both my nursing and then QI career, as both combine inductive and deductive thinking processes for problem-solving.

Pragmatists will use both quantitative and qualitative methods in a mixed methods approach to problem-solving, rather than subscribing to only one way (Creswell, 2014; Tashakkori & Teddlie, 1998; Wahyuni, 2012). The pragmatist mixed methods approach is proposed to draw on the complementary strengths and avoid the non-overlapping weaknesses of the constructionist and post-positivist approaches (Clark & Ivankova, 2015; Creswell, 2014; Tashakkori & Teddlie, 1998).

1.7.4 Mixed methods approach

A mixed methods approach is supported by the pragmatic problem-solving paradigm, using both quantitative and qualitative data to triangulate and build evidence. Both the constructionist and pragmatic research paradigms have a focus on context (Bate et al., 2015), which is the focus of this study. There is also some agreement that mixed research methods have much to offer in the study of the influences of improvement context (Bate et al., 2015; Øvretveit, 2011; Portela et al., 2015). The advantage of a mixed methods approach is the ability to utilise the strengths of both quantitative and qualitative approaches and offset any weaknesses of any one methodology (Clark & Ivankova, 2015; Creswell, 2014; Tashakkori & Teddlie, 1998). The research design followed is shown in Figure 1.5. This design will meet the needs of those of the healthcare audience with an objectivist perspective based in the familiarity of randomised control trials as the basis for 'evidence-based medicine' (Campbell et al., 2017; Cooperstein, 2017; Dopson & Fitzgerald, 2005; Goldenberg, 2009), and the interpretive holistic person-centred approaches to healthcare research which have become increasingly popular (Campbell et al., 2017; Holloway & Galvin, 2010; Strudsholm et al., 2016).

Health research is now increasingly turning to mixed methods designs to investigate complex problems in the real-world, complex-adaptive systems of healthcare (Campbell et al., 2017; Cooperstein, 2017; Creswell et al., 2011; Massoud et al., 2016; Strudsholm et al., 2016). Mixed methods can combine the use of quantitative data collection and analysis in several different ways. The quantitative and qualitative principles and methods remain the same but how they are combined differs according to the purpose of the research. The research design for this study is an exploratory sequential mixed methods study (shown in Figure 1.5) where mixed methods is defined as: "collecting both quantitative and qualitative data, integrating the two forms of data, and using distinct designs that may involve philosophical assumptions and theoretical frameworks" (Creswell, 2014, p. 4).

The design of this research, shown in Figure 1.5, uses the classification system outlined by Bryman and Bell (2015). The priority that is given to either quantitative or qualitative methods in each stage of the design is shown using upper case for the higher priority and lower case for the lower priority. The sequence of the stages is indicated by the arrows. In this research, the findings from the qualitative (inductive) stage informed the quantitative (deductive) stage (Creswell, 2014; Tashakkori & Teddlie, 1998). The associated chapters (publications) are shown in the list below each box.

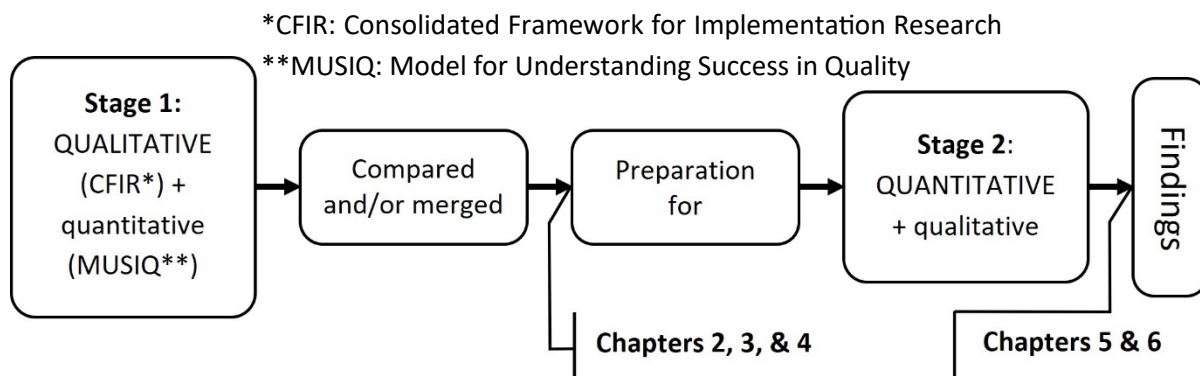


Figure 1.5. Mixed methods design (adapted from Bryman and Bell (2015))

1.7.5 Research Stage 1 qualitative comparative case study

This first stage of the research was a cross-sectional comparative case study. A case study approach was chosen to provide in-depth knowledge by providing scope for a holistic real-world exploration of the system and an understanding of the context and their interrelationships, a key element of this study (Creswell, 2014; Kumar, 2014; Yin, 2013). In healthcare, a case study approach is often chosen because of the researcher’s familiarity with, and interest in, the case to be studied (Holloway & Galvin, 2010) which is accurate for this study. At the time of the study, I was working as a Quality Improvement Advisor in a national primary care QI programme and prior to that I was working in a PHO. I have a particular interest in, and passion for, primary care, believing in the importance of primary care for individual and population health, wellbeing, and the extent to which the sector is constrained and under resourced. This produced the two cross-case study analysis articles which make up Chapters 2 (three-case) and 3 (six-case) and the methods article (Chapter 4) testing the applicability of MUSIQ in primary care. Each case was first analysed separately, and the qualitative data compared and contrasted with the quantitative data from MUSIQ before cross-case comparisons were made as described in Chapters 2 and 3.

The comparative multi-case study design entailed a cross-sectional approach where the data was collected from multiple sites at or near one point in time (Bryman & Bell, 2015) over 16 months between October 2018 and January 2020. A purposive theoretical sampling strategy (Creswell, 2014; Tashakkori & Teddlie, 1998) was used seeking a mix of rural and urban environments, some VLCA practices, Kaupapa Māori organisations, examples of the HCH model and experience with the NZ version of the Safety in Practice QI programme (Houston & Bowie, 2015). These characteristics are defined in Table 1.6. There are other important primary care characteristics likely to affect QI in primary care, but these were chosen at the time of the research to reflect the most common characteristics related to, or likely to have an impact on, primary care QI and successful outcomes in the NZ context. This resulted in the six organisations shown in Table 1.7 (also shown in Chapter 3), who were referred via PHO or DHB as practices showing either signals of success or recognised primary

care leaders and had completed a successful QII to provide a view of ‘what worked’. Six cases were needed to provide some heterogeneity of these primary care characteristics and allow for recognition of common themes.

These cases provided scope to investigate the research questions from a variety of contextual, content, and improvement approaches and compare the effects these have on each other and the improvement outcome. The unit of analysis was the QI team involved in the selected QII, which may have included people both within and outside of the general practice setting as, in some cases, the PHO and/or the DHB were involved in the QII. In other cases, participants requested that staff affected by the QII, or others with strong relationships to the organisation, be interviewed. The setting and role of the interview participants and their involvement in the QII are shown in Table 1.7 below. After several case interviews, effort was made to find cases that used ‘scientific QI’ methods (Skela-Savič et al., 2017), leading to the inclusion of Cases 4 and 6. The qualitative comparative multi-case study is described in Chapter 2 (Cases 1-3) and 3 (Cases 1- 6). Similarly to the focus of primary care QI in the UK (Gosling et al., 2021), the chosen QIIs shown in Table 1. 7 share the common concern across the cases of access to appointments and this is a key component of the US PCMH (Wagner et al., 2018) and the HCH in NZ (Cumming et al., 2018).

Table 1.6. Key primary care characteristics in Aotearoa

Name	Definition
Very Low-Cost Access (VLCA)	VLCA practices are contracted general practices that meet the eligibility criteria of 50% high needs population (defined as Māori, Pacific or New Zealand Deprivation Index quintile 5), and agree to keep their fees at a very low rate for adults and free for under 13 years.
Health Care Home (HCH)	The HCH model in New Zealand is based on international models using ‘Lean’ quality improvement theory in health and the use of technology to provide co-ordinated and convenient care for patients, improving access and decreasing the use of hospital services (Hefford, 2017).
Integrated Family Health Centre/Service (IFHC)	IFHCs provide a full range of services, including specialist assessments by GPs, minor surgery, walk-in access, chronic care, increased nursing including nurse-led clinics, allied health services (physiotherapy, dieticians, exercise education), as well as selected social services. They were a new way of working, introduced in 2010, to create a new patient-centred model of care to improve both primary and secondary care, and primary care services, integration, and patient experience of care (Lovelock et al., 2014)

Safety in Practice	Safety in Practice was an improvement collaborative in primary care, run by Ko Awatea, the improvement hub at Counties Manukau DHB. The programme has been running since 2014 and over 70 Auckland locality general practices have participated in the programme (Vasey, 2015). In 2023, the programme is currently paused. The objectives of the programme were: reduce harm to patients, create safer systems, promote a culture of safety, and acquire skills to improve patient care.
Kaupapa Māori Health providers	Kaupapa Māori providers are a diverse group of health and social care providers with the basic principle of delivering health care that reflects Māori perspectives (Durie et al., 2012; Rolleston et al., 2020) and are strongest when delivery is “by-Māori, for-Māori and guided by Māori world views and principles” (Beaton et al., 2019, p. 2).

Table 1.7. Case characteristics and QII topic

	Case 1 (C1)	Case 2 (C2)	Case 3 (C3)	Case 4 (C4)	Case 5 (C5)	Case 6 (C6)
Organisation	A PHO and VLCA* practice co-located with community mental health and other health services.	A Kaupapa Māori** VLCA practice	An IFHC	General practice	A Kaupapa Māori PHO with varied primary health care services including 5 VLCA general practices	A general practice co-located with a range of other health services
Setting	Remote rural practice	An urban practice within a satellite town of a large city	An urban practice in a large city	An urban practice in a large city	Sited in urban suburbs surrounding a large city	An urban practice in a large city
Practice size (100th percentile is the largest at approx. 29,000 patients)	Approx. 6,000 enrolled patients 76 th percentile	Approx. 3000 enrolled patients 40 th percentile	Approx. 6,000 enrolled patients 76 th percentile	Approx. 13,000 enrolled patients 95 th percentile	PHO approx. 18,000 enrolled patients. Practices: 2,500 - 5,500. From 38 th - 67 th percentile	Approx. 20,000 enrolled patients 99 th percentile
FTE unless otherwise stated	Headcount of 7 GPs with various FTE	GP: 2.5 Nurse practitioner: 1 Practice nurses (PNs): 2 Community health team 3.6	GP: 5 PNs: 2.35	Headcount of 13 GPs with various FTE	Practice headcount: GPs: 25 PNs: 30 PHO: Approx. 120 staff in a range of roles	Chief Executive GP director Finance/ admin: 2 GPs: 11.9 PNs: 9.5 Reception: 10

	Case 1 (C1)	Case 2 (C2)	Case 3 (C3)	Case 4 (C4)	Case 5 (C5)	Case 6 (C6)
Interview participants. All of those interviewed were actively involved in the improvement apart from those in italics.	PHO clinical director CMH district manager General practice (mental health) liaison nurse PN GP	GP director Practice manager Nurse lead Administration team lead Community health worker/ receptionist <i>Community health worker</i> <i>PNs (2)</i>	GP director DHB service integration facilitator <i>PHO project manager</i> PN Receptionist	Clinical nurse lead GP director Clinic RN General manager Administration manager PHO data analyst PHO nurse director	Quality Leader Clinical lead nurse Hub senior lead Hub administrator	General manager Medical director GP associate
Intervention	Physical health for patients with a mental health diagnosis.	Telephone triage project.	Patient prioritisation at reception.	Nurse-led acute paediatric (initially 13 years and under) clinic.	A central telephone call answering and appointment booking service.	Model of care change from acute care and general practice to general practice only.
Date of QII	2017	2014	2017	2018	2018	2018
Date of interviews	October 2018	October 2018	January 2019	August 2019	January 2020	December 2019
*VLCA: Very low-cost access (VLCA) practices have an enrolled population that is at least 50% economically deprived or Māori and Pacific Island peoples and the practice receives funding to maintain low fees.						
**Kaupapa Māori: "In the area of health it has been used to reflect an approach to clinical practice that recognises Māori perspectives" (Durie et al., 2012, p. 66).						

Semi-structured interviews were conducted predominantly onsite (one telephone interview), with the interview guide based on the research model for primary care QI (Figure 1.2) and the 'Interview Guide Tool' available on the CFIR website: www.cfirguide.org. At the same time, quantitative data was collected from the documents provided by participants to show the success of their quality improvement initiatives and from the MUSIQ contextual assessment survey tool. The applicability of MUSIQ in primary care is discussed in Chapter 4. All the interviews were recorded, transcribed, and sent back to the participants for checking. Specific care was taken with the data from the Kaupapa Māori provider as my worldview is that of the pākehā (non-Māori) New Zealander. Feedback from the case study organisations on interpretation of the information reported was vital to ensure correct representation of Māori concepts and perspectives and was considered an ethical responsibility.

Interviews were personally transcribed and NVivo qualitative analysis software was used to draw out the themes both intuitively and regarding the CFIR constructs or codes. The transcripts were analysed line by line for the themes which were compared to the CFIR code definitions and then coded according to the definitions. Interesting themes that arose that did not fit into the CFIR code definitions were coded intuitively and definitions were developed for these as they arose. Themes were revisited, examined against the definitions, and revised in an iterative process throughout the writing and reflecting process. After numerous comparisons with CFIR, some of those originally coded separately were incorporated into the CFIR codes but others remained coded separately. These were generally items of personal interest such as comments about certain models, professional differences, or training. A lot of time was spent digging deeper into the CFIR codes of network relationships and cosmopolitanism and the items collected within these codes, to consider whether the comments were a good fit for the Damschroder et al. (2009) code definitions or whether these had a different meaning and required a new code. Key factors specific to primary care QI were identified from the thematic analysis of the cases and that were supported in the literature.

Reliability and validity are important concepts to ensure the quality and trustworthiness of the research findings in qualitative, quantitative, and mixed methods research (Andrew & Halcomb, 2009; Kumar, 2014; Tashakkori & Teddlie, 1998; Yilmaz, 2013). Reliability is the ability to measure consistently over time, or repeatability and validity is the ability of the measure to reflect the real meaning of what it is supposed to measure, or accuracy (Andrew & Halcomb, 2009; Creswell, 2014; Hair Jr et al., 2022; Yilmaz, 2013). How these concepts are applied varies depending on the research paradigm and methods (Andrew & Halcomb, 2009; Golafshani, 2003; Yilmaz, 2013). In qualitative research, reliability can be referred to as dependability and confirmability, and validity as credibility and transferability (Andrew & Halcomb, 2009; Golafshani, 2003; Kumar, 2014). Descriptions of data collection instruments, methods, participants, setting, any potential researcher or participant bias,

triangulation of different sources of data and self-reflexivity of the researcher are all important steps to support validity and reliability in qualitative research (Andrew & Halcomb, 2009; Creswell, 2014; Kumar, 2014).

The methods used in this research to support validity and reliability of the qualitative data included triangulation of the qualitative data with quantitative data and documents supplied by the participants, publicly available data and documents on organisational websites and participant verification of the transcripts and summary themes.

Conference presentations provided progressive primary care peer review of:

- research rationale, questions, and methods at the RNZCGP Rural GP Network Conference 2018
- qualitative results at the RNZCGP Conference, Wellington 2021 and National Rural Health Conference, Taupo, 2021.

1.7.6 Research Stage 2

Stage 2 of the research was designed to test the hypotheses developed from the cross-case study analysis in Chapter 3. Research was conducted via a cross-sectional quantitative national email survey sourcing responses from the wider primary care sector and distributed in 2021 using Qualtrics® (2005). This is presented in the paper under review for publication in Chapter 5. The self-completed online survey design was chosen to obtain representative data relatively quickly and easily that would show the relationship between the variables and improvement (Creswell, 2014, Bryman & Bell, 2015). A national survey using Qualtrics® (Qualtrics Version 2021, 2005), was distributed in 2021 via the RNZCGP, the Practice Managers and Administrator Association NZ (PMAANZ), General Practice NZ (GPNZ) – the national advocacy group for general practices, Collaborative Aotearoa – the national organisation for Health Care Home implementation, and personal primary care contacts.

The survey indicators (questions) comprised questions adapted from validated general practice surveys, plus one construct that was drawn from community-based participatory research, as no other suitable indicator was found. Participants were asked to select and self-rate an improvement project they had participated in for success against a NZ adaptation of the quadruple aim. The survey had two open questions to give participants the opportunity to describe important factors for QI in primary care and offer final comments. The survey was developed in consultation with my supervisors, who provided feedback and advice from their expertise and experience in survey development and from the primary care perspective of a practicing GP (Dr Lynn McBain). The survey was then pre-tested with eight primary care workers, consisting of three GPs, two practice manager/ RNs, one Kaupapa Māori

PHO manager, a contract practice nurse/practice manager, and a PHO clinical manager. Minor amendments to the survey demographic choices and structure were made following feedback.

In quantitative research the reliability and validity of the data collected is first established before analysing the results (Andrew & Halcomb, 2009; Tashakkori & Teddlie, 1998). Internal validity refers to the degree of confidence that the results are caused by the tested variables (constructs) rather than some alternative variable or methodological error (Tashakkori & Teddlie, 1998; Yilmaz, 2013). Construct validity refers to the degree the construct indicators measure that specific construct (Tashakkori & Teddlie, 1998). Indicators for one construct should operate in similar ways (convergent validity) and should be dissimilar to other dissimilar constructs (discriminant validity) (Tashakkori & Teddlie, 1998). Appropriate statistical tests are used to establish the reliability and validity of the constructs and indicators according to the type of constructs and indicators used (Andrew & Halcomb, 2009; Creswell, 2014; Hair Jr et al., 2022). Chapter 5 describes how the research model was tested for reliability and validity using partial least squares structural equation modelling (PLS-SEM) on the SmartPLS software V.3.3.9 (Ringle et al., 2015).

1.7.7 Ethical considerations

This study was deemed to be low ethical risk and not requiring a full ethical review (Massey University Ethics Notification No. 4000018920). As the research setting is healthcare, the Health and Disability Ethical Committee (HDEC) scope of review form was submitted to the HDEC national office. Based on the proposed study not involving patients and being a quality improvement study, the response was that a full review was not required. Before approaching the case study sites, the DHB or PHO ethical review processes were completed. In most cases this was managed by the relevant DHB ethical review committee and, in one case, the PHO. Each DHB/PHO had their own processes, forms, and requirements that were completed and approval gained to approach each site. Although a full ethical review was not required by Massey, the ethical risks were still considered, managed, and are discussed below.

Ethical considerations are approached from the perspective of the Massey University (Massey) Code of Ethical Conduct for Research (Massey University, 2015). Te Ara Tika: Guidelines for Māori Research Ethics (Hudson et al., 2010) were also incorporated to ensure correct procedures and understanding for the Kaupapa Māori organisations participating in this research, particularly as this is not Kaupapa Māori research. The Massey Code of Ethical Conduct for Research has the following principles: respect for persons, minimisation of harm, informed and voluntary consent, respect for privacy and confidentiality, avoidance of unnecessary deception, avoidance of conflict of interest, social and cultural sensitivity to age, gender, culture, religion, social class of participants, and justice (Massey

University, 2015). Te Ara Tika references four tikanga based principles: whakapapa (relationships), tika (research design), manaakitanga (cultural and social responsibility), and mana (justice and equity) (Hudson et al., 2010).

Whakapapa or relationships were established and monitored over time throughout the research. Communication was open and transparent, and informed and voluntary consent was an ongoing dialogue with the participants. Efforts were made to ensure that benefits and results from the research were provided to participants by sharing the results back and offering the case study sites feedback and support with using the results to benefit their organisations. These relationships are ongoing and the published articles have been, and will continue to be, shared with the participants for their own use, including the thesis. Potential conflicts of interest in relation to my role in the Health Quality & Safety Commission were declared and discussed prior to engagement with participants.

Tika in the context of a mainstream research design is to ensure that the rights and interests of Māori and all participants were protected throughout the research (Hudson et al., 2010). All participants were given verbal and written explanations of the research, the time to consider and ask any questions, and make a fully informed decision about their participation before the research commenced and throughout the research relationship. Openness and transparency about the research, its goals, and any potential benefits were key discussion points. Each organisation was asked to advise how they wished to commence our engagement, any cultural requirements, how to organise the interviews and to decide on the most suitable time for these. In some instances, this meant a pre-interview in-person visit was arranged to meet key staff and stakeholders and for others this was a phone call or a videoconference. In two cases, onsite visits were made to gain organisational approval but interviews did not proceed due to staff individual hesitance or lack of opportunity.

Manaakitanga and respect for people encompasses privacy, and confidentiality. Privacy and confidentiality were maintained so that no one person or individual organisation is deliberately identified in the study or any publications of the research. However, due to the size of NZ and particular health service characteristics, the risk of readers having informed opinions on who participants might be was possible and this was discussed with participants. Participants were consulted about their degree of comfort in how much demographic information was revealed in the publications and thesis. All participants were sent a copy of their interview transcript and were able to remove comments, or request that they not be linked to site information if they were not comfortable to share. All participants and their organisations were assigned a de-identified code. Each site was written up as a separate case study and this was sent to the participants, and they were given the opportunity to correct any misrepresentations. This was particularly key for the Kaupapa Māori

organisations where, as a pākehā New Zealander, I do not have the embedded cultural understanding of Kaupapa Māori and Te Ao Māori.

Mana encompasses minimisations of harm, informed consent, fairness, and equity. Informed consent was obtained in writing from both the organisations and the interview participants after a full explanation of the study, its purposes, what the information from the study will be used for and how. The organisational and individual participant information form and consent form sent to each site is shown in Appendix 1 of this chapter. The national survey introductory page explained the purpose of the study and consent to commence the survey. Interview questions are shown in Appendix 2 of this chapter. The survey is also shown in Appendix 1 of Chapter 5. Minimisation of harm is also considered regarding the case study organisations and the participants of the study in several ways. The previously mentioned management of informed consent, privacy and confidentiality, and discussion of potential conflicts of interest regarding my role at the Health Quality and Safety Commission are all intended to reduce the risk of harm to participants. Care was taken to ask for their guidance on cultural requirements, tikanga or procedures the sites would like me to follow throughout our engagement. Koha (gifts) of food were arranged at each site to acknowledge the gift of their time, knowledge, and experience. Acknowledging this gift continues as I endeavour to share all I have learnt from the organisations and people who have given so generously.

1.8 Thesis structure

The thesis is structured to meet the requirements of PhD thesis by publication at Massey University. Four findings' chapters – 2, 3, 4, and 5 make up the body of the thesis and have been written as papers for peer-reviewed publications. The papers are presented as they either appear in the relevant journals or as they were submitted. However, the referencing style has been changed to meet the Massey thesis by publication requirements to APA 7 (Massey), and a consistent font and format has been used to provide consistency within the thesis, as required by Massey. Below is a brief overview of each publication chapter. Each chapter has an introductory page preceding the article explaining its position within the research and how it is connected to the preceding chapter within the whole of the research and thesis. Figure 1.6 depicts the research journey, my thinking along the way in relation to the thesis chapters, and these papers.

Chapter 2 contains the paper: **Contextual antecedents of quality improvement: a comparative case study in rural, urban and Kaupapa Māori general practice** (Cullen et al., 2022). This was published in the Journal of Primary Healthcare, NZ. It is a qualitative cross-case analysis of the first three case study sites: a remote rural practice, an urban Kaupapa Māori VLCA practice, and an urban practice in a large

city. This paper identified primary care antecedents from the context (inner and outer socio-technical setting), intervention, and implementation process for QI.

Chapter 3 contains the paper: **Developing a model for primary care quality improvement success: A comparative case study in rural, urban and Kaupapa Māori organisations** (Cullen et al., 2023). This was published in the Journal of Primary Healthcare, NZ. It is a qualitative cross-case analysis of all six case study sites: a remote rural practice, an urban Kaupapa Māori VLCA practice, an urban Kaupapa Māori PHO that fully owns four VLCA practices along with other primary and community services, and three urban practices based in large cities. This paper shows the extension of the previous cross-case comparison with the addition of a further three cases. The additional cases enabled deeper understanding and refinement of key factors and proposed directionality of interrelationships influencing QI. A refined model is shared depicting factors and relationships for effective QI.

Chapter 4 contains a methodological paper that has been submitted to a peer reviewed journal for publication: **Assessing the applicability of the Model for Understanding Success in Quality (MUSIQ) for primary care**. The MUSIQ provides a quantitative analysis of the relationship between key contextual factors based on data from large and predominantly hospital-based health service studies (Kaplan et al., 2013). However, questions have been raised regarding its applicability in primary care (Douglas et al., 2019; Kaplan et al., 2012; Siriwardena, 2012). Therefore, this study asks:

- How applicable for primary care assessment is the Model for Understanding Success in Quality (MUSIQ)?
- How might the MUSIQ be adapted for use in primary care?

A multi-case mixed methods approach was followed with quantitative data collected via the MUSIQ survey completed by participants, compared with qualitative data from primary care team interviews utilising CFIR (Laura J Damschroder et al., 2009) to guide data collection and analysis. Redundant MUSIQ factors were identified as well as additional important factors from or adapted from CFIR.

Chapter 5 contains the paper: **The role of distributed leadership in primary care quality improvement**. This article has been submitted to a peer reviewed journal for publication and examines the role of distributed leadership in primary care QI. PLS-SEM is used to test the hypothesised relationship between variables leading to successful QI using data collected from primary care workers in NZ.

Chapter 6 is the final chapter presenting a discussion of the results, conclusions, limitations of the research and directions for further research.

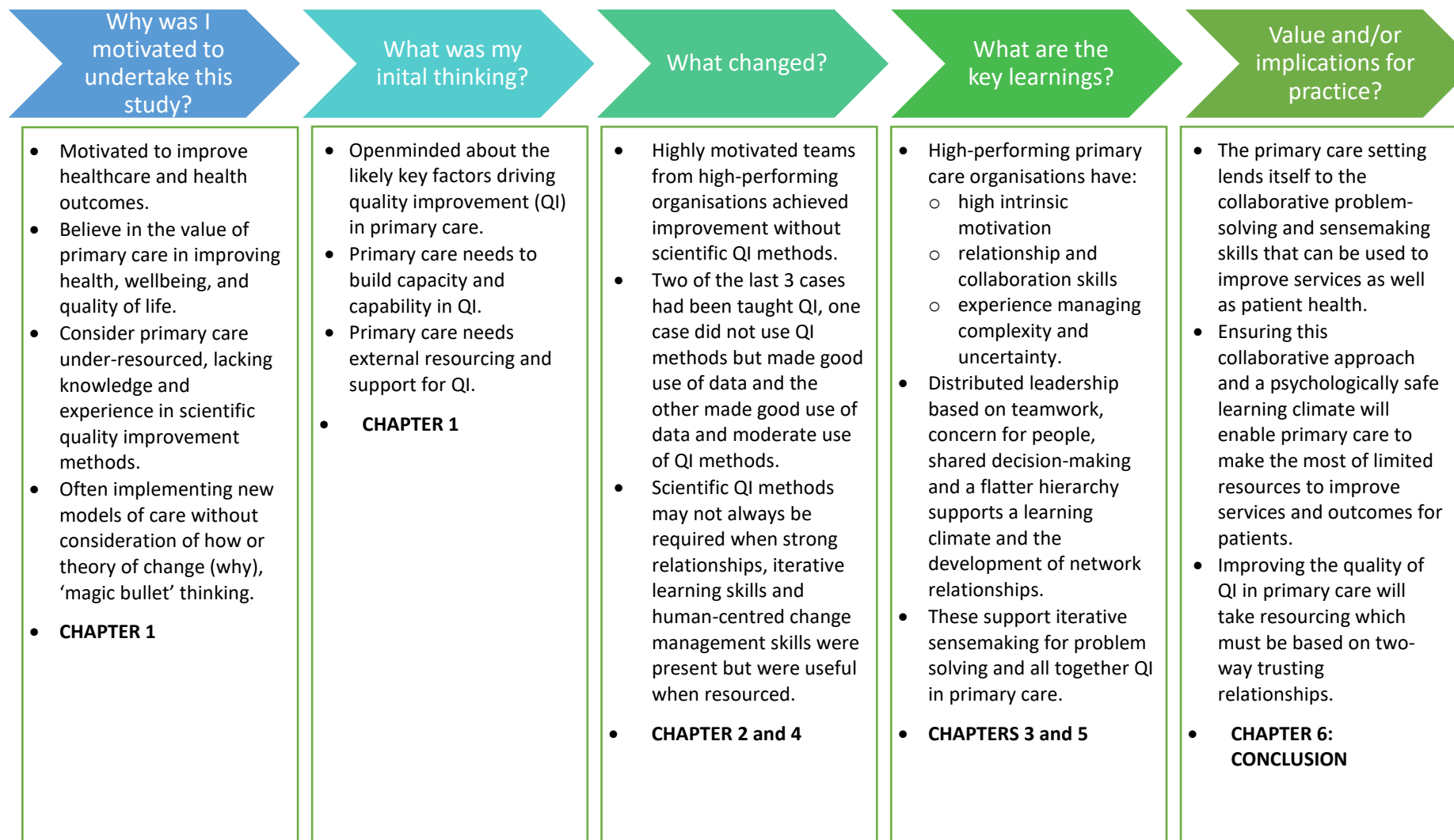


Figure 1.6. Research journey and associated chapters

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Appendix 1: Interview protocol

Content:	Estimated time:
Introduction and demographic information:	3 min.
<ul style="list-style-type: none"> Introduce self and project to the respondent. <p>The purpose of this study is to:</p> <ul style="list-style-type: none"> Explain the relationship that the improvement intervention, implementation methods and contextual factors have with the outcome. Identify the important factors in different contexts for effective improvement. <p>I want to hear about your experience undertaking the ... QI project in your practice. Ask the respondent for permission to tape the interview.</p> <p>Explain the consent form, explain how confidentiality will be maintained and ask the respondent to sign if not already obtained</p>	
Role questions – Start the recording	2 min.
<ul style="list-style-type: none"> Can you state your name please? How much experience with QI did you have prior to your role in this project? 	
Intervention	5 min
<ol style="list-style-type: none"> Why was this improvement project chosen? <ul style="list-style-type: none"> How was that decision made? (Who or what were the main drivers?) What are the changes that you are implementing in this improvement project? Why do you think those changes will achieve the improvement aim? (Look for and explore underlying hypotheses and assumptions) 	
Outcome	5 min
<ol style="list-style-type: none"> What was the main aim of this project? To what extent was the main aim achieved? To what extent were other aims or improvements achieved? 	
Process – Mechanisms	10 min
<ol style="list-style-type: none"> Can you describe how you implemented this improvement project? <ul style="list-style-type: none"> What improvement or change methods are you using? Why did you use those methods? Have you had to change anything that you had planned? Who are the key people involved in this intervention? <ul style="list-style-type: none"> Did you have any external help with this intervention? What was their role? How are consumers participating in the intervention? <ul style="list-style-type: none"> How will you or your colleagues communicate to your consumers about the intervention? 	

<ul style="list-style-type: none"> • How will they access the intervention? 	
Process – Mechanisms (Continued)	10 min
<ol style="list-style-type: none"> 1. What kind of feedback information do you plan to collect as you implement the intervention? <ul style="list-style-type: none"> • Which measures are you tracking? How do you track them? • How is this information used? • Is feedback collected from staff or patients about this intervention? 	
Context	12 min
<ol style="list-style-type: none"> 1. Can you describe the improvement team, who was involved and what were their roles? 2. How often did you meet? 3. How do other people in your organisation feel about this intervention? 4. What is this organisations attitude towards change in general? 5. How were the needs and preferences of your consumers considered when deciding to implement the intervention? 6. How did/does the infrastructure of the organisation facilitate/hinder implementation of the intervention? 7. How would you describe the culture of this organisation? (list prompts underneath – which of these most closely represents the culture) 8. What level of endorsement or support have you seen or heard from leaders? 9. Who are these leaders and how has this affected things so far? Going forward? 10. Do you expect to have sufficient resources to implement and administer the intervention? 	
Interview close	5 min
<p>Is there anything else about the QI project that you think that I need to know or that you want to add? (don't forget to pause)</p> <p>Thank-you for your time. I will send you a copy of the interview transcript so that you can check it for accuracy and a summary of the findings.</p> <p>Can I contact you if I need any further information or to clarify any points, please?</p> <p>Do you have any questions?</p>	
Post interview	
<ul style="list-style-type: none"> • Complete MUSIQ questionnaire • Complete IHI progress assessment scale • Arrange and gain consent for use of any follow-up documentation brought up during interview 	

Appendix 2: Stage 1 information form and consent forms

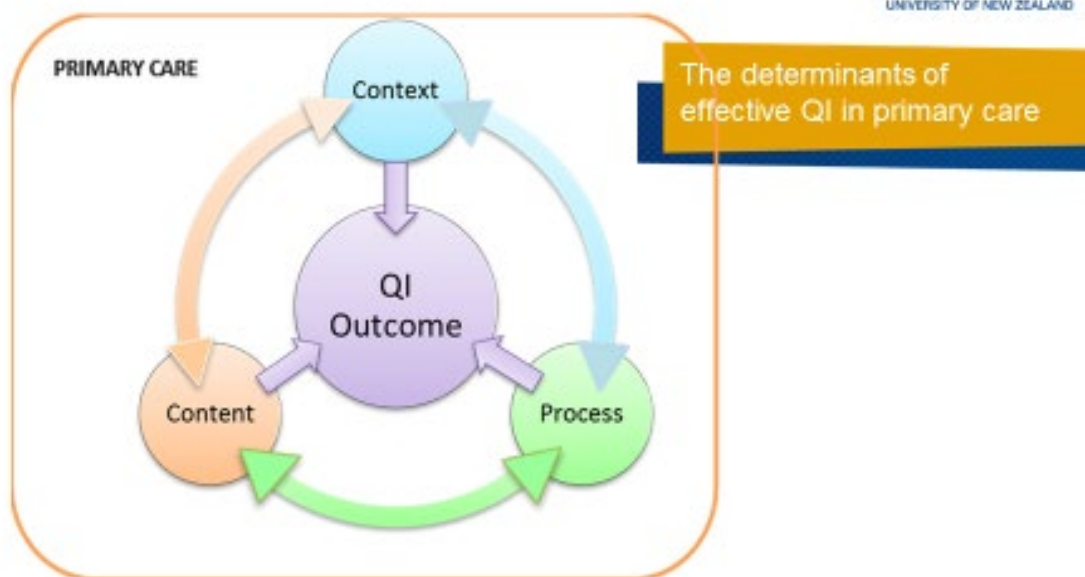
The determinants of effective quality improvement in primary care

Tēnā koe, you are invited to take part in a study on the determinants of effective quality improvement in primary care. Whether you take part is your choice. If you do not want to take part, you do not have to give a reason.

The Participant Information Sheet attached will help you decide if you'd like to take part. It sets out why we are doing the study and what your participation would involve. I will go through this information with you and answer any questions you may have. You do not have to decide today whether you will participate in this study.

If you agree to take part in this study, you will be asked to sign the Consent Form below. You will be given a copy of both the Participant Information Sheet and the Consent Form to keep.

This document is 6 pages long, including the Consent Form. Please make sure you have read and understood all the pages.



Participating Organisation Information sheet

The determinants of effective quality improvement in primary care

1. Invitation

Tēnā koe, your organisation is invited to take part in this research project. Before you decide if your organisation should do so, it is important you understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether you wish to take part. Thank you for reading this.

2. What is the project's purpose?

The research aims to:

- Explain the relationship that improvement interventions, implementation and context have with each other and the outcome in primary care.
- Test existing tools and models to understand the determinants of effective quality improvement, that have been developed in secondary care, for their applicability to primary care.
- Develop a synthesized primary care assessment tool and action guide for effective quality improvement in primary care.

This will enable primary care providers to assess their own context and the fit between their own context, the intervention and intervention methods. They will be able to assess which interventions are best suited for their context and identify any elements in the intervention content, implementation, or their own context that can be modified to improve effectiveness of an intervention.

3. Why have I been chosen?

A number of primary care organisations that are representative of New Zealand primary care characteristics and have undertaken successful improvement work have been asked to take part in this research.

4. Do I have to take part?

It is up to you to decide whether to take part. If you do decide to take part, you will be able to keep a copy of this information sheet and the signed consent form. You can still withdraw at any time. You do not have to give a reason.

5. What do I have to do?

The team members will be asked to participate in an interview of approximately one hour. They may be asked to agree to a follow-up interview if there are any further questions.

Team members will also be asked to complete a questionnaire called the Model for Understanding Success in Quality (MUSIQ).

If the practice improvement project team consents to this, observation of a team meeting to learn more about team norms and relationships may occur on another visit. This will be consented separately following discussions with the team.

6. What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?

The interview will explore knowledge of the factors that influenced the success of your improvement project. Participant views and experience are the main sources of data for this project. The information collected will be sent back to you to check its accuracy before it is used.

7. What other types of information will be sought?

You will be asked to provide documentation about the organisation and the improvement project, such as project planning documentation, meeting minutes and improvement process and outcome data. This information must not contain any identifiable or identified patient information. This information will be handled with the same privacy and confidentiality measures as discussed below in Point 10. Consent for the use of project documentation will be documented separately with a comprehensive documented list of the documentation supplied. Any documentation supplied during or after team member interviews will be reported to the organisation contact person before use by the researcher.

8. What are the possible disadvantages and risks of taking part?

There are minimal risks attached to this study. This study has been accepted as low-risk following a review by Massey University (Ethics Notification Number: 4000018920) and approved by your DHB locality ethics committee. A possible disadvantage for your organisation is the staff time to participate in the interview.

9. What are the possible benefits of taking part?

It is hoped that this work will have a beneficial impact on how quality improvement is carried out in primary care. A summary of the results will be shared with participants to inform their professional work. If you request it, I will return to present the findings to your organisation and/or the improvement project team. This is a strength-based study, looking at the factors contributing to success, and it will be these factors that will be reported.

10. Will my taking part in this project be kept confidential?

All the information that we collect about you during the research will be kept strictly confidential. Participants will not be able to be identified, or identifiable in any reports or publications. Your organisation will also not be identified or identifiable. Any data collected will be stored electronically in a form protected by passwords and other relevant security processes and technologies. These anonymised data will not allow any individuals or their organisations to be identified or identifiable. For example, if demographic information of those with minority roles or ethnicity in an organisation would identify them, this information will not be used.

11. Will I be recorded, and how will the recorded media be used?

If you consent, interviews will be recorded to ensure accuracy of the data collected. This recording will be transcribed, coded, and anonymised. Once the transcription is complete the recording will be destroyed.

12. What will happen to the results of the research project?

The research results will be part of my PhD thesis that will be submitted to Massey University. Publication of the research results will be sought in relevant journals as well as conference presentations. Interview participants will not be identified in any report or publication. Your organisation will not be identified in any report or publication.

13. What if I have concerns about this research?

If you have any concerns about the project in the first instance you should contact me as the principal researcher. However, you can contact one of my supervisors if you have any concerns or complaints that you would prefer to address with them. Contact details are provided below.

14. Who is organising the research?

This research is to fulfil the requirements for the principal researchers PhD studies at Massey University. The research team and their contact details are shown in the table below.

Principle researcher: Jane Cullen PhD Candidate Massey University E: Jane.cullen@hqsc.govt.nz T: 021-973470	Principle supervisor: Prof. Paul Childerhouse Director of Quality and Supply Chain Management Massey University E: P.H.J.Childerhouse@massey.ac.nz T: (06) 9516757
Co-supervisor: Dr. Nihal Jayamaha Senior Lecturer School of Engineering and Advanced Technology Massey University E: N.P.Jayamaha@massey.ac.nz T: +6463569099	Co-supervisor: Assoc. Prof. Dr. Lynn McBain Head of Department Department of Primary Health Care & General Practice University of Otago E: lynn.mcbain@otago.ac.nz T: (04) 385 5995

Participating Organisation Consent

Organisational consent to take part in the determinants of effective quality improvement in primary care research:

I..... (name)..... (position) on behalf of (organisation) voluntarily agree for our organisation to participate in this research study.

I have had sufficient time to read, understand and consider the Participant Information Sheet. I understand the purpose of the study and have been able to ask questions about the study. I understand that our organisation can still refuse to answer any question or withdraw at any time. If our organisation chooses to withdraw at this point, any data collected will be deleted.

Please tick to indicate you consent to the following *(Add or delete as appropriate)*

I agree to the interviews being audio-recorded.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I understand that all information we provide for this study will be treated confidentially.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I know who to contact to seek further clarification and information about this study.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I wish to receive a summary of the results from the study.	Yes <input type="checkbox"/>	No <input type="checkbox"/>

My email is: _____

Signature of research participant:

Date:

Signature of researcher:

Date:

Individual participant information sheet

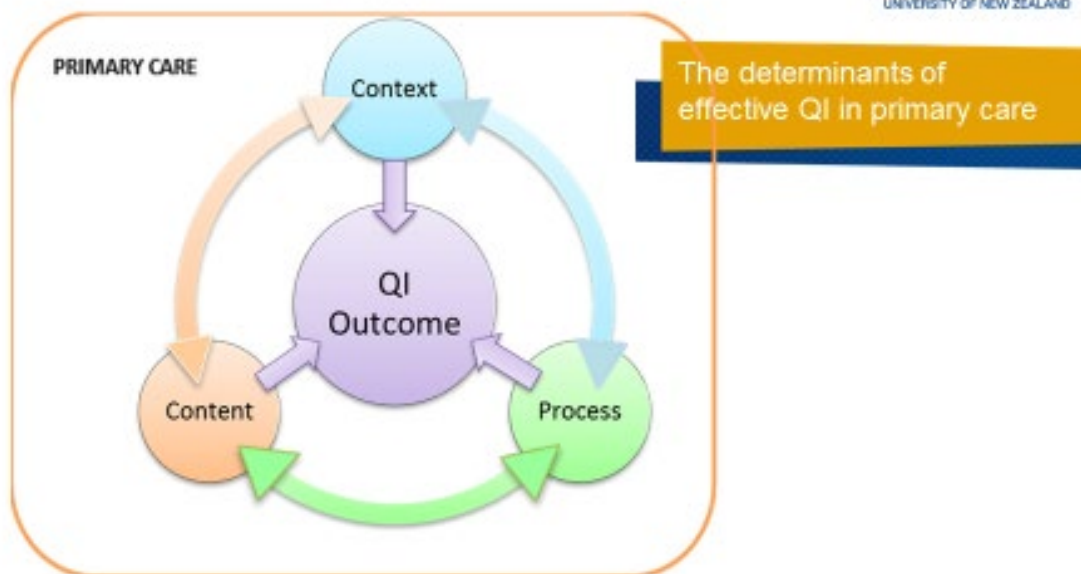
The determinants of effective quality improvement in primary care

Tēna koe, you are invited to take part in a study on the determinants of effective quality improvement in primary care. Whether you take part is your choice. If you don't want to take part, you don't have to give a reason.

The Participant Information Sheet attached will help you decide if you'd like to take part. It sets out why I am doing the study, what your participation would involve. I will go through this information with you and answer any questions you may have. You do not have to decide today whether you will participate in this study.

If you agree to take part in this study, you will be asked to sign the Consent Form below. You will be given a copy of both the Participant Information Sheet and the Consent Form to keep.

This document is 6 pages long, including the Consent Form. Please make sure you have read and understood all the pages.



Participant Information sheet

The determinants of effective quality improvement in primary care

1. Invitation

You are being invited to take part in this research project. Before you decide to do so, it is important you understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Ask me if there is anything that is not clear or if you would like more information. Take time to decide whether you wish to take part. Thank you for reading this.

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3. Why have I been chosen?

A number of primary care organisations that are representative of characteristics of New Zealand primary care and have undertaken improvement work have been asked to take part in this research. You have been chosen for an interview because of your involvement in this improvement work.

4. Do I have to take part?

It is up to you to decide whether to take part. If you do decide to take part, you will be able to keep a copy of this information sheet and the signed consent form. You can still withdraw at any time up until two weeks after the interview. You do not have to give a reason.

5. What do I have to do?

You are being asked to participate in an interview of approximately one hour. You may be asked to agree to a follow-up interview if there are any further questions.

Team members will also be asked to complete a questionnaire together called the Model for Understanding Success in Quality (MUSIQ).

If the practice improvement project team consents to this, observation of a team meeting to learn more about team norms and relationships may occur on another visit. This will be consented separately following discussions with the team.

6. What type of information will be sought from me and why is the collection of this information relevant for achieving the research project's objectives?

The interview will explore knowledge of the factors that influenced the success of your improvement project. Your views and experience are the main sources of data for this project. The information collected will be sent back to you to check its accuracy before it is used.

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You will be asked to provide documentation about the organisation and the improvement project, such as project planning documentation, meeting minutes and improvement process and outcome data. This information must not contain any identifiable or identified patient information. This information will be handled with the same privacy and confidentiality measures as discussed below in Point 10. Consent for the use of project documentation will be documented separately with a comprehensive documented list of the documentation supplied. Any documentation supplied during or after team member interviews will be reported to the organisation contact person before use by the researcher.

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It is hoped that this work will have a beneficial impact on how quality improvement is carried out in primary care. A summary of the results will be shared with participants to inform their professional work. If you request it, I will return to present the findings to your organisation and/or the improvement project team. This is a strength-based study, looking at the factors contributing to success, and it will be these factors that will be reported.

10. Will my taking part in this project be kept confidential?

All the information that we collect about you during the research will be kept strictly confidential. Participants will not be able to be identified, or identifiable in any reports or publications. Your organisation will also not be identified or identifiable. Any data collected will be stored electronically in a form protected by passwords and other relevant security processes and technologies. These anonymised data will not allow any individuals or their organisations to be identified or identifiable. For example, if demographic information of those with minority roles or ethnicity in an organisation would identify them, this information will not be used.

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This research is to fulfil the requirements for the principal researchers PhD studies at Massey University. The research team and their contact details are shown in the table below.

Principle researcher: Jane Cullen Quality Improvement Advisor Health Quality & Safety Commission E: Jane.cullen@hqsc.govt.nz T: 021-973470	Principle supervisor: Dr. Paul Childerhouse Director of Logistics and Supply Chain Management Massey University E: P.H.J.Childerhouse@massey.ac.nz T: (06) 9516757
Co-supervisor: Dr. Nihal Jayamaha Senior Lecturer School of Engineering and Advanced Technology Massey University E: N.P.Jayamaha@massey.ac.nz T: +6463569099	Co-supervisor: Dr. Lyn McBain Head of Department Department of Primary Health Care & General Practice University of Otago E: lynn.mcbain@otago.ac.nz T: (04) 385 5995

Consent to take part in research:

Individual consent to take part in the determinants of effective quality improvement in primary care research:

I..... voluntarily agree to participate in this research study.

I have had sufficient time to read, understand and consider the Participant Information Sheet. I understand the purpose of the study and have been able to ask questions about the study. I understand that I can still refuse to answer any question or withdraw at any time up until two weeks after the interview. If I choose to withdraw after the interview, my data will be deleted.

Please tick to indicate you consent to the following *(Add or delete as appropriate)*

I agree to my interview being audio-recorded.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I understand that all information I provide for this study will be treated confidentially.	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I know who to contact to seek further clarification and information about this study (contact details are in the information sheet).	Yes <input type="checkbox"/>	No <input type="checkbox"/>
I wish to receive a summary of the results from the study.	Yes <input type="checkbox"/>	No <input type="checkbox"/>

My email is: _____

- What is your role in this organisation?
- How long have you worked in this organisation?
- What was/is your role in this quality improvement project?

Signature of research participant:

Date:

Signature of researcher:

Date:

Appendix 3: Stage 2 survey introduction and consent

P.1 - Consent:

Survey: The determinants of successful improvement in primary care

Investing in quality improvement programmes that do not deliver the promised outcomes can lead to frustration and burnout. This survey seeks to learn from your practical experience of undertaking quality improvement in primary care and the factors that influence success. It is based on findings from case studies on quality improvement in New Zealand primary care.

The survey will between **5 - 10 minutes** to complete and is predominantly rating scale questions with opportunity for free comment at the end. It is also easy to complete on a mobile phone.

Ethics statement:

There are minimal risks attached to this study. This study has been accepted as low risk following peer review (Ethics Notification Number: 4000018920). The researcher(s) named in in this document are responsible for the ethical conduct of this research. If you have any concerns about the conduct of this research that you want to raise with someone other than the researcher(s), please contact the Massey University Ethics Committee: humanethics@massey.ac.nz

Anonymity

The anonymity of individual respondents and related organisations will be preserved, and results will be presented in an aggregated form only. If you have any questions or would like a copy of the (anonymised and aggregated) responses, please email Jane.Cullen3@uni.massey.ac.nz

What will happen to the results of the research project?

The research results will be part of the principal researcher's PhD thesis that will be submitted to Massey University. Publication of the research results will be sought in relevant journals as well as conference presentations. You or your organisation will not be identified in any report or publication.

Who is organising the research?

The research team and their contact details are shown below.

Principal researcher: Jane Cullen, Quality Improvement Adviser, Health Quality & Safety Commission.

E: Jane.Cullen3@uni.massey.ac.nz T: 021 973470

Principal supervisor: Dr. Paul Childerhouse, Director of Logistics and Supply Chain Management, Massey University.

E: P.H.J.Childerhouse@massey.ac.nz T: (06) 9516757

Co-supervisor: Dr. Nihal Jayamaha, Senior Lecturer School of Engineering and Advanced Technology, Massey University.

E: N.P.Jayamaha@massey.ac.nz T: +6463569099

Co-supervisor: Dr. Lynn McBain Head of Department, Department of Primary Health Care & General Practice, University of Otago.

E: lynn.mcbain@otago.ac.nz T: 027 2414082

P.2 - Survey questions:

Concept	Questions
Demographic questions	<p>1. Which categories does your organisation belong to? (Select all that apply)</p> <ul style="list-style-type: none"> • General practice • Health care home • Kaupapa Māori provider • Pacific provider • Primary Health Organisation (PHO) • Rural setting • Urban setting • Very low-cost access practice (VLCA) • Other (please specify) <p>2. Please select the approximate size of the enrolled population served by your organisation:</p> <ul style="list-style-type: none"> • Less than 2,000 • Between 2,000 to 4,000 inclusive • Between 4,001 to 6,500 inclusive • Greater than 6,500 <p>3. Which of the categories below best describes your main role:</p> <ul style="list-style-type: none"> • Administration staff • Allied health practitioner • Business manager/CE • General practitioner • General practitioner/business owner • Health worker • Nurse manager/lead • Nurse practitioner • Practice Nurse • Practice manager • Receptionist • Other, please describe

<p>Quadruple aim success</p>	<p>Consider a quality improvement project that you have been involved in and rate the level of success for each element of the quadruple aim</p> <p>4. Consider a quality improvement initiative that you participated in and rate the success of that initiative for each element of the quadruple aim of quality improvement as outlined from A to D below. This quality improvement initiative achieved the following level of improvement:</p> <p>A. Quality, safety and experience of care</p> <p>B. Population health and equity</p> <p>C. Value for health system resources</p> <p>D. Provider experience</p> <p>0) <i>Not applicable</i></p> <p>1) <i>No improvement</i></p> <p>2) <i>Marginal improvement</i></p> <p>3) <i>Moderate improvement</i></p> <p>4) <i>Good improvement</i></p> <p>5) <i>Excellent improvement</i></p>
<p>5. Considering your organisation at the time of your identified quality initiative, please rate your response to the following statements.</p> <p>All the questions below rated on the Likert scale of:</p> <p>0) <i>Don't know</i></p> <p>1) <i>Strongly disagree</i></p> <p>2) <i>Disagree</i></p> <p>3) <i>Neither agree nor disagree</i></p> <p>4) <i>Agree</i></p> <p>5) <i>Strongly agree</i></p>	
<p>Distributed leadership</p>	<p>a. This organisation encouraged staff input for making changes and improvements.</p> <p>b. This was a very hierarchical organization; decisions were made at the top with little input from those doing the work (R)</p> <p>c. The organisation defined success as teamwork and concern for people</p>
<p>Sensemaking</p>	<p>d. After trying something new, we took time to think about how it worked.</p> <p>e. We regularly took time to reflect on how we do things</p> <p>f. When we experience a problem in the organisation, we made a serious effort to figure out what is really going on.</p>

6. Continue thinking of the organisation at the time of your identified initiative to rate your response to the following statements.	
Learning climate	<ul style="list-style-type: none"> a. It was hard to get things to change in our organisation. (R) b. People at all levels of this organisation talked openly about what was and wasn't working. c. This organisation valued people who have different points of view.
Networked relationships	<ul style="list-style-type: none"> d. This organisation had relationships with other health and community organisations that enabled us to enhance and extend each other's work. e. Organisational relationships with other health and community organisations influenced the way this organisation's staff thought about and did their work. f. This organisation achieved extra outcomes for the organisation and its patients as a result of working in partnership with others.
QUALITATIVE Open questions (Free text)	<ul style="list-style-type: none"> a. Tell us more about the factors in your organisation that are important to the success of your quality improvement initiatives. b. Finally, do you have any comments about quality improvement, your initiative or your responses to this survey?

Chapter 2: Contextual antecedents of quality improvement: A comparative case study in rural, urban and Kaupapa Māori general practice

This chapter was published in the Journal of Primary Health Care, NZ (Cullen et al., 2022). This is the peer reviewed, open-access journal of the Royal New Zealand College of General Practitioners (RNZCGP) which publishes original research relevant to New Zealand, Australia, and Pacific nations.

This article describes the qualitative cross case analysis of the first three case study sites, a remote rural practice, an urban Kaupapa Māori VLCA practice and an urban practice in a large city. This article identified primary care antecedents from the context (inner and outer socio-technical setting), intervention and implementation process for QI. The sites strong commitment and connection to their community is clearly seen. This is underpinned by embedded whanaungatanga and manaakitanga in the Kaupapa Māori practice and this community commitment may be a unique feature in high-performing primary care organisations. Formal QI methods were not followed instead contextual strengths from practice relationships, distributed leadership, collaborative learning, and teamwork were utilised to drive improvement.

The ethics process followed is outlined in Chapter 1, however some specific tikanga processes were followed with the Kaupapa Māori practice which are explained here. Contacts were sought to provide a personal introduction which was followed up with onsite meetings to formally meet and discuss the research project. After this introduction to the practice management another meeting was set up to discuss the research with the community board where whanaungatanga and the research were discussed again before approval was gained for participation in the research. The offer was made to come back and present the findings to the board afterwards as a way of reciprocating for the gift of their time and this was implemented at a later stage. An organisational consent form was signed. After the board meeting, a day was arranged for staff interviews. Arrival onsite was arranged to precede morning karakia (prayer) so that I could participate, followed by whanaungatanga (introductions). I provided kai (food) for sharing as a koha (gift) in thanks for the gift of the participants knowledge and time.

Although the MUSIQ self-assessment tool was used in each case, due to the word-limit constraints of journal articles, only the qualitative data was presented in this article. The applicability of MUSIQ in primary care is discussed in Chapter Four. Some of the misalignment between MUSIQ and the primary care setting was already noticeable.

STATEMENT OF CONTRIBUTION DOCTORATE WITH PUBLICATIONS/MANUSCRIPTS

We, the candidate and the candidate's Primary Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of candidate:	Jane Cullen
Name/title of Primary Supervisor:	Paul Childerhouse
In which chapter is the manuscript /published work:	2
<p>Please select one of the following three options:</p> <p><input checked="" type="radio"/> The manuscript/published work is published or in press</p> <ul style="list-style-type: none"> • Please provide the full reference of the Research Output: Cullen, J., Childerhouse, P., & McBain, L. (2022). Contextual antecedents of quality improvement: a comparative case study in rural, urban and Kaupapa Mori general practice. <i>Journal of Primary Health Care</i>, 14(2), 179-186. <p><input type="radio"/> The manuscript is currently under review for publication – please indicate:</p> <ul style="list-style-type: none"> • The name of the journal: • The percentage of the manuscript/published work that was contributed by the candidate: 85.00 • Describe the contribution that the candidate has made to the manuscript/published work: Case study design, data collection and analysis, lit review and the initial draft. <p><input type="radio"/> It is intended that the manuscript will be published, but it has not yet been submitted to a journal</p>	
Candidate's Signature:	<p>Jane Cullen <small>Digitally signed by Jane Cullen Date: 2023.11.13 10:43:29 +13'00'</small></p> <p style="text-align: right; color: blue;">J Cullen</p>
Date:	13-Nov-2023
Primary Supervisor's Signature:	<p>Nihal Jayamaha <small>Digitally signed by Nihal Jayamaha Date: 2023.11.07 10:57:38 +13'00'</small></p>
Date:	7-Nov-2023

This form should appear at the end of each thesis chapter/section/appendix submitted as a manuscript/publication or collected as an appendix at the end of the thesis.

Contextual antecedents of quality improvement: A comparative case study in rural, urban and Kaupapa Māori general practice

AUTHORS:

1. Jane Cullen^A, Massey University (PhD student)
2. Prof. Paul Childerhouse^B, Royal Melbourne Institute of Technology
3. Assoc. Prof. Dr. Lynn Mc Bain^C, University of Otago

Abstract

Introduction:

The impact of contextual factors on primary healthcare quality improvement is significant. In-depth research is required to identify the key contextual factors that influence quality improvement initiatives to develop high-performing primary health care systems.

Aim:

This research seeks to answer two questions; what are the contextual factors influencing primary care improvement initiatives?; and how do contextual factors, the quality improvement initiative and the implementation process influence one another and the overall improvement outcomes?

Methods:

A multi-case study methodology was used to explore the complexities of the phenomena *in situ*. Three sites where successful quality improvement had occurred were selected by purposeful theoretical sampling to provide a sample of rural, urban and Kaupapa Māori general practice settings typical of the New Zealand environment. Semi-structured interviews were conducted with team members and triangulated with secondary data provided by the organisations.

Results:

The quality improvement topic and the approach taken were intrinsically linked to context. Sites reported success in achieving the desired outcomes benefitting the patients, practice and staff. Teams did not use formal improvement methods, instead relying on established relationships and elements of change management methods. The culture in all three cases was a large component of why and how these initiatives were successful.

Discussion:

Intrinsic motivation was generated by community connections and networks. This combined with a learning climate generated by distributed leadership and teamwork enabled success. Iterative

reflection and sensemaking processes were able to deliver quality improvement success in primary care without the use of formal improvement methods.

Keywords: case study, context, distributed leadership, general practice, implementation, learning climate, networks, quality improvement, reflection and sensemaking, relationships, teamwork.

WHAT GAP THIS FILLS:

What is already known:

The context surrounding improvement efforts contributes to the variation in improvement outcomes seen in many initiatives. Studies into factors influencing QI success have focussed on secondary care organisations and large-scale collaborative efforts.

What this study adds:

This research provides information on the contextual variation to quality improvement in primary care unique to Aotearoa New Zealand that will support a strengths-based approach to improvement.

Introduction

People are living longer with multiple chronic health conditions whilst healthcare costs are rising. Health systems increasingly look to primary care to achieve quality, patient-centred integrated care whilst improving the sustainability of the health system (Auraaen et al., 2018; Imison et al., 2017; OECD, 2017; World Health Organization, 2008). Definitions of healthcare quality vary depending on context and perspective (Goodwin et al., 2011; Seddon, 2006). Our definition is a New Zealand (NZ) adaption of the quadruple aim (Bodenheimer & Sinsky, 2014; Merry et al., 2017; Sikka et al., 2015) specifying value rather than cost, and using the NZ quality dimensions which use equity and access within the aim of improving individual quality, safety and experience of care (Ministry of Health, 2003; Seddon, 2006; Shuker et al., 2015) (see Table 1 below for the full definition).

Table 1. Definition of healthcare quality, the quadruple aim

Improved quality, safety, and experience of care for individuals	Improved health and equity for all populations
Includes improving one or more of: <ul style="list-style-type: none"> • The NZ dimensions of quality (Ministry of Health, 2003): Patient centredness (patient preferences, values and goal centred care), Safety (errors and harm), Access (to services and treatments), Equity (disparities), Effectiveness (provide evidence-based care) and Efficiency (productivity) • Patient experience of care 	<ul style="list-style-type: none"> • Improving amenable mortality and reducing the burden of chronic disease • Improving population health outcomes and equity for disadvantaged population groups such as Māori and Pacific peoples
Best value for public health system resources	Improved experience of providing care (Provider)
<ul style="list-style-type: none"> • Providing patient benefits without wasting resources • Reducing resource wastage 	<ul style="list-style-type: none"> • Provider experience of providing care • Improving wellbeing and reduced burnout

Healthcare interest in quality improvement (QI) has grown as achieving the aims outlined proves elusive (Braithwaite et al., 2020). Results from QI efforts have varied (Dixon-Woods et al., 2012; Reed et al., 2018) and interest in understanding the ‘black box’ of quality improvement has grown (Dixon-Woods et al., 2011; Ramaswamy et al., 2018). We use the Batalden (2007, p.2) definition of QI ‘as the combined and unceasing efforts of everyone—healthcare professionals, patients and their families, researchers, payers, planners and educators—to make the changes that will lead to better patient outcomes (health), better system performance (care) and better professional development (learning)’.

Understanding the factors that influence successful QI in primary care is critical to enable high-performing primary health care systems (Imison et al., 2017; OECD, 2017). Context contributes to the variation in improvement outcomes seen in many initiatives (Bate et al., 2015; Coles et al., 2017; Kaplan et al., 2012). However, information on the impact of contextual variation in primary care is limited (Auraaen et al., 2018; Brennan et al., 2012; Gosling et al., 2019). Definitions of context vary (Bate et al., 2015; Coles et al., 2017), and there is confusion about the extent, and how, context is interrelated with other elements of improvement efforts, the improvement intervention and implementation process (Bate et al., 2015; Coles et al., 2017; Reed et al., 2018).

The persistence of unsafe and variable healthcare and the unreliable impact of quality improvement interventions (QII) in healthcare has generated significant research seeking to increase QI success (Kaplan et al., 2013; Reed et al., 2018). This research has seen the development of the Consolidated Framework for Implementation Research (CFIR) (Damschroder et al., 2009) and the Model for Understanding Success in Quality (MUSIQ) (Kaplan et al., 2012). Culture, leadership, and teamwork are included in these frameworks as contextual factors (Damschroder et al., 2009; Harvey & Kitson, 2015; Kaplan et al., 2012).

Fig. 1 synthesises the current research into understanding the factors and interrelationships influencing QI. In this model 'process' is the implementation process, including improvement methodology and how this is facilitated (Bate et al., 2015; Brennan et al., 2012; Coles et al., 2017). The quality improvement intervention (QII) refers to the improvement topic, the planned changes, and their characteristics such as adaptability (Bate et al., 2015; Damschroder et al., 2009). Context factors are not part of the QI process or intervention but influence or surround the implementation effort (Bate et al., 2015; Coles et al., 2017; Damschroder et al., 2009).

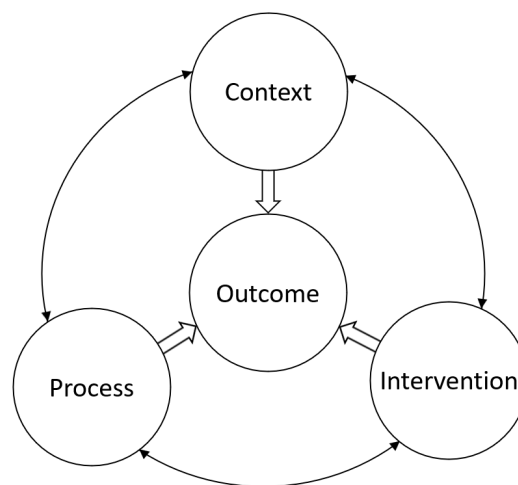


Fig.1. Primary care quality improvement

The bi-directional arrows in Fig. 1 represent the interrelationships between context, intervention, and process (Barson et al., 2017; Bate et al., 2015; Kringos et al., 2015). The QII may be a better fit in some contexts and with certain methods than others (Kringos et al., 2015). A successful QII needs to be simple to implement, show a relative advantage over the current state and generate support from the front-line (Dixon-Woods et al., 2012; Lau et al., 2016; Ramaswamy et al., 2018). Success is enhanced if the initiative is perceived as necessary and the planned changes as appropriate, acceptable, and adaptable to the local context (Dixon-Woods et al., 2012; Lau et al., 2016; Ramaswamy et al., 2018).

Most studies into factors influencing QI success have focussed on secondary care organisations and large-scale collaborative efforts (Fulop & Robert, 2013; Imison et al., 2017). Primary care services, such as general practice, present different challenges to change as they vary considerably, are smaller and more numerous than secondary care services (Auraaen et al., 2018; Crabtree et al., 2011; Lau et al., 2016). Addressing this gap prompts the following questions:

1. What are the contextual elements influencing primary care improvement initiatives?
2. How do contextual factors (inner and outer setting), quality improvement interventions (topic and planned changes) and the implementation process, influence each other and the improvement outcomes in primary care?

Methods

A qualitative multi-case study approach was used in conjunction with the CFIR (Damschroder et al., 2009) to guide data collection and analysis. The qualitative case study approach was chosen to provide an in-depth view of primary care QI with the researcher as the primary instrument of data collection (Creswell, 2014). The CFIR was included because of its fit with quality improvement theory and generic conceptual applicability (Ilott et al., 2013; Keith et al., 2017).

The five major domains of CFIR are illustrated in Fig. 2; these are well aligned with the constructs in the primary care improvement model shown in Fig. 1. The study results are reported using the five CFIR domains with the addition of project outcome.

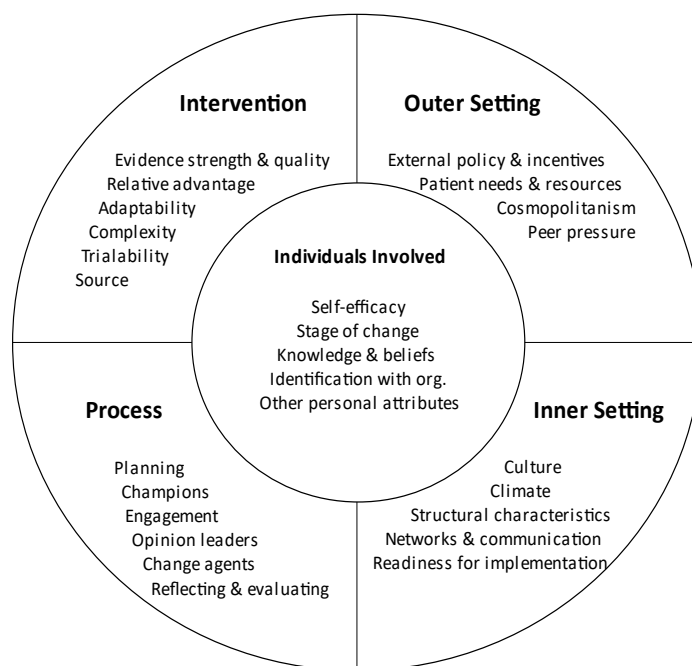


Fig.2. Consolidated Framework for Implementation Research (CFIR) Domains

Sites were selected by purposeful theoretical sampling to include a mix of general practice settings and improvement topics typical of the New Zealand general practice environment; specifically, a rural, urban and Kaupapa Māori practice. Site characteristics and their improvement topics are outlined in Table 2. Suitable sites were identified via Primary Health Organisation (PHO) referrals of practices who had completed a successful QII to provide a view of ‘what worked’.

Qualitative data were collected from the teams through in-person, semi-structured interviews between October 2018 and January 2019. The practice provided written consent for participation in the research, identified the QII and interviewees. A semi structured interview guide was developed based on our model for QI and the ‘Interview Guide Tool’ available on the CFIR website: www.cfirguide.org. All interviews were recorded, and the data were transcribed and sent back to the participants for verification. NVivo qualitative analysis software (QSR International) was used to draw out the themes both intuitively and regarding the CFIR constructs. Themes were revisited and revised in an iterative process throughout the writing and reflecting process.

Specific care was taken with the data from the Kaupapa Māori provider as our worldview is that of the pākehā, (non-Māori) New Zealander. Even though we strive to be respectful of a Māori worldview, we do not have the lived experience and embedded cultural understanding of being Māori. Feedback from the case study organisation on interpretation of the information reported was vital to ensure correct representation of Māori concepts and perspectives. The draft report was provided to the

senior leadership team at the practice for feedback, minor errors were addressed, and a follow-up meeting was held with the community board to discuss the results and conclusions.

Ethics

This study was deemed low-risk and not requiring a full ethical review (Massey University Ethics Notification No. 4000018920).

Results

The case characteristics, staff interviewees, the intervention and the reason for undertaking are outlined in Table 2. Case 2 and 3 are based in urban settings, and Case 1 in a remote rural setting.

Representative quotes illustrating the common themes and the project outcomes for each Case are provided in Supplementary Material S1. The quotes are grouped under themes which are a mix of CFIR categories and intuitive themes identified during the study.

The Cases reported successful QIIs in achieving the desired patient outcomes of improved access and experience, and in benefitting the practice and staff. Methods of evaluating success varied. Case 1 monitored a patient list and undertook an internal evaluation based on patient and staff feedback and performance against this patient list. Feedback from patients and staff were the key evaluation sources for the other two Cases. Case 2 also collected time series data related to the aim of their project (see Supplementary Material S2). Case 3 manually collected specific quantitative data at times to answer specific queries.

Table 2. Quality improvement intervention topic and site characteristics

	Site 1 - Rural	Site 2 – Kaupapa Māori	Site 3 - Urban
Organisation	PHO & Very Low-Cost Access (VLCA) practice that is co-located with Community Mental Health (CMH) and other health services	A Kaupapa Māori VLCA general practice with approximately 56% of the enrolled population identifying as Māori and 65% from low-socio-economic areas	An integrated family health service. The enrolled population is approximately 80% European
Setting	Remote rural integrated family health centre in the South Island	An urban practice within a satellite town of a large North Island city	An urban practice sited within a large South Island city

	Site 1 - Rural	Site 2 – Kaupapa Māori	Site 3 - Urban
Practice size (the largest in NZ, 100th percentile, has approximately 29,000 patients)	Approximately 6,000 enrolled patients 76 th percentile	Approximately 3000 enrolled patients 40 th percentile	Approximately 6,000 enrolled patients 76 th percentile
FTE (full time equivalent) unless otherwise stated	FTE was variable, 7 general practitioners employed over varying hours	General practitioner 2.5, Nurse practitioner 1, Practice nursing 2, Community health team 3.6 FTE including 1.5 FTE nursing	General practitioner 5, Practice nursing 2.35
Interview participants Those in italics not directly involved in QII	PHO clinical director, CMH district manager, General practice, (mental health) liaison nurse, Practice nurse, General practitioner	Medical director, Practice manager, Nurse lead, Administration team lead, Community health worker/receptionist, <i>Community health worker, Practices nurses (2)</i>	GP director, District Health Board (DHB) service integration facilitator, <i>PHO project manager</i> , Practice nurse, Receptionist
QII	Physical health for patients with a Mental Health diagnosis, implemented in 2017 with ongoing work	Telephone Triage project (Health Care Home Model), implemented in 2014 but continued to adapt and refine	Patient prioritisation at reception, implemented in 2017
Why this QII was undertaken	Mental health review in the district identified the need and awareness of the international 'Equally Well' movement	To be able to provide patients same-day appointments, improve access, continuity of care and reduce pressure on staff in the mornings, alignment with core values and kaupapa	The team were experiencing pressure at reception and identified a need to improve the process at reception for patients wanting an appointment

Teams chose improvement topics based on their context; an identified patient need that aligned with their values. The QII topics shown in Table 2 have similarities as they are all about access, one of the quality dimensions. Case 1 aimed to improve physical health services for mental health consumers, Case 2 implemented Doctor telephone triage and Case 3 a template-based receptionist prioritisation

process. Staff from each case commented on their focus on what was best for the patient. There was tension for change and a perceived relative advantage for patients, staff, and the practice. The choice of QII, capacity, capability, and values of the inner setting drove team implementation. In Case 2 and 3, the teams had researched their initiatives. In all cases the ability to adapt the QII to fit their context was key.

No formal improvement methodology or patient co-design was used in these QIIs, although elements of other change methods were used based on the experience of team leaders. Limitations were noted in the ability to collect quantitative data which often required manual collection. Case 2 de-identified data are shown in Supplementary Material S2. Informal problem-solving approaches of testing ideas, reviewing, and making rapid changes from feedback were key. Qualitative patient and staff feedback, team discussions, reflection and sensemaking were used to plan and review actions in an iterative process.

All the Cases have a network of relationships with other health organisations, providers and community organisations locally that includes their PHOs and DHBs. In Case 1, the practice is owned by the PHO, whilst in Case 2 and 3 members of the practice team have governance roles with their PHO. These close relationships also meant that the practices were aware of new initiatives and reports that would have an impact on them such as the Health Care Home model and the national Equally Well movement for patients with mental health diagnoses. This provided evidence in support of the QII and the need for change.

The 'patients' needs and resources' is an 'outer setting' construct in the CFIR model,²⁴ but here the boundaries overlapped with the inner setting. This was noted in Case 1, and particularly in Case 2 where the needs and wellbeing of the community is deeply embedded in the culture of the organisation.

All of the team members in each Case identified a strong team culture with respect, loyalty and high regard for each other and their relationships. In Case 1, this was strengthened by the remote rural location and in Case 3, it was based on relationships and respect built over time. Case 2 culture founded in Māori kaupapa values, particularly whanaungatanga, (defined by the practice as relationships, kinship, and connections), was commented on by all participants.

All Cases describe a continuous improvement culture with many improvement efforts. The quotes show a learning climate that supports a culture of innovation and continuous improvement. A psychologically safe learning climate where staff feel valued and listened to was present to varying degrees.

All teams had very capable members and leaders with several comments about a ‘*can-do*’ attitude. Key staff with strong internal and external relationships levered these to learn, share, and engage support. Staff shared leadership roles for the project in varying ways and at varying times in the projects in a combination of roles including implementation leaders, relationship builders and carrying out necessary tasks.

Discussion

The findings are synthesised into a revised model depicting the factors influencing primary care QI (Fig. 3). The model shows overlapping domains due to their interrelatedness. These relationships are described in Supplementary Material S3. The cross-case comparison in Table 3, highlights the relative strength of the identified themes.

The QIIs were strongly connected to the context in all three cases. The teams perceived a fluid, complex relationship between inner and outer settings rather than a strong boundary. The QII was chosen to address a pressing patient need with clear benefits for patients and staff, creating motivation and a shared purpose.

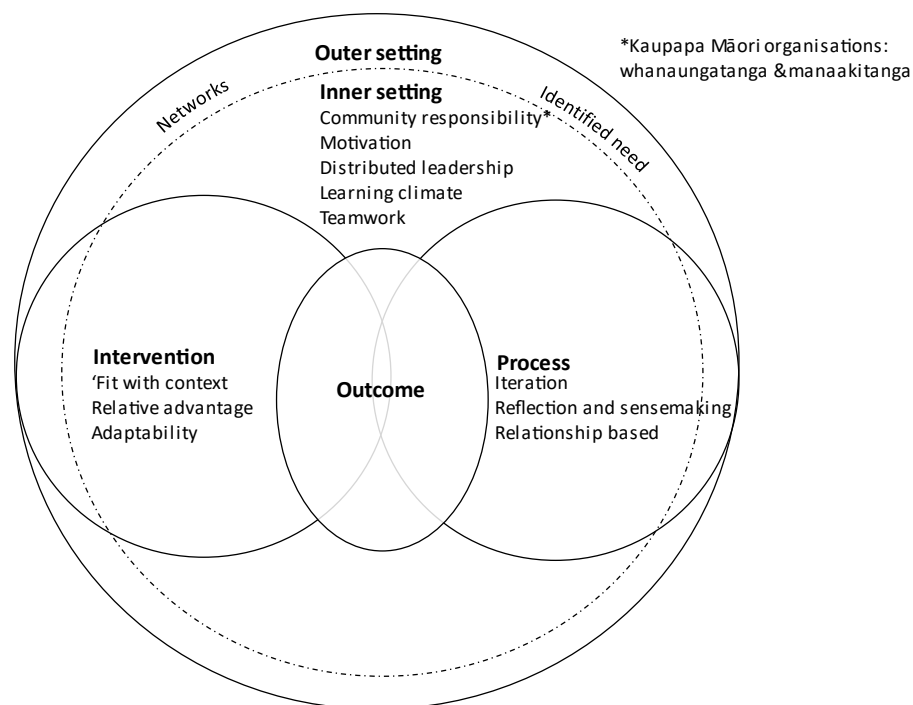


Fig.3. Revised model of quality improvement in primary care

The evaluation of QII impact in healthcare is problematic due to the combination of multi-factorial interventions, complex dynamic settings, and limitations in data (Barry et al., 2018; Shah, 2019; Willett et al., 2021). As noted by one participant, ‘*The data is limited in general practice, it is strong around things that are paid for and variable around the rest.*’ These teams are embedded within the systems

they are improving, and staff and patient experience narratives are a reasonable assessment of the value of their QIIs for their use and this study, despite the value of valid time-series data to support learning from improvement (Barry et al., 2018; Shah, 2019; Willett et al., 2021). The QII was related to outer settings through community and networks with local and national organisations providing support and expertise. Organisational leaders and staff were confident in the relative advantage of the QII and their ability to adapt the QII to their setting. The strong community and network relationships of the practices meant they were able to both draw on and provide resources across these networks. Different priorities of the factors identified in Fig. 3 for each case and relative to each other are shown in Table 3. The identified factors are present in all cases, but some factors were more critical across the cases. The weighting given to these factors was based on the frequency and passion associated with the participants' comments.

Table 3. Comparison of factor strength between the three cases

Model domains		Factors	Case 1	Case 2	Case 3
Context	Outer setting	Networks	■	■	■
		Community connection	■	■	■
		Identified need	■	■	■
	Inner setting	Motivation	■	■	■
		Distributed leadership	■	■	■
		Learning climate	■	■	■
		Teamwork	■	■	■
Intervention	Fit with context	■	■	■	
	Relative advantage	■	■	■	
	Adaptability	■	■	■	
Process	Iteration	■	■	■	
	Reflection and sensemaking	■	■	■	
	Relationship based	■	■	■	

Necessary, ■ Important, ■ Fundamental.

Context is sometimes referred to as the 'why' of a QII as it provides the reason the initiative is commenced (Bate et al., 2015). The strong sense of responsibility for and connection to their patients and community provided motivation to pursue and sustain the improvement. This was fundamental in the rural Case and in Case 2 where it was embedded in the practice by the deep cultural connection of manaakitanga and whanaungatanga that provided motivation for the improvement and how it was

carried out. These values are not able to be completely described through a western world view; they are inseparable from who they are as an organisation. A sense of community connection and responsibility is not something that has been identified in secondary care improvement studies but has been found in high-performing Indigenous primary care services (Larkins et al., 2019) and may be a factor found in other high-performing primary care providers.

Despite the lack of formal improvement methodology in any of these cases, there were common practices followed by all three teams that will be useful for primary care teams with or without formal QI expertise. All the QIIs were based on research into the topic that showed relative advantage in the QII. Implementation was supported by regular team meetings and an engaged team that exhibited agency. An iterative learning process was followed with feedback consisting of staff and patient feedback and data where available. Regular communication and this iterative process of learning were key elements of the process followed by the teams.

Specific individual champions were not identified, instead there were several champions and a cross-over with other CFIR constructs of 'opinion leaders' and 'implementation leaders' (Ilott et al., 2013). We found different types of leadership behaviours shared amongst the team. Every person played a role, depending on what was needed at the time, demonstrating distributed leadership that relied on relationships and influence rather than a specific champion. This finding contrasts with secondary care studies (Clay-Williams et al., 2014), but is similar to the findings of QII research in smaller primary care organisations (Donahue et al., 2013; Pariser et al., 2016) and that of Ilott *et al* (2013).

The learning climate varied amongst the teams in subtle ways, with Case 2 being particularly time poor and Case 1 involved several members working together for the first time. However, they all felt psychologically safe to try new things and reflect and evaluate as equal partners. All team members individually and collectively exhibited 'agency' in their "*can-do*" attitudes to improvement. Agency is the ability to make choices and to act with purpose when faced with uncertainty or difficulties (Hilton & Anderson, 2018; Vestergaard et al., 2020) Although the initiator of the QII may be the first person to display agency, every team member demonstrated agency and contributed to the successful outcome.

The teams learnt their way towards successful outcomes through collaboration, iterations of testing ideas, natural sensemaking narratives and conversations, learning and perseverance. It was these factors, the relationships, communication, learning climate and the team culture that brought about improvement. These human centred and relationship-based processes are vital to the holistic approaches required in complex healthcare systems (Braithwaite et al., 2017).

Limitations

Sites visits and interviews took place between October 2018 and January 2019 and some of the QIIs were carried earlier. All the teams still work on their QIIs and felt confident that the details were still fresh in their minds. However, time may have altered their recollection of events. The reliance on mainly subjective assessments of QII success is a limitation in this study which was also reported in the development of the MUSIQ assessment tool (Kaplan et al., 2013). All cases were contacted through PHOs, potentially skewing the sample. This comparison study only considers three cases and primary care services, but primary care services are many and varied. Further research such as a larger survey is required to assess the wider applicability of these findings.

Conclusion

The findings support the importance of distributed leadership, teamwork and an iterative approach involving reflection, sensemaking and adaptation (Crabtree et al., 2020; Crabtree et al., 2011; Hilton & Anderson, 2018) when conducting QI in primary care. It was the strength of practice relationships, collaborative learning, commitment to change, perseverance and distributed leadership that helped teams to navigate their way to success. The underpinning values of the organisations, their connections and commitment to their community were core motivating factors. This community commitment has not been reported in the secondary care literature and may be a unique factor found in high-performing primary care practices.

The teams evaluated progress to test and refine their ideas iteratively to achieve the desired outcome without the use of formal improvement methods. This does not necessarily mean that formal improvement methods would not have been useful, but here, they were not essential for success. The successful outcomes were driven by the interrelationships between the QII, the process and context as the process of change, and the QII all arose from and were connected to context. This suggests that when there are strong community and network connections for knowledge and support, within a setting of a learning climate, distributed leadership, teamwork, and time is found for reflection and sensemaking, a lack of formal improvement methods can be overcome. It is also possible that the fundamental principles that underpin improvement methods are the enabling capabilities rather than specific tools and techniques.

Data availability. Deidentified interview transcripts are available on request from the lead author.

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Author affiliations

^A Massey University, Palmerston North, New Zealand

^B Department of Supply Chain Management, College of Business and Law, RMIT, Melbourne, Australia.

^C Department of Primary Health Care and General Practice, University of Otago, Wellington, New Zealand

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Supplementary S1: Table of representative quotes

Supplementary S1. Table of representative quotes

Factor	Case 1	Case 2	Case 3
Project Aims	To improve the physical outcomes and to try and integrate physical and mental health care.	To give patients the availability of an appointment on the day. To alleviate the pressure of phones, to alleviate the pressure of patients walking in.	To develop some consistent practices of how we manage prioritisation To be able to improve our service for our patients in terms of them having ready access, that it is patient focused. To stop overloading our doctors and nurses
Outcomes	I just think the whole thing is one massive team effort and success” and GPs and members of our (CMH) team are communicating more frequently and regularly about joint clients. Just to emphasise the success of the programme [...] now we are seeing them nearly every month and they are getting their health needs met.	There are results that everyone can see, and it has made everyone’s jobs easier. So, it added value and one of our core components was to increase access, so it aligned with all those values.	It has improved the patient journey so to speak, but also, I think it has improved staff wellbeing and morale and confidence as well
Intervention			
Fit with context The intervention must be able to be implemented within existing or available capability and capacity and aligned to organisational values. This is collectively labelled ‘fit with context’ in the model.	The PHO have been good, hugely supportive. And if we needed anything, they were there and they certainly funded the programme. And most importantly, the appointments, were free to the patient.	we decided that we would start using a GP along the same lines as the Health Care Home was rolling out we had to make a change and we had no money to do it, so we had to do it within resources.	This whole project is part of our IFHS, that was where we saw the gap and part of our IFHS She had identified some issues, when having meetings with the receptionist and the nurses, some sort of gap, was the feeling. So, she thought she would have a look at this, and she realised that there was a system-wide, [DHB]-wide need for these sorts of things. And we are all big on passing that sort of thing on, so we thought, let’s do it.

<p>Relative advantage</p> <p>Stakeholders' perception of the advantage of implementing the intervention versus an alternative solution (24).</p>	<p>We had known this for years and we had worked with private practice to try and improve that ourselves without this project and failed dismally.</p> <p>But when [the PHO Clinical Manager] came and said that there was funding available, we didn't need any persuading whatsoever, because it was an opportunity to get some of our clients some good physical health care at last</p>	<p>It has increased access to those patients who really need it.</p> <p>Well, more that we couldn't continue the way that we were</p> <p>we had to make a change and we had no money to do it, so we had to do it within resources.</p> <p>So, then just prior to taking on the Health Care Home, I think it was in 2014, we decided that we would start using a GP along the same lines as the HCH was rolling out. And the reason that we did that was because one of our clinicians was part of the HCH panel and he knew that it was coming up. He was getting us ready for that.</p>	<p>It gave us a definite route, whereas before we were all on different pages.</p> <p>[the service integration facilitator] really led this. She said we could make sure that the person had a far more efficient journey if we did some triaging earlier on in the process and the West Coast and rural Australia do this, we don't need to reinvent it.</p> <p>They paid for us to do it. There was a lot of time and a lot of money put into it, it was prioritised.</p>
<p>Adaptability</p> <p>The degree to which an intervention can be adapted, tailored, refined, or reinvented to meet local needs (24).</p>	<p>there were lots of discussions about how best to do that and in the end, we decided that we just had to choose something and see how it went and then adjust it.</p>	<p>I think we did spread it out a little bit, we did put the time out a little bit. And we gave [the medical director] more acute appointments so that he could have a little bit more leeway to put people in.</p> <p>We started off with just going to open it up from 8:30 till 12. [...] So, we then had to close down that section [...]. So, now we have managed to look again and close off that time that he has got, an hour a day for him to ring and book them out.</p>	<p>This is probably draft number 4. And it is not until you use it that you realise [about the different scenarios] so we defined and refined it several times before we got to where we are now.</p>
<p>Context – outer setting</p>			
<p>Networks</p> <p>Cosmopolitanism - The degree to which an organization is networked with other external organizations (24).</p>	<p>I'm a DHB employee, employed by mental health, sitting in a medical practice that is actually run by the DHB.</p> <p>And the advantage of choosing [the practice] was that because you've got [the Integrated Family Health Service] and you've got community mental health, [the] medical service and the ward,</p>	<p>And later when it became part of the HCH, that guiding coalition became the HCH project and the PHO and DHB oversight of that as well.</p> <p>We are quite involved in [the PHO]. [The Nurse Lead] and I are on the Board of [the PHO] and [the Practice Manager] is involved in a number of Committee's at the LCA Council and also part of</p>	<p>my relationship with the team at [the] Medical Centre is based on my role being funded by the District Health Board.</p> <p>I remember, we had a huge roomful of people which included not only all of [this practice] but the pharmacist close by and physiotherapist and lots of others as well.</p>

	everything all under the one roof. So the interrelationships were easier and its one general practice owned by the DHB.	the Māori Development Committee. So, it's not really suppliers, but networking.	they have been in contact with us [the PHO] again because we interact with them quite a bit So, this practice has moved beyond their own teamworking to how does this team nest within the other teams that influence their patients care, like the district nurses, the pharmacies, the allied health, the social workers and so on.
Patient need The patient needs, their priority and the barriers and facilitators to meet those needs.	We knew that funding was not the only barrier, however, because in the past part of our own initiatives had been to pay for people to go to the GP out of mental health funds, when we saw that there was a desperate need for someone to have some medical attention.	And everything therefore that gets done has to be done with reference to what the original aims of the organisation was and the aim to provide healthcare to the Māori community but also to those with high needs in the community.	Our philosophy is always, 'What is best for the patient?' ' So, if you think about that, we are all patients ourselves, so we sometimes think; How would I like it, if I had to deal with this. I wouldn't want to go through 3 people, I would just want to go to the right person and deal with it.
Context – inner setting			
Community connection	I think that we are unique up here, because we are quite removed. Because we are a small area and it is a small rural community there is a specific issue just for the community. I couldn't believe how many patients there were who had significant mental health issues and a lot of it is socio-economic derived. A lot of drug and alcohol issues, so there was a huge need there.	So, for me personally, and how I work is our kaupapa. So, whanaungatanga is my biggest keyword here. So, that's embracing family. It's not just the one thing that they walk in that door for, there is a huge amount of things that just, that are just kind of behind that or are the next thing after that. It's just a big part of me. Address it all, or else they are just going to keep coming back. But a lot of these clients don't have whānau, so we feel like we have to fill that gap, so they can get the help and support that they need to be able to live a healthier happier live. Whānau definitely and in the context that it's not just family, you are part of the [practice] whanau.	we wanted to be able to improve our service for our patients in terms of them having ready access, that it is patient focused and that they have timely access to us. We were trying to make it the best practice that we could for the patient.

<p>Motivation</p> <p>The desire to expend effort to affect change.</p>	<p>That is been a push from the DHB, [...] PHO around mental health care. There is a lot of research out there showing that these people out there with mental health conditions are not getting physical health needs met, dying up to 25 years younger. There was a mental health review that happened [in our district] several years ago and there was a mental health workstream that was formed which had fallen over but is reinstated now.</p> <p>We had known this for years and we had worked with private practice to try and improve that ourselves without this project and failed dismally. So, the timing was right with the focus that the Ministry of health were putting on the Equally Well initiatives. The timing came at the right time for us to take advantage of the PHOs very kind offer to fund it.</p> <p>So, I think it is just really rewarding too as a team to feel that you are really doing something for the most vulnerable and patients who need more care.</p>	<p>Because there was a need. The need was that we were aware that our most needy patients were not able to access care in a timely manner.</p> <p>There was an urgent need, that is clear enough.</p> <p>to try and stop our overload in the mornings. It was part of Health Care homes (HCH) but that was one of the improvements that was because mornings here were horrendous.</p>	<p>So, internally they wanted to see better use made of the skill mix in the team members and ensure that what resources were available were being used most efficiently and cost effectively so that people enjoyed coming to work and didn't get burnt out and patients had a good experience.</p> <p>At the time, with our IFHS we had some improvements over the years and we realised that there was a gap there. We were finding that we needed to work out within the team how we were triaging or prioritising our patients which affected our acute slots, or our on-the-day appointments.</p>
<p>Distributed leadership</p> <p>Sharing of generic leadership tasks to influence resource availability, decision making and goal setting within an organizational perspective. (46)</p>	<p>And the nice thing about [the IFHS], what I'll speak to, is that its non-hierarchical</p> <p>[The Clinical Manager] at the PHO and [...], the mental health GP liaison nurse, myself as the registered nurse here at the practice and from Mental Health, I had a lot of contact with [...], the nurse manager of community mental health.</p>	<p>[the medical director] and [the practice manager]and [nurse lead]. Those 3 managers.</p> <p>Well, I think everybody is key. I mean, ... The doctors, [the Practice Manager] obviously had to be supportive of the changes and [Administration Team Leader] had to be supportive of the changes to templates and things like that, so I think it was a whole team thing.</p>	<p>The whole reception team, all of the nurses, [interviewed GP], and one of the associates [non-owner GP].</p> <p>Everybody is involved in the change in here, which is good. But [another GP at the practice] and I were the doctors who went to the workshops because they were after work and I think some or most of the nurses and the whole the reception team. Which I think was really important because they are the ones who are really at the front-line of this process.</p>

<p>Learning climate</p> <p>A climate in which:</p> <p>a) leaders express their own fallibility and need for team members' assistance and input;</p> <p>b) team members feel that they are essential, valued, and knowledgeable partners in the change process;</p> <p>c) individuals feel psychologically safe to try new methods; and</p> <p>d) there is sufficient time and space for reflective thinking and evaluation (24).</p>	<p>Our team, I would like to think that we are quite innovative and over the years we have been a team that will try new things.</p> <p>They were keen. My manager and clinical director were all keen and very supportive. And it was just like, yep, do whatever you need to do to work in this way.</p> <p>No, we were very lucky with us both being able to give every day to it, it was amazing, it really was. And we were fully supported to do that. So there was never any questions of there not being any resources.</p>	<p>we are always trying to create new ways of doing things to be able to improve the practice.</p> <p>I think that we are highly motivated, we are early adopters. I think that comes from the leadership as well, because no-one is left alone. I think that the workers see that we are actually in there 'boots and all'.</p>	<p>We just constantly want to improve things. But our way of improving is also hopefully improving".</p> <p>The employers are always listening. [...] So, it is that kind of learning as you go".</p> <p>But it was facilitating that kind of open forum for people to say, what were they afraid of, how realistic were those fears and what was everybody prepared to do to support them?</p>
<p>Teamwork</p> <p>The combined efforts of a group of people working together to achieve a common goal.</p>	<p>We all work together really well as a team</p> <p>One person can't do it and make it happen, it has to be, and it is, a team.</p>	<p>Well, we are kaupapa Māori, and we work like that. And being a Māori too, it is quite natural for me to work like that. Helping out someone and working together as a team is natural.</p>	<p>we are lucky, we do have this team approach in everything we do.</p>
<p>Process</p>			
<p>Relationship based</p> <p>Where the process is based on the teamwork and relationships both within and external to the organisation.</p>	<p>[The practice nurse] and I would meet all the time.</p> <p>A lot of it was around relational stuff and trying to get that buy-in.</p>	<p>It was a discussion between the three managers about how we would look at this and then we took it to the rest of the staff and discussed it.</p> <p>And it is easy here because the staff here have that high level of trust and will work their hardest to do it.</p>	<p>the process is one like that, it's variable in length because the practices just cannot commit time regularly and it requires us to develop a relationship with these guy as we go backwards and forward to them.</p>

	<p>that was another thing I did to try and get it off the ground and engage, [...] was when we talked about it, was to talk to the whole team.</p> <p>The main driver at the start was the PHO, and [the GP Liaison nurse] and myself continued it on with PHO support right throughout the practice and taught other staff.</p>	<p>If you can identify and know your team really well, you know that there are going to be resistors. So, they're the first ones that I talk to. I have learnt over time because we all work so closely together that one you can head off by putting them on the decision panel and the other one you can head off by knowing the real cause of why we are doing this and once she is at one with that then she is fine.</p> <p>You can write all the plans in the world but unless you know your staff and can have a conversation with them and sometimes it is about those conversation in the corridor they are never going to come around.</p>	<p>I think a lot of what we do in the system is relationship based.</p>
<p>Reflection and sensemaking</p> <p>Reflection is the ongoing critical and developmental evaluation of action (Schon 1983), as well as stepping back from action to gain perspective (Stange 2009).</p> <p>Sensemaking involves pulling together disparate views to create a plausible understanding of the complexity around us and then testing that understanding to refine it or, if necessary, abandon it and start over (47).</p>	<p>We were talking about it continually.</p> <p>We have our own informal feedback, we have regular meetings where we discuss this project.</p> <p>So, it was getting them to actually do it and experience and come up with the ideas and come up with, and then just building on that.</p> <p>And once the project started it was just mainly just [the CMHT manager], myself, [practice nurse] and [GP Liaison Nurse] that just met and troubleshooted and caught up.</p>	<p>But we usually put out there what changes we would like to do and there is usually a discussion around that. And there is also a discussion around whether they work or don't work and how people feel about them.</p> <p>We collected that data and we looked at it.</p> <p>[The medical director] normally pulls them all off (charts). [...] He usually brings to our morning huddle or our MDT and discusses them.</p>	<p>Everybody noted anything that hadn't quite worked properly.</p> <p>We need to be looking at where are we at. Just continually reassessing really.</p> <p>We have weekly meetings. We bounce things around, so if things aren't going quite right, that's why we try to do weekly meetings because it is fresh in your brain. You can go, I don't think that is quite right and I do think we need to change that slightly.</p> <p>We met together and we natted things out and we did brainstorm, we did scenarios.</p>

<p>Iteration the repetition of a process</p>	<p>Which we have tweaked and tweaked and got pretty much right.</p>	<p>I think that we have tweaked it a bit as we have gone along. [...] We have slightly changed how we get people at the front desk. [...] So, there have been some slight tweaks, but nothing majorly changed. We have changed it, I suppose, in that [the Nurse Lead] now does it and [another GP] does it on Fridays, so we are extending the base of people doing it.</p>	<p>I think any quality improvement is not done once, you are continuously reviewing, you know that cycle about how is it going now, what have we let slip, what have we learned and how can we keep progressing this?</p> <p>people stay keen and active if you can see something. You know, identify it, problem-solve it, initiate something, review, initiate, review and then come to an improvement for everybody. That is more a nimbler way than getting really formal about it</p>
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Supplementary S2: Project measures

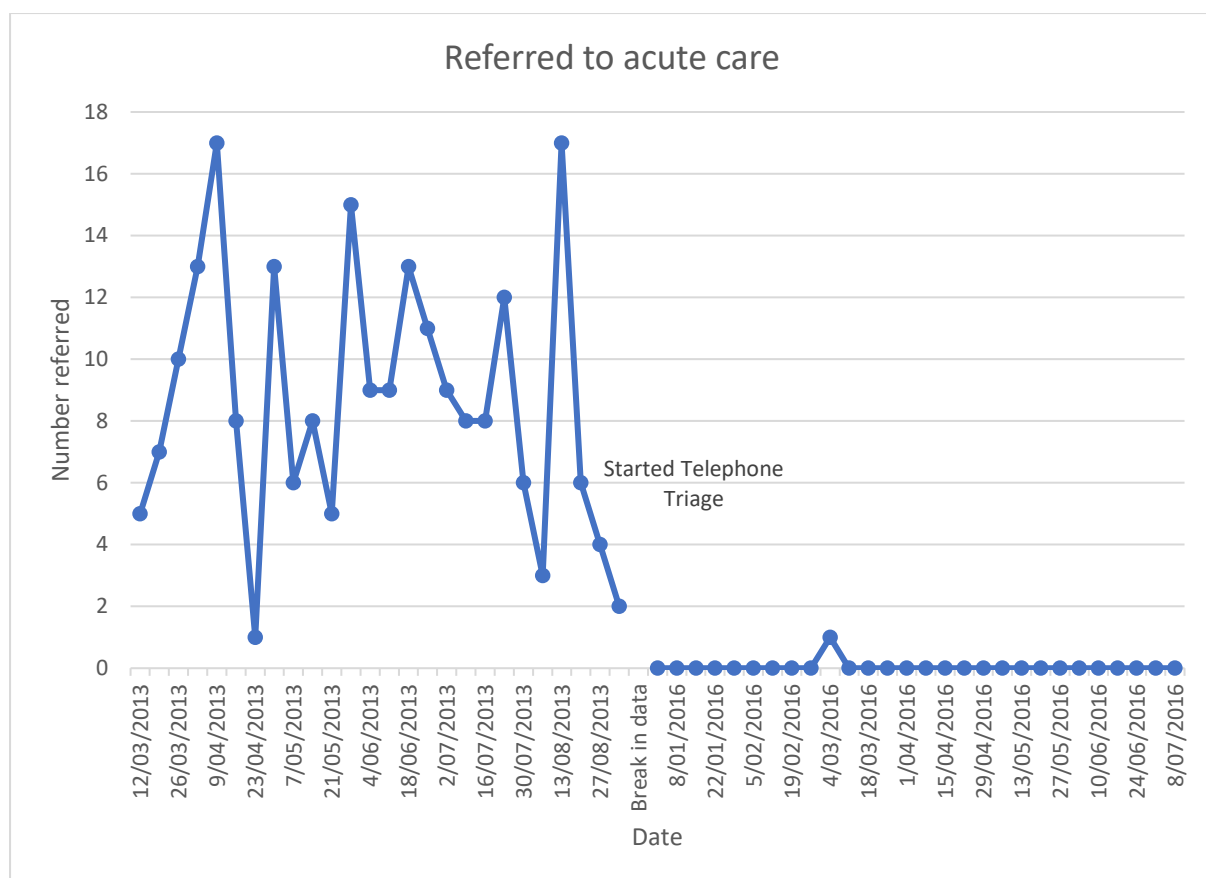
Case 1: Extract from programme evaluation

Results: (44%) 15 out of 34 patients completed the survey. 83% of staff involved in the programme delivery provided feedback (2 written/3 verbal). Five key themes emerged from the qualitative analysis: improved coordination and continuity of care is important; improved access and engagement; increased trust in relationships and confidence with self-management; satisfaction with the service; improved health outcomes. All 15 service users expressed satisfaction with the service and that it met their needs. One respondent reported that the intervention prevented them being hospitalized for a mental health crisis.

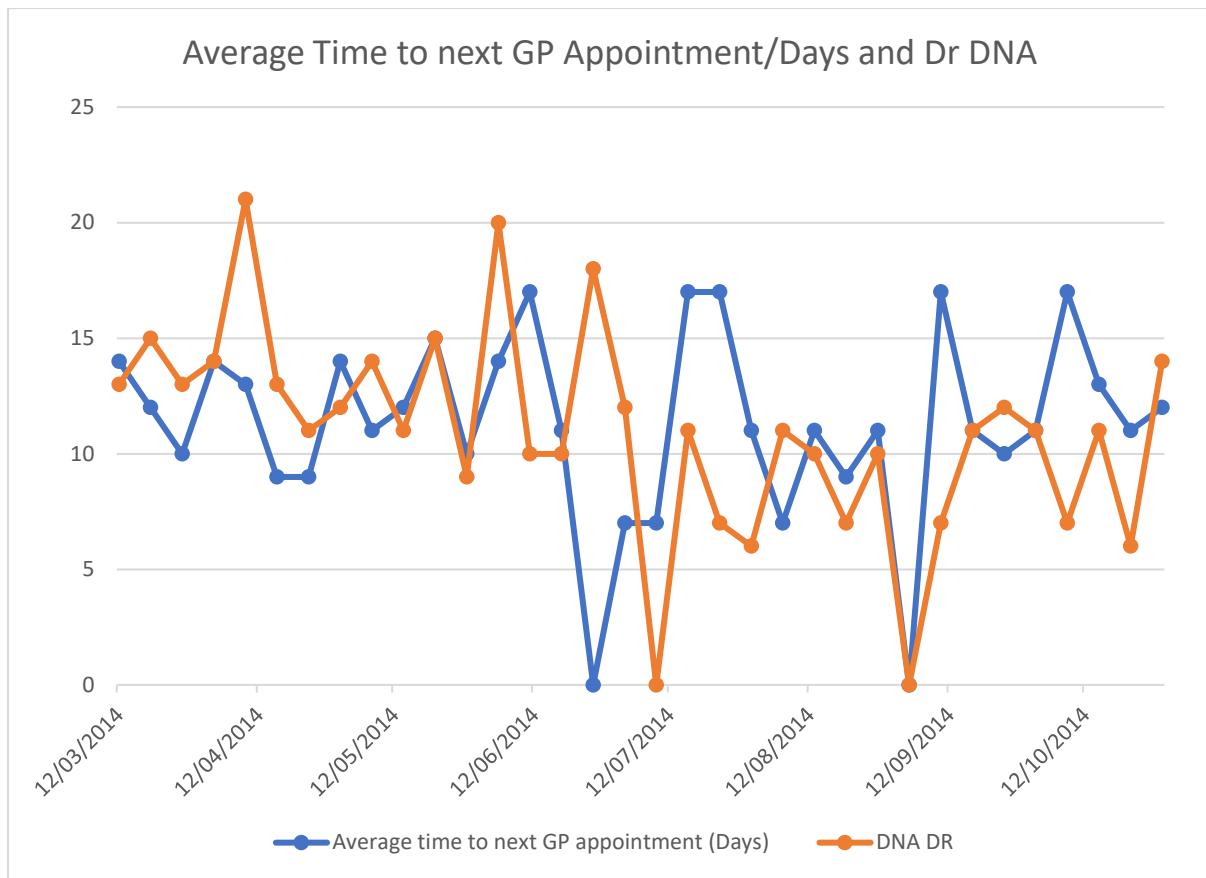
67 patients accessed the service over a one-year period. Utilization increased while a dedicated clinic was operating and decreased once this was no longer provided as a designated clinic. Physical health care was provided with many new diagnoses made, new and existing conditions treated, and health screening completed.

Case 2: Charts (Recreated)

Case 2 Acute care referrals chart



Case 2 days to GP appointments and DNAs chart



Supplementary S3: Interrelationship of the QII, context, process, and outcome

Supplementary S3. Interrelationship of the QII, context, process, and outcome

	Inner context	Outer context	QI Intervention	Process	Outcome
Inner context		The inner context has an impact on the outer context through the team members networks and relationships where team members and their organisations share lessons learnt and success stories.	The QIIs that originated elsewhere were adapted by the teams to fit the local context.	Formal improvement processes were not used, instead methods emerged from the relationships, capabilities and capacity of the setting and improvement teams.	The motivation generated from the inner context (benefits for patients and staff), shared leadership and teamwork enabled a successful outcome.
Outer context	The boundaries between inner and outer context are permeable and flexible. All the practices were strongly motivated by patient need but varied as to whether patients were considered external or internal to the practice.		Knowledge from examples of successful QIIs from other organisations were used to initiate local QIIs. Major national QIIs (outer context) had an impact on the choice of QII.	Learning from others through research and formal and informal networks and learning influenced how individuals undertake improvement initiatives.	Support from the outer context in the way of staff, funding, knowledge, tools and other resources reduce the burden on practices and support perseverance.
QII	The QII must be able to show relative advantage on a topic that is meaningful for the team and inner context. Undertaking the QII, whether successful or not, will have an impact on the inner context and if or how they undertake future QIIs.	Whether the QII is a success or not (the outcome) and lessons learnt has an impact on the outer context.		The adaptability of the QII, the implementation processes used by others and the resources required for the QII will have some an impact on the process followed. Initial processes are likely to mirror others successful processes until or unless they need to be adapted for the local context.	QIIs which are a good cultural 'fit' for the local problem, adaptable to the local context, and show relative advantage (which may include no- or low-cost), are more likely to be successfully implemented.
Process	The QII process had an impact on the inner context. The confidence and capability of individual staff increased through QII process.	The process impacts on the outer context when there is involvement of individuals from the outer context (the PHO/DHB).	The implementation process had an impact on the QII itself as the feedback, reflection and sensemaking were used to adapt the QII.		All cases had fully engaged multidisciplinary teams who all had an important part to play in the outcome.

	Inner context	Outer context	QI Intervention	Process	Outcome
Outcome	All the QIIs were successful in this study. Successful QIIs built team confidence and strengthened relationships.	Successful QIIs support spread to other primary care providers in the outer context.	A successful outcome supports the sustainability of the QII.	There is a feedback loop during the QII from the observations of how the QII is working (intermediary outcomes) to adaptations in the implementation process.	

Chapter 3: Developing a model for primary care quality improvement success: A comparative case study in rural, urban and Kaupapa Māori organisations.

This chapter was also published in the *Journal of Primary Health Care, NZ* (Cullen et al., 2023). This is a qualitative cross-case analysis of all six case study sites including the three already analysed in the previous article. At this stage of the research, I was looking for organisational characteristics that were missing from the first three cases and to confirm the findings from Case 2, the Kaupapa Māori practice. The findings of the first three cases showed practices not using formal QI methods and as I was aware that formal training in QI methods had occurred in areas of NZ, it was thought important to understand the influence of formal QI methods in primary care. After completing the first three cases it took some time to establish the final three cases to be included in the study. Of the other sites that I approached, in two sites, the management agreed to participate but the staff did not agree and in one other case they were unable to find the time to complete the interviews. Establishing engagement with the final three cases relied on personal relationships, contacts, their connections, and large amount of goodwill from the health sector and QI community.

The additional sites are an urban Kaupapa Māori PHO that fully owns four VLCA practices along with other primary and community services and two large practices each based in large cities. This article shows the extension of the previous cross-case comparison through the addition of these additional three cases. While this means there is some duplication, the additional three cases enabled deeper understanding and refinement of key factors and proposed directionality of interrelationships influencing QI in primary care. There were several valuable additions achieved by addition of the further three cases. First of these was confirmation of Kaupapa Māori values by the second Kaupapa Māori organisation. Second was the ability to see differentiation in culture typologies assessed through the Competing Values Framework (Cameron & Quinn, 2011) that was partially driven by structural characteristics and size. The Competing Values Framework was chosen for the culture assessment due to its strong relationship with QI (through TQM) and the quality strategies that are described for each culture typology. Each organisation's culture typology is shown within the article as radar plots within Fig. 3. Organisational variation can also be seen in the subtle variation shown in factor strength in Appendix 1.

Significantly the additional cases supported further refinement of the key factors influencing primary care QI across these different practice types and a refined model is shared depicting factors and relationships for effective QI. The additional case enabled a deeper understanding of how internal and external relationships functioned in the slightly different contexts and factors were further refined

into network relationships and sensemaking. Appendix 1, the comparison of factor strength is intended to demonstrate subtle variation between the case study sites. The table is shown in shades of grey as the factors are strongly present in all sites but for some cases, they were particularly strong and so embedded into the way they worked such that it seemed important to show a difference. The plus signs in the boxes are to only ensure the differences in the shades of grey are noticeable and are not intended to imply and measurement of strength.

Reference:

Cameron, K. S., & Quinn, R. E. (2011). *Diagnosing and changing organizational culture: Based on the competing values framework*. John Wiley & Sons.

STATEMENT OF CONTRIBUTION DOCTORATE WITH PUBLICATIONS/MANUSCRIPTS

We, the candidate and the candidate's Primary Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of candidate:	Jane Cullen
Name/title of Primary Supervisor:	Nihal Jayamaha
In which chapter is the manuscript /published work:	3
<p>Please select one of the following three options:</p> <p><input checked="" type="radio"/> The manuscript/published work is published or in press</p> <ul style="list-style-type: none"> • Please provide the full reference of the Research Output: Cullen, J., Childerhouse, P., Jayamaha, N., & McBain, L. (2023). Developing a model for primary care quality improvement success: a comparative case study in rural, urban and Kaupapa Mori organisations. <i>Journal of Primary Health Care</i>. <p><input type="radio"/> The manuscript is currently under review for publication – please indicate:</p> <ul style="list-style-type: none"> • The name of the journal: • The percentage of the manuscript/published work that was contributed by the candidate: 85.00 • Describe the contribution that the candidate has made to the manuscript/published work: Data collection and and cross-case analysis. lit review and the initial draft <p><input type="radio"/> It is intended that the manuscript will be published, but it has not yet been submitted to a journal</p>	
Candidate's Signature:	Jane Cullen <small>Digitally signed by Jane Cullen Date: 2023.11.13 10:42:01 +13'00'</small> J Cullen
Date:	13-Nov-2023
Primary Supervisor's Signature:	Nihal Jayamaha <small>Digitally signed by Nihal Jayamaha Date: 2023.11.07 10:51:57 +13'00'</small>
Date:	7-Nov-2023

This form should appear at the end of each thesis chapter/section/appendix submitted as a manuscript/publication or collected as an appendix at the end of the thesis.

Developing a model for primary care quality improvement success: a comparative case study in rural, urban and Kaupapa Māori organisations.

AUTHORS:

1. Jane Cullen^A, Massey University (PhD student)
2. Prof. Paul Childerhouse^B, Royal Melbourne Institute of Technology
3. Nihal Jayamaha^A, Massey University
4. Assoc. Prof. Dr. Lynn Mc Bain^C, University of Otago

Abstract

Introduction:

Primary care is under pressure to achieve accessible, equitable, quality healthcare, whilst increasingly under resourced. There is a need to understand factors that influence quality improvement (QI) to support a high-performing primary care system. Literature highlights the impact of context on QI but there is little primary care research on this topic.

Aim:

This qualitative case study research seeks to discover the contextual factors influencing QI in primary care, and how the relationships between contextual factors, the QI initiative, and the implementation process influence outcomes.

Methods:

The Consolidated Framework for Implementation Research was used to frame this qualitative study exploring the primary care experiences in depth. Six sites were selected to provide a sample of rural, urban and Kaupapa Māori settings. Qualitative data were collected via semi-structured interviews and compared and contrasted with the organisational documents and data provided by participants.

Results:

Cases reported success in achieving improved outcomes for patients, practices, and staff. Strong internal cultures of 'Clan' and 'Adhocracy' typologies supported teamwork, distributed leadership, and a learning climate to facilitate iterative sensemaking activities. To varying degrees external network relationships provided resources, knowledge, and support.

Discussion:

Organisations were motivated by a combination of patient/community need and organisational culture. Network relationships assisted to varying degrees depending on need. Engaged and

distributed leadership based on teamwork was observed, where leadership was shared and emerged at different levels and times as the need arose. A learning climate was supported to enable iterative sensemaking activities to achieve success.

KEY WORDS: case study, context, distributed leadership, general practice, implementation, learning climate, network relationships, quality improvement.

WHAT GAP THIS FILLS:

What is known about the topic:

The context surrounding improvement efforts contributes to observed variation in initiative outcomes. Studies into factors influencing QI success generally focus on secondary care organisations and little is understood about the relationship between the initiative, implementation process and context in primary care.

What this study adds:

This is an extension of the previous cross-case comparison. Additional cases enabled deeper understanding and refinement of key factors and proposed directionality of interrelationships influencing QI. A refined model is shared depicting factors and relationships for effective QI.

Introduction

Despite decades of healthcare quality improvement (QI) efforts and notable successes (Charlesworth et al., 2016; Dixon-Woods et al., 2011), results have not always been successfully replicated (Crabtree et al., 2011; Dixon-Woods et al., 2013) and quality problems persist (Braithwaite et al., 2020). The primary care system is under pressure to achieve accessible, equitable, quality health care, and reduce demand on hospital and specialist services whilst increasingly under resourced (Love et al., 2022; OECD, 2017). Building an understanding of what is needed to support quality improvement and achievement of a high-performing primary health care system is critical in the current environment (OECD, 2017; Rifkin, 2018).

Literature highlights the impact of context on QI outcomes (Bate et al., 2015; Nilsen et al., 2020; Subramanian et al., 2021), but the relationships between the context, QI intervention (QII) and implementation process have not been established (Bate et al., 2015; Coles et al., 2020). Research into factors influencing the QI success has predominantly occurred in secondary care settings (Fulop & Robert, 2013; Imison et al., 2017). General practice and other primary care services are unique settings with high degrees of heterogeneity and uncertainty (Crabtree et al., 2011; Lau et al., 2016). Primary care research into determinants of effective improvement is sparse, lacks consensus and often focuses on what was done rather than describing underpinning theory, contextual factors and their relationship to each other and success (Brennan et al., 2012; Lau et al., 2016).

Therefore, we seek to identify: (1) the contextual factors influencing primary care improvement initiatives, and (2) how contextual factors (inner and outer socio-technical setting), the improvement intervention, and implementation process influence each other and the outcomes in primary care.

Research from a 15-year program of primary care transformation in the United States suggests that a complexity informed approach is required (Crabtree et al., 2011). This research found an adaptive reserve centred on relationships was required for primary care QI and developed a relationship-centred model tested by path analysis (Lanham et al., 2009; Lanham et al., 2016). The results found strong associations between relationships, sensemaking and learning when there was higher degrees of trust and reflection, without establishing any causal link to improved quality or outcomes (Lanham et al., 2016). Pfadenhauer (2017, p.6) defines context as 'comprising not only the setting but also roles, interactions, and relationships', supporting thinking that the people-related factors of QI, such as teamwork, leadership, and culture are critical contextual factors (Brennan et al., 2012; Subramanian et al., 2021). Fig. 1 provides a high-level view of current research into understanding factors and their relationships influencing primary care QI. The intervention encompasses the topic and planned changes, including factors such as complexity and adaptability (Bate et al., 2015; Damschroder et al., 2009). The process is how the intervention is implemented, including methodology and facilitation (Bate et al., 2015; Brennan et al., 2012; Coles et al., 2017). Contextual factors are the inner and outer

socio-technical setting, including structures, people-related characteristics, and relationships (Bate et al., 2015; Coles et al., 2017; Damschroder et al., 2009). The model shows the overlap and interrelationships between the three components.

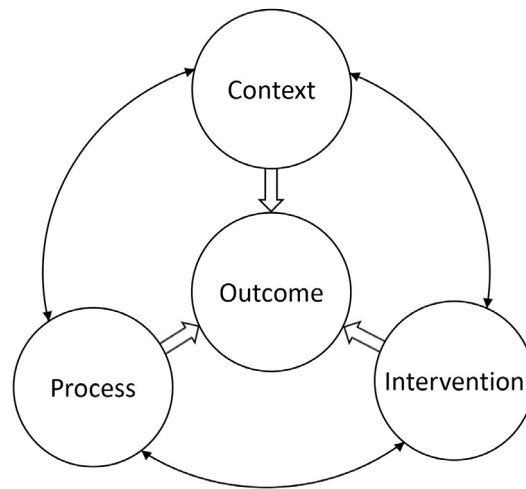


Fig. 1. Determinants of primary care quality improvement success

Methods

This qualitative multi-case study employs the Consolidated Framework for Implementation Research (CFIR) (Damschroder et al., 2009) to guide data collection and analysis. CFIR was chosen because its broad coverage, demonstrated applicability to primary care (Keith et al., 2017; Kowalski et al., 2018), and generic conceptual applicability (Ilott et al., 2013; Keith et al., 2017). The CFIR domains and constructs illustrated in Fig. 2, are a good fit with the primary care QI model (Fig. 1), to enable identification of primary care specific constructs and relationships.

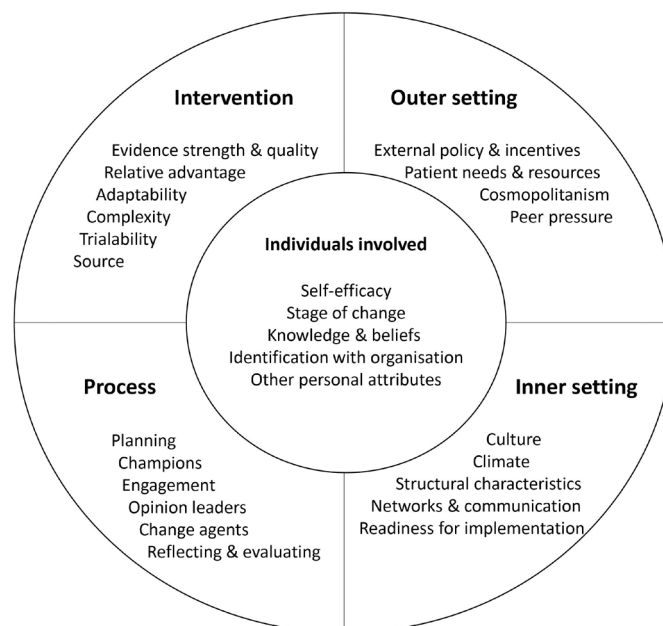


Fig. 2. CFIR domains and constructs

A sampling strategy based on known characteristics of the New Zealand (NZ) primary care setting was used to select relevant general practice, Primary Health Organisation (PHO) sites and improvement topics, resulting in a mixture of rural, urban, very-low-cost access (VLCA), Kaupapa Māori (guided by Māori worldview and principles) practices and one PHO. Case study sites were asked to choose a successful QII to discuss. After several case interviews, effort was made to find cases that used ‘scientific QI’ methods (Skela-Savič et al., 2017), leading to inclusion of Case 4 (C4) and C6. Table 1 outlines site characteristics and improvement topics.

In-person, semi-structured interviews were conducted between October 2018 and January 2020. The qualitative interview data were compared and contrasted with the organisational documents and data provided by participants. Further method details, including consent were provided in the 3-case comparison (Cullen et al., 2022) and remain the same for this study. However, it is worth repeating the care taken to honour the gift of Kaupapa Māori providers’ data and ensure principals were represented correctly from the participants perspective. The authors are all of European descent and do not have the lived understanding of Kaupapa Māori principles, therefore representatives from C2 and C5 were provided opportunity to feedback on their case report to ensure correct representation.

Table 1. QII topic and site characteristics

	Case 1 (C1)	Case 2 (C2)	Case 3 (C3)	Case 4 (C4)	Case 5 (C5)	Case 6 (C6)
Organisation	A PHO and VLCA ^A practice co-located with Community Mental Health and other health services.	A Kaupapa Māori ^B VLCA practice	An integrated family health service	General practice	A Kaupapa Māori PHO with varied primary health care services including 5 VLCA general practices.	A general practice co-located with a range of other health services.
Setting	Remote rural practice.	An urban practice within a satellite town of a large city.	An urban practice in a large city.	Urban practice in a large city	Sited in urban suburbs surrounding a large city	Urban practice in a large city
Practice size (100th percentile is the largest at approx. 29,000 patients)	Approx. 6,000 enrolled patients 76 th percentile	Approx. 3000 enrolled patients 40 th percentile	Approx. 6,000 enrolled patients 76 th percentile	Approx. 13,000 enrolled patients 95 th percentile	PHO approx. 18,000 enrolled patients. Practices: 2,500 - 5,500. From 38 – 67 th percentile.	Approx. 20,000 enrolled patients 99 th percentile

	Case 1 (C1)	Case 2 (C2)	Case 3 (C3)	Case 4 (C4)	Case 5 (C5)	Case 6 (C6)
FTE, unless otherwise stated	7 general practitioners (GPs) employed over varying hours.	GP: 2.5 Nurse practitioner: 1 Practice nurses: 2 Community health team 3.6	GP: 5 Practice Nurses (PNs): 2.35.	Head count of 13 GPs with various FTE	Practice headcount: GPs: 25 PNs: 30 PHO: Approx. 120 staff in a range of roles.	Chief Executive GP director. Finance/admin: 2 GPs: 11.9 PNs: 9.5 Reception: 10
Interview participants^c	PHO clinical director CMH district manager General practice (mental health) liaison nurse Practice nurse General practitioner (GP)	GP director Practice manager Nurse lead Administration team lead Community health worker/receptionist Community health worker Practices nurses (2)	GP director DHB service integration facilitator PHO project manager Practice nurse Receptionist	Clinical Nurse Lead GP Director Clinic RN General Manager Administration Manager PHO Data Analyst PHO Nurse Director	Quality Leader Clinical lead nurse Hub senior lead Hub administrator	General Manager Medical Director G.P. Associate
Intervention	Physical health for patients with a Mental Health diagnosis.	Telephone Triage project.	Patient prioritisation at reception.	Nurse-led acute paediatric (initially 13 years and under) clinic.	A central telephone call answering and appointment booking service.	Model of care change from acute care and general practice to general practice only.
Date of QII	2017	2014	2017	2018	2018	2018
Date of interviews	October 2018	October 2018	January 2019	August 2019	January 2020	December 2019
<p>^A VLCA: Very low-cost access (VLCA) practices have an enrolled population that is at least 50% economically deprived or Māori and Pacific Island peoples and the practice receives funding to maintain low fees.</p> <p>^B Kaupapa Māori: 'an approach that is guided by Māori worldviews and principals' (Beaton et al., 2019).</p> <p>^C All of those interviewed were actively involved in the improvement apart from those in italics.</p>						

Ethics

This study was deemed low-risk and not requiring a full ethical review (Massey University Ethics Notification No. 4000018920).

Results

Descriptive characteristics showing the key differences and similarities between the cases and the chosen QII are shown below in Table 1. Interview participant titles show the spread of staff interviewed and involved in the QII. C1 is in a remote rural setting and all the other cases are in urban settings of varying size and locations across NZ. Two were VLCA practices, as well as all the practices within Case 5, a PHO.

The main themes identified are a mix of CFIR constructs and emergent themes identified from the qualitative data during transcription, analysis, and writing-up process in an iterative and ongoing process. A small sample of quotes that illustrate these themes from each Case is provided in the Supplementary File S1. Cross-case results analysis is reported using the main CFIR domains as headings. The main constructs identified in this study and the relative strength of these in comparison to each other are presented in Appendix 1. The addition of a further three cases led to the revision of strengths for planning in C1-3. Relative strength of identified constructs is based on a combination of the frequency, passion and stated importance assigned to that construct by the participants.

QII outcomes were not evaluated as part of this study although cases provided evidence supporting the QII success. Every case used feedback from patients and staff to assess progress towards achievement of goals. Four of the cases used quantitative time series data, one case before and after data, and the other case high level data that the QII is thought to have contributed to. All the QIIs were seeking improved access in varying ways but they also sought or had additional benefits as they balanced patient needs, practice sustainability and staff wellbeing. All Cases considered their projects to be successful, not only in achieving the desired patient outcomes but also benefitting the practice and/or staff wellbeing. C3 and C5 saw unintended consequences with increased workload in other parts of the system as they improved patient access and experience. Improved value for practice resources was achieved in C2, C4 and C6 as well as improved patient and provider experience.

Intervention Characteristics

All QIIs except for C1 were internally generated. Although C1 QII was initiated by the PHO, it had been of concern for some time within the practice team. All QII topics showed influences from the wider health environment, national primary care initiatives and changes such as the Health Care Home Collaborative and funding changes.

Both C2 and C4 needed the QII to be cost neutral, but other cases provided funding to varying degrees for their QII. All teams did background investigations into their topics, seeking to learn from the examples of others. In most cases they drew on similar QIIs implemented elsewhere to develop evidence supporting the QII and how it would be an advantage to both patients and organisation. This was supported by contextual knowledge, their 'gut' instinct, and qualitative and quantitative data to establish baseline understanding and review progress. The QII had to show adaptability to fit their context as they learnt more through local implementation. C4 found that *'it was the data that kept telling the story that enabled us to tweak and adjust.'*

Context

Outer setting:

Identified patient need was a source of motivation for all cases and linked to the inner setting through a sense of community responsibility that was particularly strong in the Kaupapa Māori organisations. While several cases had other drivers, patient need was a core motivating factor without which the QIIs could not have been implemented.

All the teams had strong network relationships nationally and with their local communities, PHOs and/or District Health Boards (DHBs). PHO and/or DHB staff were members of the team in C1, C3 and C4 (C5 was a PHO) and C2, C3, C4 and C6 have staff in PHO or DHB governance positions. Several practices' PHOs used these QIIs to demonstrate successful QI to others. They were all strongly connected to their population, communities, local services and providers and utilised these networks for most cases in these QIIs, but in all cases as part of maintaining contextual awareness.

Inner setting:

Teams spoke of the need to do the QII for their patients and community, and this related to maintaining practice viability. The identified patient need connected with a strong sense of community responsibility for the enrolled population. This was particularly strong in Kaupapa Māori and rural teams, where for example (C5) *'a lot of the people work [here] because they are passionate about the community'* and many of the cases spoke of going *'the extra mile'* or *'above and beyond'*. C4 and C6, were strongly motivated by financial concerns and the need to stay in business, but C2 and C5 also sought to manage finances in their QIIs.

Culture played a significant role in why and how these QIIs were accomplished. Fig. 3, contains radar charts displaying the mix of culture types based on the Competing Values Framework (Cameron & Quinn, 2011), self-identified by participants, and a synthesis of the interview data. Teams identified strongly with the 'Clan' and 'Adhocracy' culture types. The two largest urban practices within a large

metropolitan city (C4 and C6) had spread across the culture types and had strong 'Hierarchy' culture elements. The Hierarchy culture is more formalised, structured, focused on smooth functioning and efficiency (Cameron & Quinn, 2011). There is no 'correct' culture type, but the culture should ideally respond to the environmental demands on the organisation (Cameron & Quinn, 2011).

In a 'Clan' culture, success is achieved by caring for people and meeting the needs of clients. It is friendly, like a large family held together by loyalty and teamwork, with promotion of participation and consensus (Cameron & Quinn, 2011). Every Case spoke of teamwork, and several spoke of closer family-like relationships, particularly in the Kaupapa Māori organisations where the unique cultural relationships of whānau (extended family group) and whanaungatanga (relationships and kinship) were key.

The 'Adhocracy' domain describes a creative working environment where employees take risks, leaders are seen as innovators and the long-term goal is to grow and create new resources (Cameron & Quinn, 2011). The quotes in Table 2, a sample of participants views, not only reflect that participants were constantly looking for ways to improve, but also reflect that they were looking to improve their way of improving.

Together clan and adhocracy cultures combined to create a learning climate where staff felt valued, safe, and supported to '*voice ideas*' and learn by '*trial and error*' with a '*can-do*' attitude. The teams included senior staff as well as a variety of front-line staff, including receptionists, nurses, administration staff and general practitioners, demonstrating both self-efficacy and agency. Engaged staff and leadership were key, and the mixed staff and shared leadership can be seen in Table 1. Teams spoke of flattened hierarchy and distributed leadership behaviours as they shared leadership roles and tasks to varying degrees relevant to their context and QII.

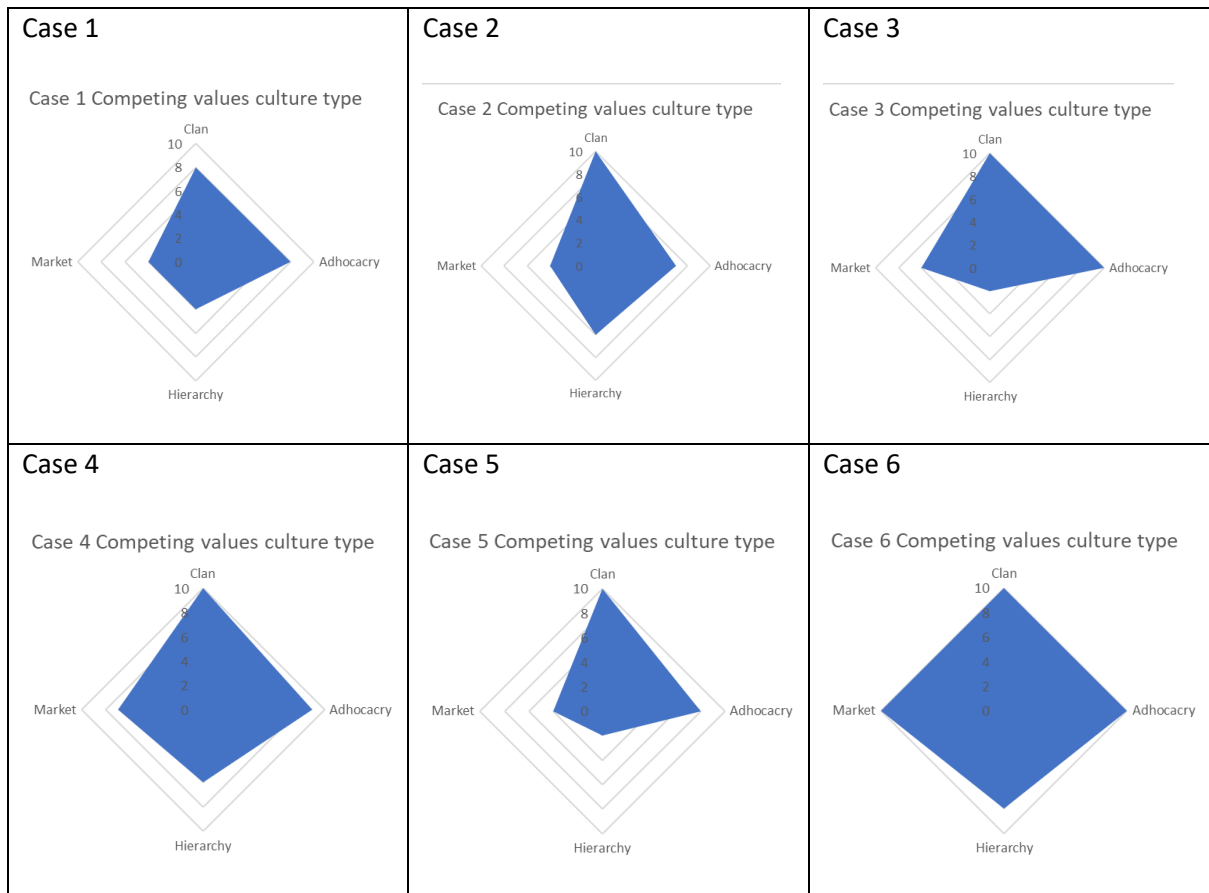


Fig. 3. Case culture types – competing values (Cameron & Quinn, 2011)

Table 2. Adhocracy quotes

Case 1	<p>We are quite innovative and over the years we have been a team that will try new things.</p> <p>There is very much a 'can-do' attitude and always has been. And the nice thing about [the IFHS], [...], is that its non-hierarchical.</p>
Case 2	<p>We are always trying to create new ways of doing things to be able to improve the practice.</p> <p>I find that we can give our own feedback as staff. [...] I give my own opinion all the time.</p>
Case 3	<p>We just constantly want to improve things. But our way of improving is also hopefully improving.</p> <p>Not too much of a hierarchy, everybody is involved in the planning, decision and evaluation, everybody.</p>
Case 4	<p>We're constantly trying to improve.</p> <p>I feel that we do a lot of thinking and trying to figure out what we can do better, is there something we can do to fix this particular problem.</p>

Case 5	<p>So, everything from the way we set up our services, how can we run it better, how can we have a safer process.</p> <p>It's quite common for staff to voice ideas, [...] be able to run with those [...]and trial new things.</p>
Case 6	<p>We've always been a group of people that have tended to be if not spearheading, certainly very quickly early adopters. We've been more cutting edge.</p> <p>We make decisions and do it. And if we've made a decision and it's not working, we stop it.</p>

Process

Processes varied according to skills and experience of participants. Participants spoke of known change methods: C2, Kotter change model (Kotter, 2012); C3, Model of Emergent Learning (Darling et al., 2016); and C4, Plan-Do-Study-Act cycles. Only C4 used improvement science and C6, although very experienced in QI, said *'we were meticulous in following the process, but we didn't use particular tools.'* Patient co-design was not part of the QIs: C3 commented, *'not having the knowledge or model of how to incorporate it.'* Only C1 and C6 employed a structured approach to consumer feedback. C6 hired a research company to undertake focus groups and surveys inform service design and C1 undertook a post-trial survey. Preparation and planning were key and mentioned as a strength in C3, C5 and C6. Every team used existing regular meetings to iteratively plan actions and review progress, *'tweaking'* processes until things worked as planned.

Discussion

This research sought to identify the key contextual factors in primary care QI, and how they were interrelated with each other, the intervention, and the process of implementation. A revised model depicting primary care QI is presented in Fig. 4 showing the key factors identified in this study and their relationships. The quadruple aim (Bodenheimer & Sinsky, 2014) is used to indicate success as case QIs sought and achieved multiple aims. The model shows the inner and outer context overlapping due to interrelatedness and soft boundaries. The specific constructs interrelationships and directionality are demonstrated by the arrows (Fig. 4).

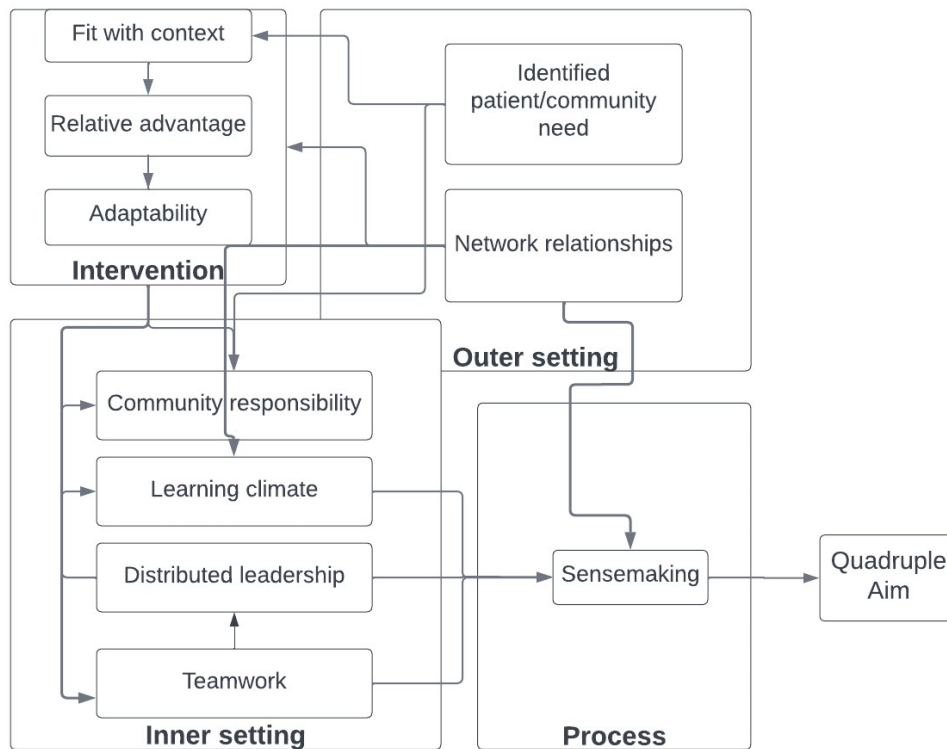


Fig. 4. Revised model of quality improvement determinants in primary care

Context, consisting of the inner and outer socio-technical setting, was a key determinant for selection of the QII in all cases. The inner and outer setting overlapped with shared relationships and strong connections. The QII was chosen to address the identified patient need but that also had benefits for the practice and staff. Network relationships assist participants in developing suitable QIIs through access to knowledge and examples from other settings. The QIIs in C2, C3 and C4 were delivered without direct financial outlay, but for all Cases, they cost money in terms of staff time. Even when external support is provided, practices must supply ‘unpaid labour’ for QIIs (Casalino, 2018). The advantage of the QII over previous ways of working for the practice, their patients and staff had to be clear and show alignment with organisational values before commencing the QII. This is reflected in the multiple aims of the QIIs aligning to the quadruple aim (Bodenheimer & Sinsky, 2014).

The participants were motivated to improve by a sense of community responsibility. This was an emergent theme, not included in CFIR and seems to be particular to primary care (Larkins et al., 2019; Miller et al., 2010). NZ studies have highlighted how important a culture-centred, participatory approach is for successful change (Beaton et al., 2019; Harding & Oetzel, 2019). For C2 and C4, staff were motivated to improve services by the Kaupapa Māori values of ‘manaakitanga’ (value, respect and care for) and ‘whanaungatanga’ which are only partially represented by the theme ‘community

responsibility'. Across all cases a commitment to provide quality care for their communities and strong connections to each other was apparent.

Engaged leadership and distributed leadership was observed, where leadership was shared and emerged at different levels and times as the need arose. In primary care, less senior, operational staff are vital to action change (Donahue et al., 2013), and participants described distributed leadership with '*flat hierarchy*' and a '*team approach*'. The engaged and participative leadership style was a key contributor to the learning climate, and both are known for being key to continual improvement (Bailie et al., 2013; Crabtree et al., 2020; Lanham et al., 2016; Miller et al., 2010).

The CFIR defines learning climate as one: 'in which: (a) leaders express their own fallibility and need for team members' assistance and input; (b) team members feel that they are essential, valued, and knowledgeable partners in the change process; (c) individuals feel psychologically safe to try new methods; and (d) there is sufficient time and space for reflective thinking and evaluation' (Damschroder et al., 2009, p.9). This combines elements of the Clan and Adhocracy cultures in a frame with a focus on learning. Learning is essential in QI as it is by learning that behaviours change (Avby et al., 2019; Bailie et al., 2013; Lanham et al., 2016). Here we saw teams draw on their natural skills and resources within the practice and through network relationships in a supported environment in order to learn and improve.

Network relationships with other organisations such as PHOs, DHBs and national organisations were present in all cases, even if not required for these QI. These network relationships provided support, where needed, in the form of personnel time and expertise, as well as sharing or enabling access to knowledge and at times funding. Team members also drew on personal, professional, community networks for support. Miller, *et al.* (2010), found that the most resilient practices were consistently engaged with their local health systems, forming part of the practices adaptive reserve (Miller et al., 2010). In NZ, the collaborative network supporting implementation of the Health Care Home initiative has been identified as an innovation enabler, although complex relationships between DHBs and PHOs have created barriers in the past (Middleton et al., 2018). All these cases draw on, and contribute to, national and local resources at an individual and organisational level, forming strong connections across the health system.

The interventions were well planned, and formal improvement methodology was only applied by C4, with several staff trained in improvement methodology and initially supported by an improvement advisor. Quantitative data collection and analysis was strong in C4 and C6, but overall, was limited across the cases. Healthcare studies have found sensemaking to be a key problem-solving process in complex settings where there is scant and ambiguous data (Lanham et al., 2016; Miller et al., 2010).

Participants described an iterative social process of 'sensemaking' where participants combined available information, tacit knowledge, and experiences to reflect and make sense of events, to learn from and plan actions. Sensemaking activities were critical in these complex contexts for successful improvement and were enabled by psychologically safe (Edmondson & Lei, 2014) learning climates and distributed leadership. Distributed leadership and learning climate can be natural, emergent properties or deliberately enacted over time based on practice and literature to guide development (Carroll & Edmondson, 2002; Edmondson, 2018; Kiran et al., 2018).

Limitations

There are several limitations in this study. Case study research provides an in-depth view of individual cases and only six cases were considered. Primary care services are heterogeneous, and the conclusions may not be generalisable to other settings even within primary care. The interviews were conducted varying amounts of time after the initiatives, and while the teams felt confident in their recollection of events, it is possible that their recollection may have changed over time. Finally, the data collection for this study was completed prior to the arrival of COVID-19 in NZ, and primary care has been affected considerably by the pandemic. There are now likely to be other factors present in primary care that will affect QI efforts including increasing resource and capacity constraints. Research to ascertain the generalisability of these findings in the current environment is recommended.

Conclusion

Community/patient need was a core motivator that connected with the sense of community responsibility in the participants, this (and more) was expressed as manaakitanga and whanaungatanga in Kaupapa Māori organisations. The teams drew on available knowledge, their networks, and resources to identify quality improvement interventions that addressed identified needs, were adaptable and a good contextual fit. Formal improvement methods were generally not applied; however, teams combined structured planning with sensemaking activities to evaluate and adjust to achieve the desired outcome. This provided just enough structure and adaptability to respond to the current and changing conditions as they sought improvement without overly increasing the burden of effort within a resource constrained environment.

Distributed leadership underpinned by teamwork was key to success, enabling inclusion of different perspectives and shared responsibility. This supported a psychologically safe learning climate for sensemaking and testing ideas. Distributed leadership, teamwork, and a learning climate enabled effective sensemaking to occur through iterative cycles of problem-solving, testing, and reviewing ideas to achieve successful outcomes.

Data availability. Deidentified interview transcripts are available on request from the lead author.

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Author affiliations

^A Massey University, Palmerston North, New Zealand

^B Department of Supply Chain Management, College of Business and Law, RMIT, Melbourne, Australia.

^C Department of Primary Health Care and General Practice, University of Otago, Wellington, New Zealand

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Appendix 1: Comparison of factor strength between the six cases

Table factor strength key: Present = +, stronger = ++, Strongest = +++

Model domains	Factors	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Outer context	Network relationships	+++	+++	+++	+++	+++	++
	Identified need	+++	+++	++	++	+++	+++
Inner context	Community responsibility	++	+++	+	++	+++	++
	Distributed leadership	+++	++	+++	+++	+++	++
	Learning climate	+	+	+++	+++	+++	+++
	Teamwork	++	+++	+++	+++	+++	+++
Intervention	Fit with context	+++	+++	++	+++	+++	+++
	Relative advantage	+++	+++	+++	+++	+++	+++
	Adaptability	+++	+++	+++	+++	+++	++
Process	Planning	+++	+	+++	+++	+++	+++
	Sensemaking	++	+++	+++	+++	+++	+++

Supplementary S1: Table of representative quotes

Factor	Case 1	Case 2	Case 3	Case 4	Case 5	Case 6
Project Aims	To improve the physical outcomes and to try and integrate physical and mental health care.	To give patients the availability of an appointment on the day. To alleviate the pressure of phones, to alleviate the pressure of patients walking in.	To develop some consistent practices of how we manage prioritisation To be able to improve our service for our patients in terms of them having ready access, that it is patient focused. To stop overloading our doctors and nurses	to ensure that those patients who were otherwise may have had a delay in getting access to care, were being able to get timely access to care with a nurse with the wraparound skill, and prescribing capability to be able to look after patients and not have them delayed in being provided access to care.	improve our call answered rate or decrease our dropped call rate	To provide high quality comprehensive general practice care for our patients, in a sustainable financial model
Outcomes	I just think the whole thing is one massive team effort and success” and GPs and members of our (CMH) team are communicating more frequently and regularly about joint clients. Just to emphasise the success of the programme [...] now we are seeing them nearly every month and they are getting their health needs met.	There are results that everyone can see, and it has made everyone’s jobs easier. So, it added value and one of our core components was to increase access, so it aligned with all those values.	It has improved the patient journey so to speak, but also, I think it has improved staff wellbeing and morale and confidence as well	We can see, [...] the value-add from a financial perspective, [...] we’ve been able to look at the value add from a access to care for Māori, Pacific and all patients perspective. And [...] for nursing, it's been an affirming opportunity for us to know that nurse clinics do make a difference for patients, and it has alleviated some	we were sitting around 53% of answered calls across the practices. [...] and we are now sitting around 87% of answered call rate. However, it wasn't really looked at the just the call volume and how much pressure would put on other staff because of that.	The financial position is like transformational. The staff are very happy, our retention rate has gone up. We never had a problem with doctors, but we did have a problem with nurses and reception. So that's good. Our patient’s continuity and access to own their own doctors improved. Our patient enrolments have grown. Our patient

				appointment slots for our doctors. 52% of our consults were done by the telephone		satisfaction has improved.
Intervention						
<p>Fit with context</p> <p>The intervention must be able to be implemented within existing or available capability and capacity and aligned to organisational values. This is collectively labelled 'fit with context' in the model.</p>	<p>When [the PHO Clinical Manager] came and said that there was funding available, we didn't need any persuading whatsoever, because it was an opportunity to get some of our clients some good physical health care at last.</p> <p>And most importantly, the appointments, were free to the patient.</p>	<p>we decided that we would start using a GP along the same lines as the Health Care Home was rolling out</p> <p>we had to make a change and we had no money to do it, so we had to do it within resources.</p>	<p>This whole project is part of our IFHS, that was where we saw the gap and part of our IFHS</p> <p>She had identified some issues, when having meetings with the receptionist and the nurses, some sort of gap, was the feeling. So, she thought she would have a look at this, and she realised that there was a system-wide, [DHB]-wide need for these sorts of things. And we are all big on passing that sort of thing on, so we thought, let's do it.</p>	<p>The paediatric clinic, their patients, which are given a certain amount of capitation, and there is no co-payment. So, it's basically a flat fee. So, it's extremely expensive, using doctors to see patients in which you can't increase a fee. Because your expenses never ever go down. [...]</p> <p>So, from a business owners' point of view, there was that. From a team member point of view, we wanted to start developing our nursing workforce. And [the clinic RN] had already done some [...] postgraduate training [...] and she wasn't using it. [...] She's already done that training, let's back it up with her</p>	<p>It was about being able to have more of a Manaakitanga role. A caring, a looking after role.</p> <p>That and the other core reason was to manage our debt. To have a response to be able to have people dealing with our patient debt, making phone calls, getting people on, setting up their AP's, and claiming, getting all our claims through is another part of it.</p>	<p>So, if we could provide the service in a more financial model, we could charge less for it for the patients, patients would pay less, so their cost implications would have improved, and our financial result would improve. So, actually, the business and the patient's needs aligned very closely, just from a different framework.</p> <p>We were not necessarily making great strides in the proactive, preventative health area. We were almost dictated to by that reactivity type approach to medicine.</p>

				utilising some of those skills.		
Relative advantage Stakeholders' perception of the advantage of implementing the intervention versus an alternative solution (20).	<p>We had known this for years and we had worked with private practice to try and improve that ourselves without this project and failed dismally.</p> <p>But when [the PHO Clinical Manager] came and said that there was funding available, we didn't need any persuading whatsoever, because it was an opportunity to get some of our clients some good physical health care at last</p>	<p>It has increased access to those patients who really need it.</p> <p>Well, more that we couldn't continue the way that we were we had to make a change and we had no money to do it, so we had to do it within resources.</p> <p>So, then just prior to taking on the Health Care Home, I think it was in 2014, we decided that we would start using a GP along the same lines as the HCH was rolling out.</p>	<p>It gave us a definite route, whereas before we were all on different pages.</p> <p>She said we could make sure that the person had a far more efficient journey if we did some triaging earlier on in the process and the West Coast and rural Australia do this, we don't need to reinvent it.</p> <p>They paid for us to do it. There was a lot of time and a lot of money put into it, it was prioritised.</p>	<p>2018, 2017, [...] we had a lot of issues trying to get people in to see our doctors.</p> <p>twofold, recognising and upskilling of the nurses. [...] And trying to better work our time so that the doctors can see patients [...] Better outcomes for the patients in terms of that they didn't need to sit and wait for a doctor.</p>	<p>there were a lot of calls dropping on the front desk when the phones were sitting with reception.</p> <p>The phones [coming off the front desk] allowed the receptionist to have more one-on-one face-to-face with the patient.</p> <p>Taking that distraction almost out of the practice by the constant ringing of phones.</p> <p>centralizing everything, [...] would just improve or streamline all of our processes and make sure everything was done and dollared off at the end of the day properly.</p>	<p>the sector changed, and the expectations of urgent care changed enormously.</p> <p>I had done a lot of research, and a lot of thinking of the problems for like two years prior to seeing that this is where we needed to go</p> <p>we have to be able to pay all our bills otherwise we can't provide the care" and "this wasn't a sustainable financial model. [...] We weren't succeeding in our goals in general practice in the way that we felt that we should be, which was continuity of care and addressing the long-term condition management of the patients.</p>
Adaptability The degree to which an intervention can be adapted, tailored, refined, or	<p>there were lots of discussions about how best to do that and in the end, we decided that we just had to</p>	<p>I think we did spread it out a little bit, we did put the time out a little bit. And we gave [the medical director] more</p>	<p>This is probably draft number 4. And it is not until you use it that you realise [about the different scenarios] so</p>	<p>looking at where we were with our plan-do-study-act, and what we needed to tweak and</p>	<p>Lots of changes, lots of communication. [...] So, it was working with the GPs and the nurses to get their input into how</p>	<p>giving that feedback and then when able to, for the practice to change direction or tweak things so that actually</p>

<p>reinvented to meet local needs (20).</p>	<p>choose something and see how it went and then adjust it.</p> <p>Which we have tweaked and tweaked and got pretty much right. As things have come up, we have said we could do with this, we could do with that, or we could do away with that or whatever.</p>	<p>acute appointments so that he could have a little bit more leeway to put people in.</p> <p>We started off with just going to open it up from 8:30 till 12. [...] So, we then had to close down that section [...]. So, now we have managed to look again and close off that time that he has got, an hour a day for him to ring and book them out.</p>	<p>we defined and refined it several times before we got to where we are now.</p> <p>You can go, I don't think that is quite right and I do think we need to change that slightly. So, that is constantly being modified.</p>	<p>adjust as we went based upon the data.</p> <p>That was flexible, it was just on the needs of the nurse so didn't put a timeframe to it, it was just when [the clinic RN] felt she was comfortable, and [the GP Director] felt that she was comfortable with her skills.</p>	<p>processes, should be done in the hub. So, it worked for everyone.</p> <p>And then she said 'well we can try it, give it a go and we'll think what all the other practices think of it, and then we'll roll with it'.</p>	<p>was [a] smoother transition.</p> <p>nobody knew how to do it and we didn't have time to coach them. So, we stopped that, but now we're doing it.</p> <p>there is continuous feedback coming back how people were experiencing and then the management enabled to tweak things so that we could actually keep up with what the demands were at the same time.</p>
<p>Context – outer setting</p>						
<p>Network relationships (The degree to which an organisation and its staff are networked, combining complementary strengths with other external organisations, their local community and population to collaborate for</p>	<p>I'm a DHB employee, employed by mental health, sitting in a medical practice that is actually run by the DHB.</p> <p>And the advantage of choosing [the practice] was that because you've got [the Integrated Family Health Service] and you've got community mental health, [the] medical service and the ward,</p>	<p>And later when it became part of the HCH, that guiding coalition became the HCH project and the PHO and DHB oversight of that as well.</p> <p>We are quite involved in [the PHO]. [The Nurse Lead] and I are on the Board of [the PHO] and [the Practice Manager] is involved in a number of Committee's at the</p>	<p>We had a huge roomful of people which included not only all of [this practice] but the pharmacist close by and physiotherapist and lots of others as well.</p> <p>So, this practice has moved beyond their own teamworking to how does this team nest within the other teams that influence their patients care, like the</p>	<p>we talked with lots of other people [...] And [the clinic RN] certainly had some training with other nurse specialists, and we went to see how people did it and brought back her ideas.</p> <p>we're running lunchtime sessions with all the practices doing Enhanced Primary Care,</p>	<p>[Health Care Home Collaborative] did help with some of that initial set up. [...] this is a key contact person, ring this person and have a discussion.</p> <p>our community outreach services include mental health, homecare nursing, or Primary Care nursing in the home and community nurses,</p>	<p>our clinical director, we sent her on a study tour in 2013 and she went and visited Thomas Bodenheimer. And, [...] explored it quite in depth in his work.</p> <p>we've been through about five cycles of the safety in practice initiative.</p>

<p>quality improvement.</p>	<p>everything all under the one roof. So the interrelationships were easier and its one general practice owned by the DHB.</p>	<p>LCA Council and also part of the Māori Development Committee. So, it's not really suppliers, but networking.</p>	<p>district nurses, the pharmacies, the allied health, the social workers and so on.</p>	<p>so they can share experiences. I'm on the clinical board of the PHO. So, I know [the data analyst] well. [...] So, they ask us for a lot of help, with things that they want to know. [...] Can you try this for a week? And the other director, the other GP director is also on the clinical board as well.</p>	<p>community outreach workers Tamariki Ora WellChild service. I know the nurses that are working at [Practice E] and then I know the nurses that are working at [Practice A], and how that's going to work when they come together. So, I know that certain things are going to have to happen within that day to day.</p>	<p>Share owner/GP Clinical Director Primary Care [...] DHB.</p>
<p>Identified patient/community need</p>	<p>We knew that funding was not the only barrier, however, because in the past part of our own initiatives had been to pay for people to go to the GP out of mental health funds, when we saw that there was a desperate need for someone to have some medical attention.</p>	<p>Because there was a need. The need was that we were aware that our most needy patients were not able to access care in a timely manner. Being heard. If you have been unwell overnight and you're scared and frightened but being able to touch base early in the morning and it being resolved, either, no you don't need to come in, or we need to see you, we'll see you in an hour.</p>	<p>Our philosophy is always, 'What is best for the patient?' ' So, if you think about that, we are all patients ourselves, so we sometimes think; How would I like it, if I had to deal with this. I wouldn't want to go through 3 people, I would just want to go to the right person and deal with it. driven through the years of doing this, by mantra's or touchstones, I think the DHB calls them, like: 'If it's not good for</p>	<p>The patients get a much better, quicker service. Instead of waiting until 4 or 5 o'clock in the afternoon, or squashed in amongst something, they get a telephone call within 10 or 15 minutes. So, they've got somebody on the phone speaking to them. We did statistics on what it was that came in, what was presenting for that age group. And the breakdown of what they were, were they ear, throats, cold, what were they? [...] And that that's how we recognise</p>	<p>we asked our patients, what they wanted to see what they felt wasn't working for them within their practice. So, there were stickies and they could write on those and it just put it back on the board, and [they say], we can never get through on the phone. one of the initial concerns anyway was to make sure that they would be able to get through.</p>	<p>But as part of this process we engaged an independent researcher. [...], she did three focus groups one in English, one in Mandarin, one in Korean and then from that developed a big survey. We then sent out every adult patient an invite to do an online survey. [...] And from that we came to understand that what was most important for patients was access, access to the doctor, when they</p>

			patients, why are we doing it?'	what it was that we were doing with our patients and what we should do, to what level we should do things, as opposed to all children being seen no matter what.		wanted and preferably their own doctor and the cost. [...] And that was the same for all three cultural groups but in differing orders. So, in that way we could then really see that what we're doing was supported by patients.
Context – inner setting						
Community responsibility	<p>Because we are a small area and it is a small rural community there is a specific issue just for the community.</p> <p>I couldn't believe how many patients there were who had significant mental health issues [...] so there was a huge need there.</p> <p>I think that once you have engaged patients and made promises you really have to, there is a real duty of care to keep that up.</p>	<p>all of us who work here are here because we believe in the vision of serving the patients.</p> <p>But a lot of these clients don't have whānau, so we feel like we have to fill that gap, so they can get the help and support that they need to be able to live a healthier happier live.</p> <p>Whānau definitely and in the context that it's not just family, you are part of the [practice] whanau.</p> <p>We are here because we believe that this work is important, and I</p>	<p>we want to do what is best for the patient.</p> <p>we wanted to be able to improve our service for our patients in terms of them having ready access, that it is patient focused and that they have timely access to us.</p> <p>We were trying to make it the best practice that we could for the patient.</p>	<p>The needs of our patients.</p> <p>what motivates the team here really is the collective value that they can bring to a very high enrolled population of vulnerable patients in a very busy part of [inner city suburb].</p>	<p>a lot of the people work [here], because they are passionate about the community.</p> <p>really it was it was about being able to have more of a Manaakitanga role. A caring, a looking after role.</p> <p>they value the community that their practices [are] in.</p> <p>the organization stands for [...] to uplift [...] the overall health of communities that have huge Māori and Pacific populations. That was like a big thing for me,</p>	<p>the main aim was [...] to address the needs of the community that we serve. So, that we could address what people wanted and that was really to get back to the basics of general practice for primary care and is to build up relationships with families and with individuals. And in that way really having people come into a place where they felt comfortable.</p> <p>really not just being reactive and waiting for things to happen but actually sort of keeping</p>

		<p>think that we all believe in the [...] need to provide equity.</p> <p>we do a lot for our clients that no other practice would do. We go the extra mile.</p>			<p>it's what I love about working here.</p>	<p>an eye out seeing how we can improve and meet the needs of the community.</p> <p>what we were saying was our enrolled population was our focus. And we put a focus completely on them.</p>
<p>Distributed leadership</p> <p>Sharing of generic leadership tasks to influence resource availability, decision making and goal setting within an organizational perspective. (46)</p>	<p>And the nice thing about [the IFHS], what I'll speak to, is that its non-hierarchical</p> <p>[The Clinical Manager] at the PHO and [...], the mental health GP liaison nurse, myself as the registered nurse here at the practice and from Mental Health, I had a lot of contact with [...], the nurse manager of community mental health.</p>	<p>[the medical director] and [the practice manager]and [nurse lead]. Those 3 managers.</p> <p>Well, I think everybody is key. I mean, ... The doctors, [the Practice Manager] obviously had to be supportive of the changes and [Administration Team Leader] had to be supportive of the changes to templates and things like that, so I think it was a whole team thing.</p> <p>it was [...] a collective. We all had a different role.</p>	<p>You have to get buy-in from the owners and the staff and then the other stuff happens. If you don't have that nothing happens.</p> <p>The whole reception team, all of the nurses, [interviewed GP], and one of the associates [non-owner GP].</p> <p>Everybody is involved in the change in here, which is good. But [another GP] and I were the doctors who went to the workshops [...] and most of the nurses and the whole the reception team. Which [...] was really important because they are the ones who are really at</p>	<p>we had a [...] cross functional team.</p> <p>So, we don't have leaders who sit there and don't do anything, we're all do'ers as well.</p> <p>... the nurses, [...] the general manager because she would be wanting influence over budgets [...], the reception team leader [...], [the GP Director] [...],the nurse director for our local PHO</p>	<p>Everyone on an even keel [...]. I think we all treat each other the same, there's no hierarchy here.</p> <p>we're able to make these kinds of decisions, implement things. I suppose, but with the support of the manager, as long as we do the work.</p>	<p>we're trying [...] involve everybody in the whole thing and get away from the idea that it's only the doctors that are in the game [...], everybody else has a role.</p> <p>we have a little management team. [...], those four people [clinical nurse leader, medical director, finance manager, reception] are like, you know, everybody. And in addition, the shareowners, [...] they are sitting in the background like the silent chairs. And they are very pivotal because if they're objecting or not on board with what</p>

			the front-line of this process.			we're doing, then it doesn't work.
<p>Learning climate</p> <p>A climate in which:</p> <p>a) leaders express their own fallibility and need for team members' assistance and input;</p> <p>b) team members feel that they are essential, valued, and knowledgeable partners in the change process;</p> <p>c) individuals feel psychologically safe to try new methods; and</p> <p>d) there is sufficient time and space for reflective thinking and evaluation (20).</p>	<p>Our team, I would like to think that we are quite innovative and over the years we have been a team that will try new things.</p> <p>My manager and clinical director were all keen and very supportive. And it was just like, yep, do whatever you need to do to work in this way.</p> <p>No, we were very lucky with us both being able to give every day to it, it was amazing, it really was. And we were fully supported to do that. So there was never any questions of there not being any resources.</p>	<p>we are always trying to create new ways of doing things to be able to improve the practice.</p> <p>I think that we are highly motivated, we are early adopters. I think that comes from the leadership as well, because no-one is left alone. I think that the workers see that we are actually in there 'boots and all'.</p> <p>I can say my opinion to the senior staff and it won't get thrown back at me and be told be quiet.</p>	<p>We just constantly want to improve things. But our way of improving is also hopefully improving".</p> <p>The employers are always listening. [...] So, it is that kind of learning as you go".</p> <p>But it was facilitating that kind of open forum for people to say, what were they afraid of, how realistic were those fears and what was everybody prepared to do to support them.</p> <p>people felt like they had permission to do these sorts of things.</p> <p>We just constantly want to improve things. But our way of improving is also hopefully improving.</p>	<p>I think we are always thinking about improving. [...] there are leaders who are leading the changes, but I think [...] all of us are very open to change. And we are happy to look at what we've been doing.</p> <p>If something has gone wrong, [we] try and think about, how can we not let this happen again? And I guess that's one thing about life and jobs and in your own life, hopefully you learn from the mistakes.</p>	<p>it's quite common for staff to voice ideas and have them and be able to run with those and trial new things.</p> <p>I think we're lucky in the fact that we're able to make these kinds of decisions, implement things. I suppose, but with the support of the manager as long as we do the work.</p> <p>So, everything from the way we set up our services, how can we run it better, how can we have a safer process.</p>	<p>Well we still want to do this, let's do what we can. And if we can't do it perfectly [...], don't worry at least we'll be doing better than if we didn't do it at all.</p> <p>we make decisions and do it. And if we've made a decision and it's not working, we stop it.</p> <p>I think it's this never sort of sitting back and saying things are fine, it's always saying well we have reached this point what can we do, going forward.</p> <p>We've been more cutting edge. We've been braver than a lot of other people to do stuff.</p>
Teamwork	I think that we're a strong team, we support each other and	we all recognise that this is an Iwi affiliated organisation and I think	we are lucky, we do have this team	We are a great team, we all work together as a full team, as well as in	they are like my Whānau	we've all been part of the team, throughout the whole process we've

<p>The combined efforts of a group of people working together to achieve a common goal.</p>	<p>are not getting to dragged into the politics of life.</p> <p>So its entirely a team approach, it's not an I am, it's a wouldn't happen without any one of us contributing and helping.</p>	<p>that we believe in teamwork and being supportive to each other.</p> <p>Which is why it worked so well because it was not just one person having to do the action it is actually the whole team.</p>	<p>approach in everything we do.</p> <p>relationship building [...] is key</p> <p>everybody is involved in the planning, decision and evaluation, everybody.</p>	<p>our own teams. We're supportive of each other.</p> <p>I think we've got a very woven, well respected, well trusting team that have a good collegial relationship, and a high level of trust with each other.</p>	<p>I think we hire really good people. And they all contribute to the team success, and they all support each other.</p> <p>We're really comfortable with each other, we get along.</p>	<p>all been involved in interacting and looking at proposals and giving our insights and how we see things evolving.</p> <p>team building we work on that on a daily basis</p>
<p>Process</p>						
<p>Planning</p>	<p>there were lots of discussions on how the nurse/doctor appointments would be arranged and how much time to be allocated.</p> <p>We started off by identifying, who are the people [...] there was actually 3 lists of people [that needed to be seen in the practice]. Then we basically worked on, [...], identifying who the case managers were.</p> <p>then basically I went away and developed the advanced form that we use.</p>	<p>Approaching everyone at MDT's as a group and also the templates. So, there was action put behind that, templates were made, [the CD/GP] was willing to do triage. It was more showing the team that this is what we are going to do, and we are doing it.</p> <p>But basically, that was one week and then the next week we were into it. We find that we don't have a lot of time here to communicate, which is sometimes a bad thing because changes happen so rapidly, and everyone here is in change fatigue. We also</p>	<p>definitely had it structured, and it was well organised</p> <p>I think that we've got good routines in place. And good instruction, and visual things, the flowchart was really good.</p>	<p>we did the project scope first, what was included and what was excluded.</p> <p>So, we did the 300-patient case review [...] We analysed that data</p> <p>we had to rearrange templates, [...] we had to make sure that we had the nurse available at that time, we had to train the reception staff on how they handled those phone calls.</p> <p>And we had great big sheets of butchers paper all over the place. And we were writing</p>	<p>I had done up a project plan. That was probably my saving grace and making sure that everything, all the boxes were being ticked.</p> <p>A proposal that went to the Audit and Risk Committee, which sits within our Runanga Board. [...], PHO Board first and then Audit and Risk Committee, and then the Runanga Board.</p>	<p>there's a few months of planning, so that people could make the necessary changes in it</p> <p>the key to success is really planning. [...] before anything was done that people really had a good think about it and looked at all the aspects.</p> <p>there wasn't any point that a person sat there and said, what do we have, what are we going to do now? [...] it was very much proactive [...] so when anything did arise there was actually a plan in place already.</p>

		lack the ability to find the space to be planning.		what we needed to figure out.		
<p>Sensemaking</p> <p>Pulling together disparate views to create a plausible understanding of the complexity around us and then testing that understanding to refine it or, if necessary, abandon it and start over (47).</p>	<p>We have our own informal feedback, we have regular meetings where we discuss this project.</p> <p>And once the project started it was just mainly just [the CMHT manager], myself, [practice nurse] and [GP Liaison Nurse] that just met and troubleshooted and caught up.</p>	<p>But we usually put out there what changes we would like to do and there is usually a discussion around that. And there is also a discussion around whether they work or don't work and how people feel about them.</p> <p>We collected that data and we looked at it.</p> <p>[The medical director] normally pulls them all off (charts). [...] He usually brings to our morning huddle or our MDT and discusses them.</p>	<p>You know identify it, problem-solve it, initiate something, review, initiate, review and then come to an improvement for everybody.</p> <p>Everybody noted anything that hadn't quite worked properly.</p> <p>We have weekly meetings. We bounce things around, so if things aren't going quite right, [...]because it is fresh in your brain. You can go, I don't think that is quite right and I do think we need to change that slightly.</p>	<p>during those conversations, we went over the previous meeting, got the answers for what we wanted to do. And then we move forward and spread it out a bit further and got more information.</p> <p>if something fell out of that and we thought okay, that needs to be tweaked well then would tweak it.</p> <p>graphs and a whole lot of things [...] just make it easier for us to see.</p> <p>we met regularly to do that data analysis.</p>	<p>everyone has their voice, in how they think it might work.</p> <p>we meet monthly just to discuss any clinical issues and the call answer rate was part of that.</p> <p>there are little huddles. So, it's shorter, like 10-, 15-minute meetings we have a twice a week.</p>	<p>meetings [...] continuous feedback coming back how people were experiencing and then the management enabled to tweak things.</p> <p>the collaboration and communication between management and the actual team, and then getting back</p> <p>And then we consulted and analysed and figured out what that meant. With both groups, staff and patients.</p>

Chapter 4: Assessing the applicability of the Model for Understanding Success in Quality for primary care: A multi-case mixed methods analysis.

This mixed methods chapter has been submitted to a peer reviewed journal for publication. A multi-case mixed methods approach was followed with quantitative data collected via the Model for Understanding Success in Quality (MUSIQ) survey completed by participants, compared with qualitative data from primary care team interviews utilising CFIR (Damschroder et al., 2009). The MUSIQ was developed based on quantitative data from large and predominantly hospital-based health service studies (Kaplan et al., 2023). However, questions have been raised regarding its applicability in primary care (Douglas et al., 2019, Kaplan et al, 2012; Siriwardena, 2012). Therefore, this part of the study asks:

- How applicable for primary care is the Model for Understanding Success in Quality (MUSIQ)?

Each case study site completed the MUSIQ survey as well as the interviews and as each case was analysed individually the MUSIQ data was included and compared with the qualitative interview data. Each site was written up as an individual case study using both sets of data. These case studies were offered to each site, but most sites only wished to view a one-page summary. The cross-case analysis at both the three- and six-case stages initially included the MUSIQ data but this was removed to achieve journal article word limits.

The individual mixed-method case studies provided a good foundation for the assessment of the applicability of MUSIQ in primary care. During the coding process within NVIVO, codes were assigned to both CFIR and MUSIQ codes. The results were analysed through the broader lens of CFIR qualitative data and compared with the MUSIQ quantitative data. In some areas the CFIR qualitative data and the quantitative MUSIQ data showed conflict, that was explained by the perspectives given in the qualitative data as participants explained why they had given that score. The MUSIQ scores for each site are shown in Appendix 1 and the factors with a score less than four (the highest possible score for each factor is seven) are highlighted in amber. Redundant MUSIQ factors were identified as well as emergent and factors from or adapted from CFIR not currently included in MUSIQ. A primary care adaptation of MUSIQ is proposed to enhance the applicability of MUSIQ in primary care.

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STATEMENT OF CONTRIBUTION DOCTORATE WITH PUBLICATIONS/MANUSCRIPTS

We, the candidate and the candidate's Primary Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of candidate:	Jane Cullen
Name/title of Primary Supervisor:	Nihal Jayamaha
In which chapter is the manuscript /published work:	4
<p>Please select one of the following three options:</p> <p><input type="radio"/> The manuscript/published work is published or in press</p> <ul style="list-style-type: none"> • Please provide the full reference of the Research Output: <p><input checked="" type="radio"/> The manuscript is currently under review for publication – please indicate:</p> <ul style="list-style-type: none"> • The name of the journal: BMJ Quality & Safety • The percentage of the manuscript/published work that was contributed by the candidate: 85.00 • Describe the contribution that the candidate has made to the manuscript/published work: The candidate was responsible for conceptualisation, data collection, analysis and writing a complete first draft of the article based on suggestions from the co-author supervisors. <p><input type="radio"/> It is intended that the manuscript will be published, but it has not yet been submitted to a journal</p>	
Candidate's Signature:	Jane Cullen <small>Digitally signed by Jane Cullen Date: 2023.11.13 10:42:43 +13'00'</small> J Cullen
Date:	13-Nov-2023
Primary Supervisor's Signature:	Nihal Jayamaha <small>Digitally signed by Nihal Jayamaha Date: 2023.11.13 09:45:58 +13'00'</small>
Date:	13-Nov-2024

This form should appear at the end of each thesis chapter/section/appendix submitted as a manuscript/publication or collected as an appendix at the end of the thesis.

Assessing the applicability of the Model for Understanding Success in Quality for primary care: A multi-case mixed methods analysis.

AUTHORS:

1. Jane Cullen, Massey University (PhD student)
2. Prof. Paul Childerhouse, Royal Melbourne Institute of Technology
3. Nihal Jayamaha, Massey University
4. Assoc. Prof. Dr. Lynn Mc Bain, University of Otago

Abstract

Background:

Effective quality improvement (QI) is vital to improve healthcare quality and outcomes. The context surrounding QI has a dynamic relationship with QI efforts over time. Developing an understanding of context may provide opportunities to address barriers to success. Most studies into contextual influences have been conducted in secondary care. Primary care is key to improving population health, equity, and value. The Model for Understanding Success in Quality (MUSIQ) is a commonly used context assessment tool that was developed in large mainly secondary care organisations and unanswered questions have been raised as to its applicability in primary care.

Methods:

A multi-case mixed methods approach was followed. Quantitative data from the MUSIQ survey, were compared with qualitative data from New Zealand (NZ) primary care interviews. The Consolidated Framework for Implementation Research (CFIR) guided qualitative data collection and analysis.

Results:

A small subset of CFIR interview participants completed the MUSIQ tool (14 out of 33). Scores were duplicated between common microsystem and organisational factors. External motivation created mixed reactions and scores depending on interpretation, but consistent themes of community responsibility and network relationships were identified as strengths. A lack of QI infrastructure and triggering events were consistent findings.

Conclusions:

Total MUSIQ scores were impacted by scores given for factors at different MUSIQ levels that are combined in many primary care organisations. A primary care adaptation of MUSIQ is proposed that removes the duplicated levels and adds key primary care contextual factors not included in MUSIQ.

Key words: Quality improvement, Implementation science, Model for Understanding Success in Quality, MUSIQ, general practice, context.

Paper type: Research paper

What is known about the topic:

Contextual factors are an important determinant for successful quality improvement. Context assessment tools that have been developed for primary care are rare and primary care settings are very different from hospital settings.

What this study adds:

This research evaluates the use of MUSIQ in primary care and provides direction for improving its applicability in primary care. Duplicated levels have been removed and specific primary care factors added to improve applicability, particularly for small-medium sized general practice settings.

How this study might affect research, practice, or policy:

The MUSIC adapted for primary care can be used to assess the primary care context surrounding quality improvement efforts and identify important modifiable factors to act on and improve the likelihood of success.

Introduction

Quality improvement (QI) is vital in healthcare where there are too many examples of poor access, inequity, harm, unwarranted variation, and care that is not in line with current evidence-based knowledge (Braithwaite et al., 2020; Doty et al., 2021). Implementation and improvement science research identifies context as contributing to the variation seen in QI outcomes (Bate et al., 2015; Kao, 2014). The context surrounding QI has a dynamic relationship with the intervention and implementation process over time and developing an understanding of the context may provide opportunities to address barriers to success (Dewan et al., 2021; Kaplan et al., 2013; Øvretveit et al., 2017; Reed et al., 2018). Assessment and measurement instruments have been developed so that this knowledge can be used to modify contextual factors and improve QI success (Coles et al., 2020; Kaplan et al., 2013; Øvretveit et al., 2017; Reed et al., 2018). The Model for Understanding Success in Quality (MUSIQ) is a model that is widely used by QI practitioners to assess contextual factors (Dewan et al., 2021; Douglas et al., 2019). In this model context is defined as everything that is not part of the intervention and the implementation process (Kaplan et al., 2012).

It is internationally recognised that “high-quality primary care is the foundation of a robust health care system”, and is critical for achieving health of the population, addressing inequities, improving care experience, system value and sustainability (National Academies of Sciences et al., 2021). Most research into the factors influencing QI success has been conducted in large, predominantly secondary care organisations where key contextual factors are likely very different to those in the more numerous primary care settings with different funding, structures, culture, care delivery models and aims (Auraaen et al., 2018; Crabtree et al., 2011; Fiscella & McDaniel, 2018; Lau et al., 2016).

MUSIQ was developed based on quantitative data from large and predominantly hospital-based studies and provides statistical analysis of the relationship between contextual factors (Kaplan et al., 2013). MUSIQ has not been widely tested in primary care and questions have been raised regarding its applicability (Douglas et al., 2019; Kaplan et al., 2012; Siriwardena, 2012). Therefore, this study asks:

- How applicable for assessment in primary care is the Model for Understanding Success in Quality (MUSIQ)?
- How might the MUSIQ be adapted for use in primary care?

Background

Implementation science has generated a wide range of heuristics, to understand or explain the determinants of implementation outcomes with subsequent attempts to provide consolidated

models, associated taxonomies, templates, checklists and selection guides (Birken et al., 2018; Damschroder et al., 2009; Flottorp et al., 2013; Nilsen, 2020; Stange & Glasgow, 2013; Tabak et al., 2012). Context is a common factor across these heuristics but one that is variably defined and described (Nilsen & Bernhardsson, 2019). The large number of heuristics developed attempting to explain the role of context in QI demonstrates the complexity and variation inherent to the topic (Moullin et al., 2020; Nilsen, 2020; Reed et al., 2018). As definitions of context vary, so do the modifiable factors identified in the various frameworks and potential measures and measurement tools (Brennan et al., 2012; Damschroder et al., 2009; Nilsen & Bernhardsson, 2019).

MUSIQ is one of few models where the relationships between contextual factors and improvement outcomes has been explored (Kaplan et al., 2013; Wilson et al., 2018). It is theory-based, with well-defined constructs built from a systematic review and structured expert opinion (Kaplan et al., 2012; Reed et al., 2018; Tomoaia-Cotisel et al., 2013). MUSIQ has been used for qualitative evaluation within secondary care (Griffin et al., 2017; Wilson et al., 2018), the health system (Barson et al., 2017), a mixed-methods evaluation of a collaborative initiative (Dewan et al., 2021) and as a categorization framework for systematic review (Kringos et al., 2015). Recent reviews of MUSIQ conducted by secondary analysis of hospital QI through a complexity lens produced additional constructs and levels of context (Reed et al., 2018), and an adapted version for low-income countries (Reed et al., 2017). However, the applicability of MUSIQ in primary care is still in question.

A systematic review of instruments to measure contextual factors for QI in primary care by Brennan et al., (2012) found 41 mainly Likert-scale based measurement instruments available, with 15 of these from primary care. The conceptual model for that review, Informing Quality Improvement Research (InQuIRe) in primary care, separated context into the domains of organisational context (antecedents and proximal outcomes) and individual level context (Brennan et al., 2012). No instrument included all the InQuIRe indicator domains or sub-domains, some instruments focused on very few domains but comprehensively and others had a scattering of several InQuIRe domains (Brennan et al., 2012). Culture, climate, and leadership for QI were the most comprehensively measured but instruments were usually not designed for primary care (Brennan et al., 2012). Only 17% (7) of the instruments provided evidence of validity or reliability (Brennan et al., 2012).

The Consolidated Framework for Implementation Research (CFIR), a theory based determinant framework, was developed from a synthesis of nineteen published models (Damschroder et al., 2009) and is commonly used in healthcare (Birken et al., 2017; McDonald, 2013; Skolarus et al., 2017). It has been used in primary care QI in the stages of pre-, during- and post-implementation (Garbutt et al., 2018; Ilott et al., 2013; Keith et al., 2017; Kirk et al., 2015; Kowalski et al., 2018; McHugh et al., 2018;

Meyers et al., 2018). The CFIR has predominantly been used in qualitative studies, but it has also been used in mixed methods and quantitative studies (Kirk et al., 2015) and in a hospital-based study as a qualitative tool to compare with quantitative MUSIQ data (Dewan et al., 2021).

Qualitative exploration gives an in-depth understanding of factors and the relationships between factors, the intervention and implementation (Bate et al., 2015; Queirós et al., 2017; Reed et al., 2018). Quantitative approaches, which rely on reductionism may focus on accurately estimating key factors effect size on the outcome without describing 'how' or 'why' this occurs (Coles et al., 2017; Kao, 2014). The simplification inherent within quantitative variables can reduce the burden of data collection, analysis and aid understanding through statistical examination of relationships (Choy, 2014; Queirós et al., 2017). Application of quantitative and qualitative methods together (mixed methods) has potential to provide a more complete picture of context and is frequently used in QI and implementation science (Bate et al., 2015; Kao, 2014; Nilsen & Birken, 2020).

Method

A multi-case mixed methods approach was followed with quantitative data collected via the MUSIQ excel calculator (Cincinnati Children's Hospital Medical Centre, CC BY 3.0) attached in word format in supplemental file S1. This was compared with qualitative data from primary care interviews conducted by the lead author (JC, PhD candidate and QI advisor) utilising CFIR to guide data collection and analysis (Damschroder et al., 2009). The interviewer had no relationship to the organisations prior to the research but did know one participant through other primary care work. The rationale, purpose and mixed methods constructionism approach of the research was explained during the consent process.

A mixed methods approach was chosen to allow comparison of the in-depth qualitative data with the MUSIQ quantitative data (Creswell, 2014). CFIR was used to identify primary care contextual factors that may or may not be present in MUSIQ because of the frameworks' broad coverage, its similarities with MUSIQ (Kaplan et al., 2012) and its applicability to primary care (Ilott et al., 2013; Keith et al., 2017; Kowalski et al., 2018). The wider range of CFIR constructs allowed identification of factors not part of MUSIQ.

Participating sites were selected by purposeful theoretical sampling to include high-performing general practice and Primary Health Organisation (PHO) settings typical of New Zealand (NZ) primary care. Sites were approached via email after obtaining the ethical approval and support of their Primary Health Organisations and/or District Health Boards. Three other sites were approached and consented but either the staff did not consent, or a suitable time could not be arranged and therefore no data were collected. Case study sites chose a completed successful QI intervention (QII) for this study and

interviews were conducted on-site, with one interview and all follow-up interviews via telephone or videoconference. Case characteristics and interview participants are outlined in Table 1.

The interviews, between 30 minutes to one hour long, were audio recorded and transcribed by the lead author. Transcripts were checked for accuracy by the participants. Qualitative comments were themed intuitively and according to the CFIR codes and MUSIQ codes using NVivo qualitative analysis software (QSR International). The themes were compared to MUSIQ scores and any field notes made during the interviews by the lead author. Broad themes were reported back to the participants and feedback received with some corrections or clarification of comments and feedback that supported the findings. The alignment between MUSIQ factors and the CFIR domains and subconstructs are shown in Table 2. CFIR domains and constructs that do not align to the MUSIQ factors are not shown.

The qualitative data collection methods and analysis have previously been presented in a three-case comparative study (Cullen et al., 2022) and six-case comparative study (Cullen et al., 2023). The MUSIQ survey tool used in the study is available online from international sources (<https://qi.elft.nhs.uk/resource/the-model-for-understanding-success-in-quality-2/>) and supplemental file 1. Participants were asked to complete the MUSIQ survey post-interview, management choosing who would participate and how to complete the survey (individually or group) according to capacity constraints. All participants were given the MUSIQ definitions to consider beforehand and while answering questions. The MUSIQ data, codes and CFIR codes were compared at each stage of transcript thematic analysis, during within case analysis and again at cross-case analysis.

Ethics

This study was deemed low-risk and not requiring a full ethical review (Massey University Ethics Notification No. 4000018920).

Table 1. Case characteristics

	Case 1 (C1)	Case 2 (C2)	Case 3 (C3)	Case 4 (C4)	Case 5 (C5)	Case 6 (C6)
Organisation	A PHO and VLCA* practice co-located with Community Mental Health and other health services.	A Kaupapa Māori** VLCA practice	An integrated family health service	General practice	A Kaupapa Māori PHO with varied primary health care services including 5 VLCA general practices.	A general practice co-located with a range of other health services.

	Case 1 (C1)	Case 2 (C2)	Case 3 (C3)	Case 4 (C4)	Case 5 (C5)	Case 6 (C6)
Setting	Remote rural practice.	An urban practice within a satellite town of a large city.	An urban practice in a large city.	Urban practice in a large city	Sited in urban suburbs surrounding a large city	Urban practice in a large city
Practice size (100th percentile is the largest at approx. 29,000 patients)	Approx. 6,000 enrolled patients 76 th percentile	Approx. 3000 enrolled patients 40 th percentile	Approx. 6,000 enrolled patients 76 th percentile	Approx. 13,000 enrolled patients 95 th percentile	PHO approx. 18,000 enrolled patients. Practices: 2,500 - 5,500. From 38 – 67 th percentile.	Approx. 20,000 enrolled patients 99 th percentile
FTE unless otherwise stated	7 general practitioners (GPs) employed over varying hours.	GP: 2.5 Nurse practitioner: 1 Practice nurses: 2 Community health team 3.6	GP: 5 Practice Nurses (PNs): 2.35.	Head count of 13 GPs with various FTE	Practice headcount: GPs: 25 PNs: 30 PHO: Approx. 120 staff in a range of roles.	Chief Executive GP director. Finance/admin: 2 GPs: 11.9 PNs: 9.5 Reception: 10
Interview participants. All of those interviewed were actively involved in the improvement apart from those in italics.	PHO clinical director CMH district manager General practice (mental health) liaison nurse Practice nurse General practitioner (GP)	GP director Practice manager Nurse lead Administration team lead Community health worker/receptionist <i>Community health worker</i> <i>Practices nurses (2)</i>	GP director DHB service integration facilitator PHO project manager Practice nurse Receptionist	Clinical Nurse Lead GP Director Clinic RN General Manager Administration Manager PHO Data Analyst PHO Nurse Director	Quality Leader Clinical lead nurse Hub senior lead Hub administrator	General Manager Medical Director G.P. Associate
Intervention	Physical health for patients with a Mental	Telephone Triage project.	Patient prioritisation at reception.	Nurse-led acute paediatric	A central telephone call answering and	Model of care change from acute care and

	Case 1 (C1)	Case 2 (C2)	Case 3 (C3)	Case 4 (C4)	Case 5 (C5)	Case 6 (C6)
	Health diagnosis.			(initially 13 years and under) clinic.	appointment booking service.	general practice to general practice only.
Date of QII	2017	2014	2017	2018	2018	2018
Date of interviews	October 2018	October 2018	January 2019	August 2019	January 2020	December 2019
<p>*VLCA: Very low-cost access (VLCA) practices have an enrolled population that is at least 50% economically deprived or Māori and Pacific Island peoples and the practice receives funding to maintain low fees.</p> <p>**Kaupapa Māori: “In the area of health it has been used to reflect an approach to clinical practice that recognises Māori perspectives” (Durie, 2012).</p>						

Table 2. MUSIQ and CFIR domains and factors/constructs

MUSIQ system levels	Factors	CFIR domains	Constructs
Environment	External motivators External project sponsorship	Outer setting	Peer pressure External policy & incentives Intervention construct 'Intervention Source' aligns to external project sponsorship
Organisation	QI leadership Senior leader sponsor Organisational QI culture QI Maturity	Inner setting	Culture Implementation climate Tension for change Relative priority Organisational incentives and rewards Goals & feedback Learning climate Readiness for implementation Leadership engagement Available resources Access to knowledge & information
QI support and capacity	Data infrastructure Resource availability Workforce focus on QI		
Microsystem	QI leadership Motivation QI capability Microsystem QI culture		

MUSIQ system levels	Factors	CFIR domains	Constructs
QI Team	Team leadership Team diversity Team subject matter expertise	Characteristics of individuals	Knowledge & beliefs about the innovation Self-efficacy Individual stage of change
	Decision making process Team norms QI skill Prior QI experience Physician involvement Team tenure	Implementation process	Opinion leaders Champions Reflecting and evaluating
Miscellaneous	Task strategic importance to the organisation Triggering event	Inner setting	Relative priority
	Although the <i>implementation process</i> is theoretically not part of context, the definitions for the CFIR constructs in this section aligns to the MUSIQ factors in bold.		

Results

A smaller subset of CFIR interview participants completed the MUSIQ tool (14 out of 33). Cross-case results analysis is reported under the MUSIQ headings comparing MUSIQ and CFIR results. The CFIR results and illustrative quotes have been reported previously and are available in the supplementary material (Cullen et al., 2023; Cullen et al., 2022) The MUSIQ interpretation guide and complete results are shown in Appendix 1. Case 1 scores are shown for the DHB, and the PHO/practice participants described in Table 1 and are an agreed score, remaining scores are averages or a single participant score. The MUSIQ survey is made up of 35 questions which are grouped to provide scores for the contextual factors, with a maximum possible score of 7. The overall MUSIQ scores are between 125 and 140 out of a possible 168. Where the scores were below 4, they have been highlighted in amber. The QIIs were selected by participants for their success, were scored retrospectively and all projects are within the highest range.

Outcome

This study was based on the participants perception of success and QII success was not scored. Cases provided direct data, and in one case indirect data, that supported achievement of the QII aims and other related benefits.

Context

External environment

The factor 'external motivators' was understood and interpreted differently by the teams which affected scoring. Some cases included patient need in their score for this factor and scored this highly. Lower scoring cases were C2, a Kaupapa Māori organisation that did not view patients as external to the organisation and disliked 'incentives', and C3 and C6 also felt they did not need external incentives. The CFIR construct of 'patient needs and resources' was a key factor supporting QII success, for example from C3: *"If it's not good for patients, why are we doing it?"*

Case 1 (C1) was the only team with financial sponsorship, but most teams had some degree of external support and/or team participation from the PHO and/or DHB (C5 is a PHO). This is shown in Table 1 and contributed to the positive scores for external sponsorship. High scores for external sponsorship were associated with cases where support was provided from the PHO (C4) and Healthcare Home Collaborative (C5), even though there was no financial support. In C6 the score of 1 reflects that external sponsorship was not desired nor required.

The CFIR construct of cosmopolitanism refers to the degree to which organisations are networked with other organisations (Damschroder et al., 2009). All teams had strong networks with national groups, PHOs and/or DHBs and within local communities. These relationships differed from external project sponsorship and were an important factor in most of these QIIs and how all Cases operate. C2 - C4 and C6 have staff in governance positions at the PHO or the DHB. Several of the PHOs and DHBs use these practices work to demonstrate improvement to others. C1, C3, C5 and C6 are integrated health services working alongside other primary health services.

Organisation

MUSIQ includes QI leadership and QI culture at both organisation and microsystem levels and in smaller primary care organisations there is no separation between microsystem and organisation. Similarly, QI maturity (sophistication of the QI programme) at the organisation level and capability for QI (staff ability to use QI for change) had substantial overlap in the smaller cases.

QI support and capacity

The factor QI workforce focus, which is about training and reward systems to support QI (Kaplan et al., 2012) did not score highly. Only C4 had received training in QI and no case rewarded QI, although it was encouraged. C4 and C6 were both part of a local primary care QI programme that taught the PDSA methodology and several C4 participants had completed a short course on QI.

Microsystem

Microsystem QI leadership was generally scored highly. The high scores for QI culture reflect the high culture scores also given for organisational QI culture and apart from C1 the microsystem and organisation are the same. There was some variation in motivation scores as C1, C3 and C4 reported the microsystem (or organisation) outside the QI team less motivated than the QI team. QI capability was the lowest score in this section. Only C3 had some confidence in their abilities to use QI methods with an average score of five, and C4, the only case to use formal QI methods, scored themselves three.

MUSIQ measures external sources of motivation and within the microsystem. This caused some confusion in the participants who felt intrinsically motivated by their sense of responsibility for the communities they care for and often did not regard the community as external.

QI Team

QI team scores were generally high which included leadership, diversity, subject matter expertise and physician involvement. This is reflected in the mixed team membership shown in Table 1. The lowest scoring factor in this group was for QI skill with C1 and C5 only scoring 2 and 3 as participants were not confident to score highly for the use of technical QI skills. However, as they had all been working to improve the quality of healthcare services for some time, they rated prior QI experience more highly. All teams had capable members and leaders with confidence in leading change. Both C4 and C6 had team members with experience in formal QI but it was only C4 that applied formal QI methods.

Team decision-making, team norms and team tenure received high scores reflecting established team relationships and collaborative decision-making, a feature of teamwork, that was supported by the qualitative data. Teamwork was commented on by every team and several teams spoke of having a family-like relationship. In C2 and 5 the unique cultural characteristics of *kotahitanga* (unity, strength within, solidarity and accord) and *whanaungatanga* (relationships and kinships) supported strong internal and networked community relationships. These cultural perspectives are not able to be captured by a western-based quantitative measurement tool. Every team agreed on the importance of team leadership, and described shared or distributed leadership models involving both formal and informal leadership that was reflected in the high scores given for QI Team Leadership and Diversity but is not fully captured in the leadership attributes defined in MUSIQ.

An inner setting team and organisational theme of community responsibility was identified that was not included in either MUSIQ or CFIR. Community responsibility was expressed by each case and the need to do this work C6-GP: *“to address the needs of the community that we serve.”* The Kaupapa

Māori organisations felt an even deeper connection, described as *manaakitanga* (value, respect, and care for) and *whanaungatanga*.

Miscellaneous

This section includes the tasks strategic importance to the organisation and the presence of a triggering event (positive or negative) prompting the QII. All teams assigned a score of one for ‘triggering event’ indicating that this was not a factor. The teams commented that these QIIs were internally motivated, reflected in the high score for strategic importance.

Additional themes

Patient needs and resources and a deeper form of cosmopolitanism were identified as important factors underpinning QII success. These are CFIR constructs that are not included in MUSIQ. The sense of community responsibility underpinning the high levels of motivation to succeed is not part of either model although motivation (MUSIQ) and compatibility and relative priority (CFIR) are related. Table 3 below shows these additional two CFIR constructs (in italics) and one new construct (not in italics).

Table 3. Identified additional themes (CFIR and emergent)

MUSIQ/CFIR Domains	Construct
	<i>Additional construct not included in CFIR is shown in italics</i>
Environment/ <u>Outer setting</u>	Patient needs and resources Cosmopolitanism (deeper)
Microsystem/ <u>Inner setting</u>	<i>Community responsibility (motivation)</i>

Discussion

This study used the quantitative MUSIQ tool alongside qualitative use of CFIR to assess the applicability of the MUSIQ tool in primary care. The qualitative data guided understanding of the thinking behind participant scores and allowed exploration of additional contextual determinants of success demonstrating the utility of mixed methods design. MUSIQ has recently been revised (Reed et al., 2018), that version is referred to as MUSIQ2.0 and we include consideration of MUSIQ2.0 changes in this discussion.

The overall MUSIQ score is high indicating likelihood of success because of the strength of the strong human-centred contextual factors. However, the total score is likely to have been raised by multiple scores for factors at different levels. In the small-medium sized practices that make up the majority of NZ general practice, leadership was shared and distributed throughout the team without the three levels defined in MUSIQ. This distributed leadership, QI culture, team relationships, and motivation

engendered by their community responsibility mitigated the identified weaknesses in formal QI methods, skills, staff, and resources. Teams described “family-like” relationships, kinship, unity, and togetherness, expressed in the Kaupapa Māori organisations as *whanaungatanga* and *kotahitanga*. This is not included in any of the definitions of MUSIQ team factors which did not capture the essence of these team strengths and teamwork described.

MUSIQ2.0 has two new external contextual factors: external knowledge general (quality improvement and implementation (QI&I)) and; project specific, regarding the “extent to which the team or organisation values and acquires knowledge from external sources” (Reed et al., 2018). This study supports QI&I external knowledge general as trusting relationships and *whanaungatanga* take time to build (Lanham et al., 2016; Larkins et al., 2019). This study highlighted network relationships for the purposes of QI and more, building relationships as a source of two-way sharing, knowledge, resources, and adaptive reserve.

Patient engagement was not included as a factor in this version of MUSIQ, but it has been added as a team factor in MUSIQ2.0 (Reed et al., 2018) reflecting the shift in healthcare QI thinking and practice (Damschroder et al., 2022). Consumer engagement and co-design are part of the healthcare quality improvement curriculum in NZ, but this knowledge is still developing in the primary care sector and was not a factor in most of these cases, although a focus on patient needs was expressed in every case. Patient needs and resources: “the extent to which patient needs, as well as barriers and facilitators to meet those needs are accurately known and priorities by the organisation” (Damschroder et al., 2009) was identified here as an inner setting factor.

The MUSIQ2.0 has the additional infrastructure factor of specialist QI&I staff and QI&I portfolio management (Reed et al., 2018), both are rare in the small-medium sized organisations that figure predominantly in NZ general practice. Formal QI methods were only applied in Case 4, where several staff are trained in QI, and they were supported by an improvement advisor at the start of the project. This is reflected in the low MUSIQ scores for microsystem QI capability by all teams and by C1 and C5 for QI team QI skill who had the most exposure to QI methods. Overestimation of QI skills from those with less exposure has been found in primary care studies (Gosling et al., 2019; Parchman et al., 2019), the scores are subjective self-assessments and practice comparisons cannot be made. Workload has been identified as a barrier to QI and the supportive QI infrastructure, including personnel, that exists in hospitals is not often present in primary care (Gosling et al., 2019; Parchman et al., 2019).

A primary care adaptation of MUSIQ is proposed in Figure 1 that combines the duplicated features between organisation and microsystem to increase applicability in the small-medium sized practices common in NZ. External motivators remains although rather than a ‘motivator’ or incentive it can

disincentivise primary care QI, this is still relevant. The arrows between Microsystem/Organisation (MS/O) and QI support and capacity are two-way as there are interrelationships between several of the factors and the QI support and capacity comes from the organisation which is also the microsystem in small-medium sized primary care organisations. Network relationships also provide resources in knowledge, connections to others working on similar work and in some cases data and this is shown in the arrow from network relationships to QI support and capacity.

Two new factors are added to the outer setting domain. *Network relationships specific to QI* (but not project specific) is similar to, but distinct from, cosmopolitanism and the new MUSIQ2.0 factors of external knowledge general and project specific (Reed et al., 2018). This was identified in these primary care cases from the interconnectivity present with local community, population, other health and social care organisations and professional communities for QI in general and for the QII. Patient needs and resources from CFIR was added as this was a key motivator and guided QII selection, although it was identified as an inner setting factor rather than outer setting factor by participants.

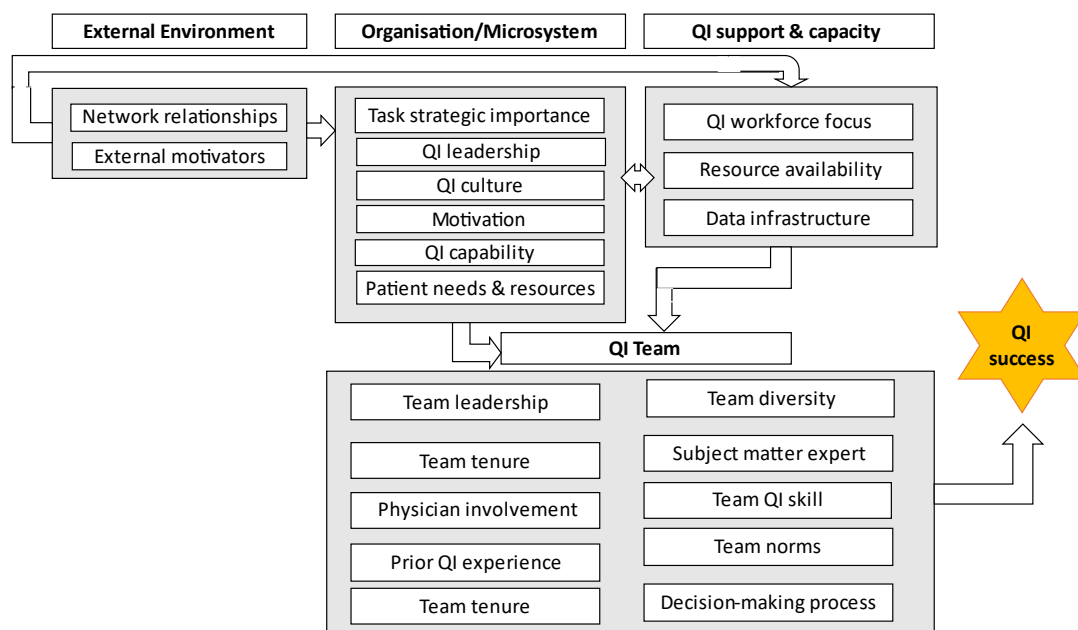


Figure 1. The Model for Understanding Success in Quality adapted for primary care (MUSIQ-PC)

Conclusion

The high-level principles and factors, such as leadership, motivation and QI culture within MUSIQ are applicable in primary care. However, as Kaplan et al., (2012) suggest, the multiple levels and roles within the model were difficult to apply. This meant that the teams received multiple scores for QI culture and QI leadership and created some confusion when answering these questions.

Triggering events were not present in any of the cases and seems to offer little value. Patient need is a key driver and connected to motivation for improvement and would seem to be a suitable replacement for triggering event within the model as an inner setting factor. The specific sense of community responsibility, which is receptive to and triggered by the identification of patient need is not included in MUSIQ. However, consideration of motivation at different parts of the system is, and this is applicable and useful.

Table 4. Definitions of contextual factors

Contextual factor	Definition source
External environment	
External motivators	(Kaplan et al., 2012)
Network relationships The degree to which an organisation and its staff are networked, combining complementary strengths with other external organizations, their local community and population to collaborate for QI.	(Coombe et al., 2020; Damschroder et al., 2009; Lanham et al., 2016; Larkins et al., 2019)
Organisation/microsystem	
QI leadership	(Kaplan et al., 2012)
Culture supportive of QI	(Kaplan et al., 2012)
Motivation to change	(Kaplan et al., 2012)
Capability for improvement	(Kaplan et al., 2012)
Patient needs and resources	(Damschroder et al., 2009)
QI support and capacity	
Data infrastructure	(Kaplan et al., 2012)
Resource availability	(Kaplan et al., 2012)
Workforce focus on QI	(Kaplan et al., 2012)
QI Team	
Team diversity	(Kaplan et al., 2012)
Physician involvement	(Kaplan et al., 2012)
Subject matter expert	(Kaplan et al., 2012)
Team tenure	(Kaplan et al., 2012)
Prior QI experience	(Kaplan et al., 2012)
Team leadership	(Kaplan et al., 2012)

Team decision-making process	(Kaplan et al., 2012)
Team norms	(Kaplan et al., 2012)
Team QI skill	(Kaplan et al., 2012)
Miscellaneous	
Task strategic importance to the organisation	(Kaplan et al., 2012)

The structures and relationships within and between the inner and outer setting differs in primary care, some of the layers are not present and external sponsorship can receive a mixed reception in primary care (Avby et al., 2019; Middleton et al., 2018). MUSIQ2.0 adds missing factors, but it also adds further infrastructure and organisational details that are not present in primary care. The network relationships that provide shared knowledge and resources where required, in reciprocal relationships, support spread and sustainability of improvement. This is a key enabler in primary and community care, particularly in under-resourced settings (Larkins et al., 2019; Lim & Islam, 2022). Internationally, investments have been made in, and via, network relationships to provide the QI infrastructure and expertise that is not often present in the small -medium sized primary care organisations (Crabtree et al., 2011; Knight et al., 2019) that make up the bulk of NZ general practice organisations.

Despite the issues described, some team members found value in the thinking and conversation generated by completing the quantitative snapshot of context and as intended, it highlighted a modifiable aspect of context in their QII. As a tool to guide thinking about possible enablers and barriers to QI in primary care, MUSIQ has value, but we question the ability to make comparisons and judgements on the viability of QI efforts based on the numerical MUSIQ scores.

Strengths and limitations

This is one of few attempts to study the applicability of MUSIQ in primary care, thus building the understanding of how context influences quality improvement success in primary care and proposing a primary care adaptation of MUSIQ. Limitations of this study include the low number of participants that completed the MUSIQ tool and the case sample from only successful projects meaning that it is unknown how these factors might operate in unsuccessful primary care projects. This research studied six NZ cases and with the heterogeneity of primary care applicability will need to be evaluated from the descriptions of site characteristics and tested further in other settings.

Another limitation is the appropriateness of using western models such as CFIR or MUSIQ to understand Indigenous (Māori) QI approaches. This risks misinterpretation, misrepresentation and devaluing of indigenous knowledge and one should be cautious interpreting the findings in Indigenous

settings. This risk was mitigated by the feedback from these teams, but it still exists as only the experience of being Māori can allow a full understanding of Māori concepts and ways of viewing the world.

Future directions

Further research is required to test this primary care model on successful and unsuccessful primary care quality improvement efforts and particularly the values assigned to the likelihood of successful projects. Is the best practical use of the MUSIQ as a combined qualitative and quantitative tool or only one or the other? Are the different uses of the tool more applicable at different levels of the system, e.g., micro-system: qualitative and meso- or macro-system: quantitative? These questions all prompt avenues for future research.

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Appendix 1: MUSIQ results

Contextual Factor	C 1* PHO & GP	C 1* DHB	C 2*	C 3*	C 4*	C 5*	C 6*	Max score
External environment								
External Motivators	7	7	1	5	7	7	5	7
External Project Sponsorship	5	5	5	5.3	7	7	1	7
Organisation								
QI Leadership	7	2	7	7	7	3	7	7
Senior Leader Sponsor	7	7	7	7	7	7	7	7
QI Culture	7	7	7	6.3	7	7	7	7
QI Maturity	6	4	5	5.8	2	5	6	7
QI support and capacity								
Data Infrastructure	6	6	2	6.5	6	4	6	7
Resource Availability	4	4	7	5	7	7	5	7
QI workforce focus	2.8	3.3	4.3	4.9	4.8	5	4.7	7
Microsystem								
QI Leadership	4	4	7	6	7	7	7	7
QI Culture	7	7	7	6.8	7	7	7	7
Motivation	4	4	7	5.5	5	7	7	7
QI Capability	1	1	3	5	2	2	2	7
QI Team								
Team Leadership	7	7	7	7	7	7	7	7
Team Diversity	7	7	7	7	7	6	6	7
Subject Matter Expert	7	7	7	6.3	7	6	7	7
Team Decision-Making Processes	7	7	6.7	6.5	7	6.8	6.8	7
Team Norms	7	7	7	6	7	6.8	7	7
Team QI Skill	2	2	7	5.3	7	3	5	7
Physician Involvement	7	7	7	7	7	6	7	7
Prior QI Experience	5	5	7	5.3	7	6	6	7
Team Tenure	7	7	7	7	7	7	7	7
Miscellaneous								

Triggering Event	1	1	1	1	1	1	1	7
Task Strategic Importance to the Organization	7	6	7	6.8	7	7	7	7
Total Score	132	125	140	140	147	138	139	168
<p>*C1 completed the MUSIQ survey together as two groups (DHB and PHO/general practice) and provide an agreed score for each group. C2 had two participants give an agreed score, C3 four participants scored separately and then the scores were averaged, C4, C5 and C6 only one person completed the survey. A total of 14 out of 33 individual participants completed the MUSIQ survey. Scores less than 4 are highlighted in amber.</p>								

MUSIQ score interpretation guide

Total Score	
168	Highest possible MUSIQ score
120-168	Project has a reasonable chance of success
80-119	Project could be successful, but possible contextual barriers
50-79	Project has serious contextual issues and is not set up for success
25-49	Project should not continue as is; consider deploying resources to other improvement activities
24	Lowest Possible MUSIQ Score when all questions are answered
1	Lowest Possible MUSIQ Score (questions recorded as "don't know" or "N/A")

Supplemental S1: MUSIQ Calculator

(Cincinnati Children's Hospital Medical Centre, Licensed under CC BY 3.0)

DIRECTIONS								
This is a tool designed to help you assess aspects of your local context that may affect the success of your quality improvement project								
We have identified a number of contextual factors at multiple levels of the health care system that we believe influence the successful implementation of quality improvement								
We have summarized these factors and how they influence success in a model called MUSIQ. This tool is meant to help you examine context using MUSIQ.								
This excel spreadsheet has eight tabs (worksheets)								
The first tab includes definitions of terms you will find throughout the tool. Please reference this page to make sure you are familiar with the terms that will be used.								
The third, fourth, fifth, sixth, seventh, and eighth tabs have questions assessing aspects of context at multiple levels including:								
QI team, Microsystem, QI Support Infrastructure, Organization, Environment, and Other								
On each of these tabs (tabs 3-8), a series of questions is listed on left hand side of the spreadsheet.								
Indicate the extent to which you agree or disagree with that statement by typing the appropriate response (number 1-7) in the indicated cell.								
For example:								
Question	Totally Agree			Neither Agree Nor Disagree			Totally Disagree	Don't Know N/A
	7	6	5	4	3	2	1	0
Most members of our QI team have worked on improvement projects before				4				
The QI team members have diverse professional backgrounds and experiences							1	

In this example, the respondent has answered the first question with a 4=Neither Agree Nor Disagree, and the second question with a 1=Totally Disagree by entering the numbers in the appropriate columns

The final tab gives your score for each contextual factor in MUSIQ. A higher score (max=7) for a contextual factor indicates that your context is likely to be supportive for this feature.

A lower score (min=1) indicates that this is an area you may want to address before or during your QI project.

Total Score

168	Highest possible MUSIQ score
120-168	Project has a reasonable chance of success
80-119	Project could be successful, but possible contextual barriers
50-79	Project has serious contextual issues and is not set up for success
25-49	Project should not continue as is; consider deploying resources to other improvement activities
24	Lowest Possible MUSIQ Score when all questions are answered
1	Lowest Possible MUSIQ Score (Questions recorded as "don't know" or "N/A")

IF YOU USE THE MUSIQ EXCEL CALCULATOR:



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Definitions

Term	Definition
Data Infrastructure	Extent to which a system exists to collect, manage, and facilitate the use of data needed to support performance improvement
Environment	the community and society surrounding your organization. It includes the geographical, political, and economic environment in which your organization (or office) exists and the associated regulations, policies, payment structures, etc.
External Motivators	Environmental pressures and incentives that stimulate the organisation to improve its performance and quality in the area of focus of this QI project
External Project Sponsorship	Substantial and meaningful contributions of personnel, expertise, money, equipment, facilities, or other important resources from outside entities (external to the organisation) with formal relationships with this QI project
Microsystem	a small group of people working together on a regular basis to provide care to discrete populations of patients. Microsystems may include doctor's offices or clinics, hospital units, hospital wards, or departments within a business/billing office
Microsystem Leaders	top managers with responsibility for the operation and administration of the microsystem affected by this QI project. Microsystem leaders may include department or division chairs, department managers, ward/unit medical or nursing directors, business unit managers, a senior physician in a large physician group, etc.
Microsystem Motivation	Extent to which microsystem staff members have a desire and willingness to improve performance in this area of focus
Microsystem QI Capability	Microsystem staff's ability to use QI methods for change
Microsystem QI Culture	Values, beliefs, and norms present in the microsystem that emphasise teamwork, communication, freedom to make decisions, and commitment to improve
Microsystem QI Leadership	Microsystem leadership capacity for improvement and degree to which they are personally involved in supporting and facilitating improvement efforts
Organization	the largest collective unit that provides service to a population of patients. For inpatient services we are typically referring to a hospital, nursing home, or long term care facility. For services in the outpatient setting, the organization may be a health care plan, hospital, or health care system (e.g., HMO affiliated clinic, hospital affiliated clinic, integrated services organization, etc.) However, some outpatient settings (clinics or offices) are not part of a larger organization, and in this case, the organization may refer to your clinic/office/physician group.
Organizational QI Culture	Values, beliefs, and norms of an organisation that shape the behaviours of staff in pursuing QI

Organizational QI Leadership	Senior management's (CEO, COO, CMO, Senior VP, Board of Directors) governance—guidance, support, oversight, and direction-setting—of improvement efforts
Physician Payment Structure	Physicians are employed and compensated by the organisation
QI Maturity	Sophistication of the organisation's QI program
QI Team	a group of individuals that work together on the QI project. The team is defined by their shared goals and mutual accountability for the QI project outcome. QI team members are typically responsible for planning and conducting tests of change and/or data collection and management. Members of the QI team may include, physicians, nurses, pharmacists, data managers, administrative staff, etc.
QI Team Decision-Making Process	Team engages in well-designed decision making practices
QI Team Diversity	Diversity of team members with respect to professional discipline, personality, motivation, and perspective
QI Team Leader	the member of the QI team that is responsible for directing the work of the team
QI Team Leadership	Team leader's ability to accomplish the goals of the improvement project through guiding the actions of the QI team
QI Team Norms	Team establishes strong norms of behaviour related to how work is to be carried out and how goals are to be achieved
QI Team Physician Involvement	Contribution of physicians to the QI team efforts
QI Team Prior Experience	Prior experience with QI
QI Team QI Skill	Team's ability to use improvement methods to make changes
QI Team Subject Matter Expert	One or more team members is knowledgeable about the outcome, process, or system being changed
QI Team Tenure	Team members have worked together as a team before
QI Workforce Focus	Degree to which the organisation develops the workforce through training and engages them in QI through reward systems and expectation setting
Resource Availability	Degree to which financial support for QI, including allocation of resources and staff time, is provided
Senior Executives	people with the overall responsibility for the operation and administration of the organization. Senior executives may hold various titles. At a hospital or HMO/Hospital affiliated clinic these may include: president, CEO, COO, members of the board of directors or cabinet, senior or vice president, or chairs or vice chairs of nursing or medicine. In a smaller office or clinic, these may include: senior partner or members of the partnership group.
Senior Leader Project Sponsor	Senior leader commitment to champion and support this QI project

Task Strategic Importance to the Organization	Work perceived as part of the organisation's strategic goals
Triggering Event	Presence of a specific event (positive or negative) that stimulates a new emphasis on improving quality in the area of focus of a given QI project

QI Team

Question	Totally Agree			Neither Agree Nor Disagree			Totally Disagree	Don't Know N/A
	7	6	5	4	3	2	1	0
Most members of our QI team have worked on improvement projects before								
The QI team members have diverse professional backgrounds and experiences								
There is a physician actively participating on this QI team								
At least one member of the QI team is an authority on the outcome, process, or system being changed in this project								
The QI team leader is an ongoing "presence" in this team-- someone who is readily available ¹								
Most members of my QI Team have a chance to participate in decision making ²								
We appreciate and build on our individual differences ²								
The contribution of every group member is listened to and considered ²								

Question	Totally Agree			Neither Agree Nor Disagree			Totally Disagree	Don't Know N/A
	7	6	5	4	3	2	1	0
Our QI team applies enough knowledge and skill to get the work done well ²								
We like to consider a lot of different ideas before making a decision ²								
Our QI team works hard enough to get the task done well ²								
QI team members agree on the projects overall goals ²								
The overall goals of the project guide the activities of QI project team members ²								
Members of my QI team behave as they are expected to ²								
All of the QI project team members are committed to the same project goals ²								
Our QI team effectively uses improvement methods (e.g., Plan-Do-Study-Act [PDSA] cycles, run charts, control charts) to make changes								
Members of our QI team were familiar with each other before they began working on this QI project								
Members of our QI team were familiar with each other before they began working on this QI project								
Reference:	¹ Edmondson A. Psychological Safety and Learning Behavior in Work Teams. Adm Sci Q 1999, 44(2):350-383 ² Lemieux-Charles L, Murray M, Baker GR, Barnsley J, Tasa K, Ibrahim SA. The effects of quality improvement practices on team effectiveness: A mediational model. J Organ Behav 2002, 23(5):533							

Microsystem

Question	Totally Agree			Neither Agree Nor Disagree			Totally Disagree	Don't Know N/A
	7	6	5	4	3	2	1	0
Microsystem leaders personally facilitate this QI project								
The microsystem values teamwork, communication, and a commitment to quality improvement								
Microsystem staff who are not members of the QI team are effective at using QI methods for change								
Microsystem staff who are not members of the QI team have a strong desire to improve performance in the area of focus of this QI project								

QI Support

Question	Totally Agree			Neither Agree Nor Disagree			Totally Disagree	Don't Know N/A
	7	6	5	4	3	2	1	0
Existing information systems allow us to easily pull data specifically needed for this QI project								
Our QI team has adequate financial support, resources, and time to meet the aims of this QI project								

Organization

Question	Totally Agree			Neither Agree Nor Disagree			Totally Disagree	Don't Know N/A
	7	6	5	4	3	2	1	0
The senior executives in my organization are directly involved in quality improvement activities								
At least one specific senior executive in my organization specifically supports this QI project								
This organization places no value on quality improvement note: this should default to "7" until it is scored by user	7							
Quality improvement is thoroughly integrated in this organization								
Staff are given education and training in how to identify and act on quality improvement opportunities ¹								
Staff are given education and training in statistical and other quantitative methods that support quality improvement ¹								
Staff are given the needed education and training to improve job skills and performance ¹								
Staff are rewarded and recognized (e.g., financially and/or otherwise) for improving quality ¹								
This QI project is directly aligned with the organization's key strategic goals								
Reference:	¹ RAND, Improving Chronic Illness Care Evaluation. Healthcare Organization Survey for Quality Management Director, http://www.rand.org/content/dam/rand/www/external/health/projects/icice/pdfs/qmd.pdf Shortell SM, Levin DZ, O'Brien JL, Hughes EF. Assessing the evidence on CQI: is the glass half empty or half full? Hosp Health services Adm 1995, 40(1):4-24							

Environment

Question	Totally Agree			Neither Agree Nor Disagree			Totally Disagree	Don't Know N/A
	7	6	5	4	3	2	1	0
Pressures or incentives from outside my organization motivated us to undertake this specific QI project								
Groups external to my organization (e.g., associations, institutes, collaboratives) provide important personnel, money, resources, or training in support of this QI project								

Other

Question	Yes	No
	7	1
A specific event prompted the launch of this QI project		

Total

Contextual Factor	Score
External Motivators	0
External Project Sponsorship	0
Organizational QI Leadership	0
Organization Senior Leader Sponsor	0
Organization QI Culture	1
Organization QI Maturity	0
QI Workforce Focus	0
Resource Availability	0
Data Infrastructure	0
QI Team Leadership	0
QI Team Diversity	0
QI Team Subject Matter Expert	0
QI Team Decision-Making Processes	0
QI Team Norms	0
QI Team QI Skill	0
QI Team Physician Involvement	0
QI Team Prior QI Experience	0
QI Team Tenure	0
Microsystem QI Leadership	0
Microsystem Motivation	0
Microsystem QI Capability	0
Microsystem QI Culture	0
Task Strategic Importance to the Organization	0
Triggering Event	0
TOTAL	1

Total Score	
168	Highest Possible MUSIQ Score
120-168	Project has a reasonable chance of success
80-119	Project could be successful, but possible contextual barriers
50-79	Project has serious contextual issues and is not set up for success
25-49	Project should not continue as is; consider deploying resources to other improvement activities
24	Lowest Possible MUSIQ Score

References

Some items included in this tool were taken or adapted from previously published instruments as follows:
QI Work Force Focus (aka Human Resource Utilization)
¹ . RAND, Improving Chronic Illness Care Evaluation. Healthcare Organization Survey for Quality Management Director. http://www.rand.org/content/dam/rand/www/external/health/projects/icice/pdfs/qmd.pdf
² . Shortell SM, Levin DZ, O'Brien JL, Hughes EF: Assessing the evidence on CQI: is the glass half empty or half full? Hosp Health Services Adm 1995, 40(1):4-24
QI Team Decision Making and Norms
¹ . Lemieux-Charles L, Murray M, Baker GR, Barnsley J, Tasa K, Ibrahim SA. The effects of quality improvement practices on team effectiveness: A mediational model. J Organ Behav 2002, 23(5):533
QI Team Leadership
¹ . Edmondson A. Psychological Safety and Learning Behavior in Work Teams. Adm Sci Q 1999, 44(2):350-383

Supplementary S2: MUSIQ-Primary Care factor representative quotes

Table 1. Participant identification

Case 1		Case 2		Case 3		Case 4		Case 5		Case 6	
ID	Role	ID	Role	ID	Role	ID	Role	ID	Role	ID	Role
C1.1	PHO-CD	C2.1	GP-Dir	C3.1	GP-Dir	C4.1	CNL	C5.1	QL	C6.1	GM
C1.2	CMHT-DM	C2.2	PM	C3.2	DHB-SIF	C4.2	GP-Dir	C5.2	CNL	C6.2	MD
C1.3	GPLN	C2.3	NL-NP	C3.3	PHO-PrM	C4.3	PN	C5.3	HSL	C6.3	GP
C1.4	PN	C2.4	ATL	C3.4	PN	C4.4	GM	C5.4	HA		
C1.5	GP	C2.5	CHW/R	C3.5	R	C4.5	AM				
		C2.6	CHW			C4.6	PHO- DA				
						C4.7	PHO-ND				
Primary Health Organisation (PHO) Community Mental Health Team (CMHT) District Manager (DM) General Practice Liaison Nurse (GPLN) Practice Nurse (PN) General Practitioner (GP) Director (Dir) Practice Manager (PM) Nurse Lead (NL) Nurse Practitioner (NP) Administration Team Lead (ATL) Community Health Worker (CHW) Receptionist (R)						District Health Board (DHB) Service Integration Facilitator (SIF) Project Manager (PrM) Clinical Nurse Lead (CNL) General Manager (GM) Administration Manager (AM) Data analyst (DA) Nurse Director (ND) Quality Lead (QL) Hub Senior Lead (HSL) Hub Administrator (HA) Medical Director					

Table 2. MUSIQ (and additional) factor representative quotes

Environment	
External motivators	<p>C1.2: So, the timing was right with the focus that the Ministry of health were putting on the Equally Well initiatives.</p> <p>C2.1: Because there was a need. The need was that we were aware that our most needy patients were not able to access care in a timely manner.</p> <p>C3.2: Also prior to [the] Healthcare Home [model] becoming influential I could see an alignment with [named service], you know the after-hours telephone service, because that is part owned by [two large PHOs].</p> <p>C4.1: partly the impact of the change in funding, when it went from free to under 6's to free to under 13's and under 14's. So, that had a financial impact on us as well. So, multipronged. We wanted to look at trying to change the model of care and this was just a small start.</p> <p>C5.1: I might just add also that dropped call rates was a Health Care Home (HCH) priority as well, and we were just starting out in the HCH initiative.</p> <p>C6.1: increasingly over the, till 2018, that period, the sector changed, and the expectations of urgent care changed enormously.</p>
External project sponsorship	<p>C1.2: The timing came at the right time for us to take advantage of the PHOs very kind offer to fund it.</p>
Patient needs and resources	<p>C1.1: We used our KARO data management programme and they tracked all of the advanced forms and the information from the advanced forms. So, we could see who had CVRAs done and flu vaccines, who'd had all of that stuff that is captured in the advanced form. So, we could actually get data and how many people had been seen and how many had had a follow-up appointment and how many had then gone on to their annual review. I got data from the DHB on how many patients, I had NHI level on how many had been admitted to hospital for any reason, whether it was in the ED or the acute patient ward or anything like that.</p> <p>C1.2: So, trying to think creatively around that, and saying, well look, your appointment is at 10, how about we will go over at 5 to 10 and ring up and if the doctor is running half an hour late, we will ring you and you won't have to come in at 10. We will ring you when there is only one client in front of you and we will try and do whatever we can to delay that. I think what has been underestimated by some of the primary staff is just how uncomfortable it is for some mental health</p>

clients to sit in a busy waiting room, when they are scared and anxious and paranoid. You know, it is a big ask to get them to sit in that environment.

C2.1: Because there was a need. The need was that we were aware that our most needy patients were not able to access care in a timely manner.

C2.4: My child is one of them, I take her to ED, or I call an ambulance to get her in to ED, constantly. So, for me to be able to ring up first thing in the morning to get an appointment on the day, or to be triaged by the doctor is a huge difference for her care as well. So, personally, it has made a huge difference for me. And for work, it does alleviate the pressure and it gives that clear line of what we can all do for the patient when they phone up or when they present to the clinic.

C3.1: Our philosophy is always, 'What is best for the patient.' So, if you think about that, we are all patients ourselves, so we sometimes think; How would I like it, if I had to deal with this. I wouldn't want to go through 3 people, I would just want to go to the right person and deal with it.

C3.3: The practice, the consumers have a large part to play as they are the consumers of what is moving or changing, they are communicating with them, getting their ideas as part of it. [...]. But also, when they are making a change like prioritisation, there is a process change that has to be promulgated and there is feedback that comes back from that. *[Some examples of the type of conversations given]* and the receptionist talks to the patients about what to expect and so on and that has all gone out on the website, through handouts and all sorts of things.

C4.1: Informal feedback from them is that they are pleased. They are pleased about the speed of the service. We have got people who are starting to come back and ask for [the clinic RN] now, which is really good.

C4.4: After we started using the clinic, we asked a lot of the patients, you know, how did you feel about seeing a nurse.

C5.2: We put up a communication board at each practice, a whiteboard. And we asked them, we asked our patients, what they wanted to see what they felt wasn't working for them within their practice. So, there were stickies and they could write on those and it just put it back on the board, and so that says a lot about their, we can never get through, we can never get through on the phone.

C6.1: We already had a good idea, really, of what our patients want and what is important to them. But as part of this process, we engaged an independent researcher. From the research collective [Researcher]. And so, she ran three focus groups. [...] She did three focus groups one in English, one in Mandarin, one in Korean and then from that developed a big

	<p>survey. [...] We then sent out every patient, adult patient an invite to do an online survey. And then she reported on that survey.</p>
<p>Network relationships</p>	<p>C1.1: And the advantage of choosing [the practice] was that because you've got [the Integrated Family Health Service] and you've got community mental health, [the] medical service and the ward, everything all under the one roof. So the interrelationships were easier and its one general practice owned by the DHB</p> <p>C1.3: The PHO have been fantastic, because they are not only the funding arm, but they are also all the data and reporting. [...] I'm a DHB employee, employed by mental health, sitting in a medical practice that is actually run by the DHB.</p> <p>C2.1: We are quite involved in [the PHO]. [The Nurse Lead] and I are on the Board of [the PHO] and [the Practice Manager] is involved in a number of Committee's at the LCA Council and also part of the Māori Development Committee. So, it's not really suppliers, but networking.</p> <p>C3.2: They have a good relationship with the community pharmacist. [...] They also have a co-located midwife. [...] This practice has moved beyond their own teamworking to how does this team nest within the other teams that influence their patients care, like the district nurses, the pharmacies, the allied health, the social workers and so on. How have they attracted them to make them teams within teams?</p> <p>C4.2: I'm on the clinical board of the PHO. So, I know [the data analyst] well. He knows us well, as well. Because if they have something to be tested, when you've got 30 and a half thousand patients, if there are fishhooks in it, we soon know. Because you know we are doing a big throughput. So, they ask us for a lot of help, with things that they want to know, do you think this would work? Do you think this wouldn't work? Can you try this for a week? [...] And the other director, the other GP director is also on the clinical board as well.</p> <p>C4.6: And we've also got the opportunity, we're running lunchtime sessions with all the practices doing Enhanced Primary Care, so they can share experiences. And rather than just doing your own thing to learn what other people have done and we've got that within the PHO but also with a greater group as well. [...] So, we're trying to learn from the other groups so we can share that.</p> <p>C4.7: And It's been nice to have a PHO, you know, directly being a connected to this piece of work. They could have perhaps, with their experience done it in silo, done it in isolation of the PHO, but it's been nice to be able to connect to policy, professional development, postgraduate study, through universities and through the DHB. And also having the</p>

	<p>analyst support in the background as well has been helpful. [...] Plus, the relationship with the PHO because there's such a very informal and friendly relationship with the PHO, that also helps. So, [...], the practice manager here has a great relationship with our CEO and with our Board, and with our PHO, as does [the clinical lead nurse] and the lead nurses, as do the GP's who would also sitting on the Clinical Advisory Committee with our PHO. So, some of those GP's are members of the Clinical Advisory Committee. So, there's a good kind of cross pollination, if you like, of people thinking and working collectively for the greater good.</p> <p>C5.1: We are a Māori owned health service we are owned by [the tribe]. [...] We are our own Primary Health Organisation. And we so we report to that board, and we also report to the Runanga board. We have five medical centres, and an enrolled population of approximately 18,000. Over 80% of our patient's, enrolled patients are dep. five or Māori or Pacific. And we have a range of community outreach services to support our, all of our different health goals and medical centres as well. And we have a five-bed residential care facility, and our community outreach services include mental health, homecare nursing, or Primary Care nursing in the home and community nurses, community outreach workers Tamariki Ora WellChild service.</p> <p>C5.3: We had some support from the Health Care Home</p> <p>C6.2: We've got a board; we've got an independent chair and directors on the board. [...] we got feedback from the other urgent care providers,</p> <p>C6.3: Safety in Practice, yeah so, we've been really active in that. So, I think we've been through about five cycles of the safety in practice initiative.</p>
Organisation	
QI leadership	See quotes QI Team: Team leadership
Senior leader sponsor	<p>C1.1: The key people were the team leader, if you want names, that was [the district manager] from the CMH team and at that time [...] was the Nurse Manager at [the practice]</p> <p>C2.4: That was the 3-senior management. Plus, there was an administrative leader, I wasn't that then.</p> <p>C3.5: [The service integration facilitator] drove it and [the GP-Dir] backed her on it and looked over it.</p>

	<p>C4.1: [The GP Director], she is a huge influencer in the practice, she's got a vested interest, because she's a part owner, but she's also a director, and a shareholder, and she has huge influence on the other GPs.</p> <p>C5.1: We just have to get the approval from the board and the manager, and then we're running with it.</p> <p>C6.1: So, we have a, a little management team. We have a clinical nurse leader. [...] We had a medical director, [the previous medical director] at the time, who's now resigned, retired. And [the current medical director] has taken her place, but [she] was the medical director with urgent care. [...] and [name1, is the] finance manager and [name2 is] reception. So, those four people are like, you know, everybody. And in addition, the shareowners, they are like, they are sitting in the background like the silent chairs. [...] the board were quite supportive, well you know, reporting but it was about it's about once a month.</p>
Organisational QI culture	See quotes in Microsystem: QI culture
QI Maturity	See quotes in Microsystem: QI capability.
QI support and capacity	
Data infrastructure	<p>C1.1: I went away and developed the advanced form that we use. Which was around, the things that we picked up from patients the things that they needed and the things that we picked up from the two nurses the practice nurse and the GP Liaison nurse that participated in the pilot as well as what their needs were and what our needs were as well as the PHOs needs around population health and incorporated all of that into an advanced form. ... we used our KARO data management programme and they tracked all of the advanced forms and the information from the advanced forms.</p> <p>C1.3: we had to set up a database of the clients to work out who had been on, when they had their initial review.</p> <p>C2.2: We were tracking available nurse appointments, how many were had, how many were DNA'd, how many were surplus. For instance, there were 200 and 180 of those were actual appointments and 20 were DNA'd or did not arrive or weren't taken up and we did that for the GP's as well. Our PHO will have all of that data as they collected all that data. We also collect 'time to next available appointment'. We were sitting a 9 for a few years and then we started to sit at 2 because we employed more GP's, we increased our GP capacity, but not by much. So, we collected that data and we looked at it. We also looked at our phone triage. So, how many people were on that phone triage wanting an appointment for the day that we couldn't give them, how many people were on there for results, how many were on there for scripts and had that made a difference.</p>

	<p>C3.3: Firstly, we are constrained by the data. The data is limited in general practice, it is strong around things that are paid for and variable around the rest. ... We do it once at the start and we will do it once afterwards, variable, but then on request. Because it is fairly labour intensive, and we only have so many of us, so we tend to use it a part of the change process as opposed to any ongoing measurement.</p> <p>C3.4: So, we might do some on the spot week collecting data, manual data collection. Or we can retrospectively, we have someone at [the PHO] who can collect the data, look at our data.</p> <p>C4.1: So, there was a big, big, major, major thing that I had to learn, where I wanted to be able to be able to pull out stats on how we were progressing. [...] if we just went into the daily record and wrote notes, I wouldn't have been able to get the stats. So, I had worked in another place that used an advanced form, and I thought, right, I'll just create an advanced form.[...] So out of that I could create my query builds. It's not a slick system. But at least it's better than touring manually through. [...] [the PHO data analyst] made, graphs and a whole lot of things [to] just make it easier for us to see.</p> <p>C5. 4: It shows the amount of calls we've taken the amount of calls that's dropped and who's taken, who are the top three call takers for the day. And then, and then it goes. The amount of calls, and then adds totals up for the whole week, and for the month. About again, how many calls we've taken that week or month, how many calls we've lost that week or month and who has taken the most.</p> <p>C6.1: So, we report to the board on willingness to recommend and access to appointments. And access to appointments we measure from the patient satisfaction with access, how they rate it. So, we measure that and then we also measure the third available appointment, but don't always report that. And because third available appointment doesn't really work with book-on-days as a measure. Because book-on-days are holding them anyway. It's assuming an open. So, it doesn't really work. And there's continuity of care. So, we look at the number of appointments that were seen by the patient's own GP. So that's our continuity measure.</p>
<p>Resource availability</p>	<p>C1.3: No, we were very lucky with us both being able to give every day to it, it was amazing, it really was. And we were fully supported to do that. So, there was never any questions of there not being any resources. The funding would be there, the funding for the initial reviews has been there. It's been great. The PHO stepped up and there has never been any question.</p> <p>C2.2: what we lack here is the capacity.</p> <p>C3.4: They paid for us to do it. There was a lot of time and a lot of money put into it, it was prioritised.</p>

	<p>C4.1: Whilst we set up the clinic Monday, Tuesday, Thursday mornings, that was purely around nursing resource. Because I wasn't given any nursing resource around this, I had to magically make it happen out of thin air. We have been given a resource subsequently.</p> <p>C4.2: We had no financial resources. We got time, from the PHO with [the data analyst] and informatics.</p> <p>C5.3: So, I guess there were things that could have been helpful like budgets and stuff, but I just went ahead and got what I needed, ordered stuff to do the job, computers and all that was okay. Actual people resources to do the job, well I had these two, so that was all good.</p> <p>C6.1: mean, in an ideal world, you know you'd have consultants that would come in and sort out the measurement and stuff a lot more and get more sophisticated. But we were pleased just to be able to use the external research collective for the patient's survey. [...] We dedicated time to appointment times out of doctors' templates to actually spend time to plan for their patients and work on their patients.</p>
Workforce focus on QI	<p>C3.3: We demonstrate how to actually organise the work, celebrate with them when it goes well and help nut things out when it doesn't. So, it is not a formal process, because of the resistance that we got earlier on. We just quietly do it, teach the things that are obvious and straightforward without giving it a name.</p> <p>C4. 7: In regard to [this practice], they'd already been immersed in some Safety in Practice activity as well. So, they were familiar with some of the NHS Scotland's work around that improvement science, as was [...] their practice manager who'd been on the Quality Improvement course at the same time as me.</p> <p>C6.3: Safety in Practice, yeah so, we've been really active in that. So, I think we've been through about five cycles of the safety in practice initiative. So, I think it has also helped us a lot to look at improving our quality you know basically in how we manage data and medications and then, obviously, then the patients.</p>
Microsystem	
QI leadership	<p>C1. 2: We had a previous [practice] manager who was also very supportive and keen to do whatever she could do to help remove any barriers.</p> <p>C1.4: [The Clinical Manager] at the PHO and [...], the mental health GP liaison nurse, myself as the registered nurse here at the practice and from Mental Health, I had a lot of contact with [...], the nurse manager of community mental health.</p>

	<p>C2.4: That was the 3-senior management. Plus, there was an administrative leader, I wasn't that then.</p> <p>C3.1: Everybody is involved in the change in here, which is good. But [another GP at the practice] and I were the doctors who went to the workshops because they were after work. [...] I was totally open to it, I could see the need.</p> <p>C4.5: I know that [the GP/director] has provided the GP support for [the clinic RN] and still does, [...] as well as being the lead nurse and I thought she was very much behind this whole idea, the whole concept. So, and, obviously, [...] the GM had to sign it off, but they were the drivers behind it all.</p> <p>C5.1: So, mainly it was [Hub senior lead]</p> <p>C6.3: It was essentially the management team. So, which was [the CEO] that you met this morning, [] she's more the admin, and accounting side of things and then basically the clinical director was []. And, obviously, [] the new clinical director.</p>
<p>Motivation</p>	<p>C1.2: We had known this for years and we had worked with private practice to try and improve that ourselves without this project and failed dismally. So, the timing was right with the focus that the Ministry of health were putting on the Equally Well initiatives. [...] we didn't need any persuading whatsoever, because it was an opportunity to get some of our clients some good physical health care at last.</p> <p>C1.5: I couldn't believe how many patients there were who had significant mental health issues and a lot of it is socio-economic derived. A lot of drug and alcohol issues, so there was a huge need there.</p> <p>C2.1: Because there was a need. The need was that we were aware that our most needy patients were not able to access care in a timely manner. [...] I think all of us who work here are here because we believe in the vision of serving the patients. [...] I feel that I am a guest here, this is not my organisation. I have been invited onto the journey because I have a particular skillset, but it's not mine. And everything therefore that gets done has to be done with reference to what the original aims of the organisation [...] and the aim to provide healthcare to the Māori community but also to those with high needs in the community. Even the name (<i>of the organisation</i>) means 'to share the blessing'.</p> <p>C2.5: to try and stop our overload in the mornings. It was part of Health Care homes (HCH) but that was one of the improvements that was because mornings here were horrendous.</p> <p>C3.4: We wanted to be able to improve our service for our patients in terms of them having ready access, that it is patient focused and that they have timely access to us.</p>

	<p>C3.5: To get the patient the best care and to stop overloading everybody else if it is something that we could have dealt with [...]. We were trying to make it the best practice that we could for the patient.</p> <p>C4.7: I think what motivates the team here really is the is the collective value that they can bring to a very high enrolled population of vulnerable patients in a very busy part of [the city].</p> <p>C4.4: Well, I'm all for change and anything that makes life better, easier, more efficient, we're into. We do a lot of beta testing of our practice management system. We like to get things in place that make life easier, more efficient, as I said. So, where we can improve, and if it's something like this, a nurse-led clinic which helps to improve our ability to work well and efficiently, and offer our patients a better service than yeah, all for it.</p> <p>C5.2: We spoke about our dropped call rate, and we've been working a little while on trying to improve it, but we weren't really getting anywhere. [..] One strong culture that I feel it's within the organisation is that a lot of the people work for [the PHO], because they are passionate about the community.</p> <p>C6.1: the long-term view that this wasn't a sustainable financial model. And that it wasn't a problematic model, per se, at the time, but the writing was on the wall. And that we weren't succeeding in our goals in general practice in the way that we felt that we should be, which was continuity of care and addressing the long-term condition management of the patients. [...] We have to be a profitable business. And we have to be able to pay all our bills otherwise we can't provide the care we want to do. And so, for those reasons, we went through a big process to actually review what our patients wanted and what was most important to them and how our staff felt about everything and then we exited urgent care.</p>
<p>QI capability</p>	<p>C1.3: The trial and errors method, I think!</p> <p>C2.1: IHI Conference at Amsterdam and I have got an executive diploma in business administration from Henley which is where I learnt about Kotter not in my Master of General Practice.</p> <p>C3.1: You can sometimes get tied up in trying to measure everything too much so that you don't actually do anything, and people stay keen and active if you can see something. You know identify it, problem-solve it, initiate something, review, initiate, review and then come to an improvement for everybody. That is more a nimbler way than getting really formal about it.</p> <p>C4.1: We had a process improvement advisor. Who came but changed positions partly through our process, but he got us going and it was enough to get us going.</p>

	<p>C4.7: So, they were familiar with some of the NHS Scotland's work around that improvement science, as was [...] their practice manager who'd been on the Quality Improvement course at the same time as me. So, I think it enabled some of the processes of change in the clinic, to be more smoothly implemented, with a bit more of a rigorous process to ensure that things were not being missed.</p> <p>C5.1: Nothing formal, I guess just touching base and making sure everything's going okay and open communication to see if there's any issues that could be dealt with.</p> <p>C6.1: I think we were meticulous in following the process, but we didn't use particular tools.</p>
Microsystem QI culture	<p>C1.1: I think the culture is very good, tries to be innovative, tries to think of new ways and doing new things. Obviously, nowhere is ever perfect, but they're always willing to learn, we're always open.</p> <p>C2.5: We are always continually trying to improve, make improvements. They don't always turn out right, but we continue trying.</p> <p>C3.1: We just constantly want to improve things. But our way of improving is also hopefully improving.</p> <p>C4.4: Quality improvement is always high on the agenda for us here. So, as we've moved through the years, we do as much quality improvement in situations as we can.</p> <p>C5.1: It's quite common for staff to voice ideas and have them and be able to run with those. And trial things, trial new things</p> <p>C6.3: trying to be pre-emptive, looking at what's happening in the environment in primary care and really not just being reactive and waiting for things to happen but actually sort of keeping an eye out seeing how we can improve and meet the needs of the community. So, I must say, they're really progressive I think, compared to a lot of other general practices.</p>
QI Team	
Team leadership	<p>C1.1: The key people were the team leader, if you want names, that was [the district manager] from the CMH team and at that time [...] was the Nurse Manager at [the practice]</p>

	<p>C2.3: [The practice manager] had been here, and [the practice manager] had also worked here before, [the practice manager] is also the historian of [the practice]. She's [from the local tribe], and there was [the medical director] on the clinical side and me on the nursing side.</p> <p>C3.5: [The service integration facilitator] drove it and [the GP-Dir] backed her on it and looked over it.</p> <p>C4.5: [The GP/director] was involved with it. [...] the clinical nurse lead, and [the clinic RN], I think they were the main players.</p> <p>C5.1: I think in terms of this project, [Hub senior lead] definitely led the project, and (C5.2: we're just the support) we're just the support wherever required. She knows she can call.</p> <p>C6.1: o, we have a, a little management team. We have a clinical nurse leader. We had two at the time. In [clinical nurse leader acute care] who left was huge. We had a medical director, [the previous medical director] at the time, who's now resigned, retired. And [the current medical director] has taken her place, but [she] was the medical director with urgent care. She is an urgent care doctor. She's now the medical director management and [name1, is the] finance manager and [name2 is] reception. So, those four people are like, you know, everybody.</p>
<p>Team diversity</p>	<p>C1.1: There was the wider group, like [the Māori health provider], the general manager and various other people, CMH Team and various other people who turned up, there was probably a dozen people identified as key people. And we met several times, [...]. And once the project started it was just mainly just [the CMHT manager], myself, [the practice nurse] and [GP Liaison Nurse] that just met and troubleshooted and caught up.</p> <p>C2.1: Well, I think everybody is key. I mean, I think that the receptionist obviously had to tell people what was going on and they've done a good job of that. The nurses have to be aware of it and they have to pick up the triage after the doctor has finished on the phone in the morning. The doctors, [the Practice Manager] obviously had to be supportive of the changes and [Administration Team Leader] had to be supportive of the changes to templates and things like that, so I think it was a whole team thing.</p> <p>C3.2: The whole reception team, all of the nurses, [interviewed GP], and one of the associates [non-owner GP].</p> <p>C4.1: GM, she came along [...] to make sure that [...] she was informed and knew what was happening in the business. And that if there were any budgetary requirements that she was aware of that. She also has her eye on reception and admin. [...] [The clinic RN], from the perspective that she was going to be running the clinic. [...] [The GP Director], she is a huge influencer in the practice, she's got a vested interest, because she's a part owner, but she's also a director, and a</p>

	<p>shareholder, and she has huge influence on the other GPs. [...] [Administration Manager] from the perspective of her reception team and having her support with that. And [PHO Nurse Director] from that broader context of nursing and his experience going to various other practices and seeing how it could be done in different ways. So, he has that higher-level nursing perspective as well. So, making sure that we're in line with legislation and nursing council requirements. And he brings a lot of knowledge as well. So, that was the project team.</p> <p>C5.1: Yeah, our manager was, [the Hub senior lead], we had an HR consultant as well for that initial process. We had [...] some support from the Health Care Home, [a GP] and [clinical nurse lead] for the clinical input.</p> <p>C6.1: So, we have a, a little management team. We have a clinical nurse leader. We had two at the time. In [clinical nurse leader acute care] who left was huge. We had a medical director, [the previous medical director] at the time, who's now resigned, retired. And [the current medical director] has taken her place, but [she] was the medical director with urgent care. She is an urgent care doctor. She's now the medical director management and [name1, is the] finance manager and [name2 is] reception. So, those four people are like, you know, everybody. [...] we've got hugely diverse staff, and we don't always understand each other</p>
<p>Team subject matter expertise</p>	<p>C1.3: my manager [CMHT Manager] as part of her role, she was very keen on it she had picked up over the years that quite a few of the clients of CMH mental health weren't having their physical needs met properly.</p> <p>C2.1: So, after going to Seattle to see the Health Care Home working there, when I came back, I talked to [Practice Manager] and [Nurse Lead] and decided to implement it here.</p> <p>C3.2: I found an outfit in Australia, GP Triage it's called, and they had some online materials. I liaised with the developer of that, and he said that it was open source, we could use it, adapt it, he would make that available.</p> <p>C4.4: And [PHO Nurse Director] from that broader context of nursing and his experience going to various other practices and seeing how it could be done in different ways. So, he has that higher-level nursing perspective as well. [...] [The GP Director], [...] she released some appointment slots so that she could support [the clinic RN]. And she was always available teaching, talking, assessing, working together. And then that weaned off, but [the clinic RN] could still go to her. And then as the skills develop then there was less support required.</p> <p>C5.3: I was in contact with the, they call it a PAC, a Patient Access Centre, up in [another district]. So, I was in talks quite a lot with their manager and seeing what worked for them, although they're way bigger than us, but getting some insight</p>

	<p>into how they set up, how they run it, what their day-to-day things are, really helped with our vision of what we were wanting to do down here.</p> <p>C6.1: I had done a lot of research, and a lot of thinking of the problems for like two years prior to seeing that this is where we needed to go. [...] We'd done a lot of reading and work with Thomas Bodenheimer, who did that model of care stuff, the ten building blocks of primary care. And in fact, [name] who was our clinical director, we sent her on a study tour in 2013 and she went and visited Thomas Bodenheimer.</p>
<p>Decision making process</p>	<p>C1.3: We were talking about it continually.</p> <p>C1.5: There were lots of discussions on how the nurse/doctor appointments would be arranged and how much time to be allocated.</p> <p>C2.2: Approaching everyone at MDT's (multi-disciplinary team meetings) as a group and also the templates. So, there was action put behind that, templates were made, [the CD/GP] was willing to do triage. It was more showing the team that this is what we are going to do, and we are doing it.</p> <p>C2.5: Every morning in the hub, we would discuss it.</p> <p>C4.4: I think it was a monthly, it was certainly regularly. And we had great big sheets of butchers' paper all over the place. And we were writing what we needed to figure out and what we needed to, who needed to take it away and do it and figure it out and bring it back. So, we had a lot of investigation.</p> <p>C3.2: I facilitated 3 evening, 2-hour sessions with the whole team. Not all of the doctors, 2 of the doctors. The 3 nurses and all of the reception team and the practice manager at the time. [...] I went through the process with this team, learned about the process and they learned heaps about each other. [...] It was facilitating that kind of open forum for people to say, what were they afraid of, how realistic were those fears and what was everybody prepared to do to support them? So, we did the three, 2-hour sessions in the evenings, funded, they were paid to come and in-between the sessions there was reading and thinking, and there were worksheets. They came back with questions, and we built on that, it was a cumulative sort of process. Then we developed some tools to help</p> <p>C4.7: So, it was it was the data that kept telling the story that enabled us to tweak and adjust as we go really.</p> <p>C5.1: it was working with the GPs and the nurses to get their input into how processes, should be done in the hub. So, it worked for everyone. That was hard. [...] Even decisions on layout and painting and putting walls in, you know like that</p>

	<p>was really cool things to be able to make a decision on, but, and I didn't have to really go back to anyone to say is this all good, I just did it.</p> <p>C6.3: And although I think the decisions were pretty much had to be made that it was sort of just making sure that it was done in the right way. I think it was a key to success. And then I think the measurement afterwards, with each stage, with the staff questionnaires, with the patients being canvassed all time, it was really evaluating the system. So, I think that's really the key to it as well. [...] The collaboration and communication between management and the actual team, and then getting back so that you weren't implementing things that made people unhappy.</p>
<p>Team norms</p>	<p>C1.2: We are the smallest team up here; we are isolated and we have particular challenges in delivering care up here and we have to be creative. We have to do things differently but there is a great commitment with all the staff here.</p> <p>C1.4: So that has been able to bring the teams closer together and I've found it a lot easier to contact the mental health team for support as well. And vice versa, just the communication link, I think that has been the biggest thing. Previously it was GP practice, mental health completely separate, no relationship between. But now actually it is a lot better.</p> <p>C2.4: We are a Māori Kaupapa organisation. I suppose, for me being here so long, they are like my whānau (extended family), all of them. And that's how the majority of us treat each other.</p> <p>C2.6: But we call it different names, we call it tikanga (correct procedure), whanaungatanga (relationship, kinship), most of it is all whanaungatanga.</p> <p>C3.2: But it was facilitating that kind of open forum for people to say, what were they afraid of, how realistic were those fears and what was everybody prepared to do to support them?</p> <p>C3.4: I think we are pretty team oriented in terms of ideas actually. It's how we work within our practice, and everyone brainstorms and collectively we came up with the ideas and how they might work. [...] we operate as a pretty flat, non-hierarchical structure. We have 3 nurses, and we choose not to have a lead nurse because we each of us have our own leading, we all lead in different areas, and we acknowledge that.</p> <p>C4.2: Collegiate, we all work together very well. We are multicultural. Which of course helps in looking after our population. And we certainly work very cooperatively between colleagues working at the same level and between colleagues working at different levels as well.</p>

	<p>C5.1: We have a reasonably flat management structure and because of the because of, I think, because we don't have GP ownership. I suspect that's one of the reasons a lot of people get to have a say in what happens. So, it's quite common for staff to voice ideas and have them and be able to run with those. And trial things, trial new things. [...] I feel like when we get together, it feels very much like a family. Like everyone gets to know each other and each other's backgrounds and uniqueness and can be themselves.</p> <p>C6.1: So, from my view, it was like saying well we still want to do this, let's do what we can. And if we can't do it perfectly to the, how we should be, don't worry at least we'll be doing better than if we didn't do it at all. So that was kind of like our philosophy. [...] But we had our project team met every week, formally and then but more, you know like short meetings between times. And we had the staff engagement meetings once a week, just for quite a short time, for probably four weeks, while we designed it and then we were away. We have a system of what we call rounding. So, the leaders, make sure that they meet with their staff each, just a quick catch up, every month for 15 minutes. So, that was really to make sure that we did that. [...] I think they have a very committed family view of their workplace.</p> <p>C6.2: [the CEO] and myself, particularly operate on an open-door policy, we tried to be available to people, sitting alongside them, helping them transition if they were having any difficulties or anything like that.</p>
<p>QI skill</p>	<p>C1.1: I have always been aware of it; I have always had a passion for it even without any major training or anything like that.</p> <p>C2.1: I've got a master's in general practice and my thesis was on quality. That was about 2000 or thereabouts and since then I have been involved in the College of GP's Cornerstone Accreditation programme and then quality improvement projects in [district], with [name] Practice as I was there for about 5 years or so. And I also had a role in quality improvement with the [district health board]. [...] IHI Conference at Amsterdam and I have got an executive diploma in business administration from Henley which is where I learnt about Kotter not in my Master of General Practice.</p> <p>C3.3: I'm from IT, so the business analysis skills that I carried, I dug through my kit-box and brought them out just as a way of thinking about the patient journey. It isn't analysis step-by-step or Lean if you will, which is a very detailed process specific.</p>

	<p>C3.4: Nothing formal, it was all very informal. The quality improvement, I suppose you could take from our integrated family health service programme. I would see that as quality. I have been involved in a lot of education at [the PHO], that's quality focussed.</p> <p>C4.1: we had a process improvement advisor. Who came but changed positions partly through our process, but he got us going and it was enough to get us going. [...] I have done some training through [our DHB].</p> <p>C4.2: Quite a lot, because I've worked with DHB, on projects and back in England I've worked on the medical audit group. And that was way back in the early 1990s, where everybody thought audit was a really dirty word. For a long time, I have been doing lots of quality improvement stuff.</p> <p>C4. 7: I've done, quite a bit of experience with quality improvement through [the DHB]. So, through the Safety in Practice program, for example, we did quite a bit with the PDSA with improvement methodology with looking at, reviewing literature around change management, and in regards to [this practice], they'd already been immersed in some Safety in Practice activity as well. So, they were familiar with some of the NHS Scotland's work around that improvement science, as was [...] their practice manager who'd been on the Quality Improvement course at the same time as me.</p> <p>C5.1: we tend to just get on and do things and not necessarily consider them quality improvement.</p> <p>C6.1: A lot. I've been working in senior leadership management jobs in the health sector for a long time and have been fortunate and had various training in quality improvement processes and have been intent on developing that sort of process on our organisation.</p> <p>C6.3: Safety in Practice, yeah so, we've been really active in that. So, I think we've been through about five cycles of the safety in practice initiative. So, I think it has also helped us a lot to look at improving our quality you know basically in how we manage data and medications and then, obviously, then the patients.</p>
Prior QI experience	See quotes above in QI skill
Physician involvement	See Table 1, Case Characteristics. GPs were involved in all Case QIs.
Team tenure	C1.4: Previously the relationship was virtually non-existent, it just wasn't there. And, I guess, [the GP Liaison Nurse] has been a huge help as well [...], in the fact that she liaises quite closely with the mental health team. So that has been able to bring the teams closer together and I've found it a lot easier to contact the mental health team for support as well.

	<p>And vice versa, just the communication link, I think that has been the biggest thing. Previously it was GP practice, mental health completely separate, no relationship between. But now actually it is a lot better.</p> <p>C2.2: I have learnt over time because we all work so closely together [...] So, it's about knowing your staff. You can write all the plans in the world but unless you know your staff and can have a conversation with them, and sometimes it is about those conversation in the corridor, they are never going to come around.</p> <p>C3.2: So, given that broad remit, and the [Medical Centre] Team being [here] already, and I have been here for 6 years now, with different titles over the time.</p> <p>C4.4: Over the last probably couple of years, but quality improvement is always high on the agenda for us here.</p> <p>C4.7: very dynamic team of young and older GP's, and nurses that work collegially very well together. So, I think we've got a very woven, well respected, well trusting team that have a good collegial relationship, and a high level of trust with each other.</p> <p>C5.1: 16 years. C5.2: I've been with [the PHO] for 8 years. C5.3: I started about seven years ago, but I worked for two years, just as a practice nurse. And then I went to Australia for three years, came back, did one year with another organisation and then came back to [the PHO] as the clinical lead. And I have been the clinical lead for two years.</p> <p>C6.1: a lot of thinking of the problems for like two years prior to seeing that this is where we needed to go. [...] [C6.3] he came out here from South Africa like 9 years ago. C6.2: five to eight years of key involvement.</p>
Miscellaneous	
Task strategic importance to the organisation	<p>C1.1: That is been a push from the DHB, [...] PHO around mental health care. There is a lot of research out there showing that these people out there with mental health conditions are not getting physical health needs met, dying up to 25 years younger. [...] [The PHO EO], [Planning & Funding] from CDHB, [...] had a very clear interest in it. He's the head psychiatrist from [the] DHB, who covers [our district] as well.</p> <p>C2.2: So, we are part of the Health Care home (HCH) and as part of the HCH it is mandatory that we implement a Doctor Triage programme daily so that we could reach the patients that weren't, the unmet need really.</p>

	<p>C3.1: She (the DHB-SIF) had identified some issues, when having meetings with the receptionist and the nurses, some sort of gap, was the feeling. So, she thought she would have a look at this, and she realised that there was a system-wide, [district]-wide need for these sorts of things. And we are all big on passing that sort of thing on, so we thought, let's do it.</p> <p>C4.2: And so, the paediatric clinic, their patients, which are given a certain amount of capitation, and there is no co-payment. So, it's basically a flat fee. So, it's extremely expensive, using doctors to see patients in which you can't increase a fee. Because your expenses never ever go down. We moved into this beautiful building last October, and our expenses tripled. So, from a business owners' point of view, there was that. From a team member point of view, we wanted to start developing our nursing workforce. [...] So, it's a way [...] of ensuring that general practice is still going to have quality staff and patients are still going to have quality primary care.</p> <p>C5.1: I might just add also that dropped call rates was a Health Care Home priority as well, and we were just starting out in the Health Care Home initiative. Back then, but it was always something we were looking at addressing anyway. So just to add that in. So, in terms of our organization, we are a Māori owned health service we are owned by [the tribe]. And so, tribe, the [name] tribe owns our services. [...]we had to pay for it, so it meant that the hub had to work, because we had to have, be able to do some of our claiming right and all these things to pay for this, among other things.</p> <p>C6.1: And so that whole philosophy started to really compromise our general practice care. And in addition, how urgent care works is you have to have people on standby. So, it's actually a very costly financial model to provide. So, it was the profitability of the model was getting thinner and thinner and it was harming the core business, which was general practice.</p>
Triggering event	Zero triggering events

Chapter 5: The role of distributed leadership in primary care quality improvement: A New Zealand empirical study

This chapter has been submitted to a peer reviewed journal for publication. This quantitative article examines the role of distributed leadership in primary care quality improvement. Partial least squares structural equation modelling (PLS-SEM) is used to test the hypothesised relationship between variables leading to successful quality improvement (QI) using data collected from primary care workers via a NZ national survey.

The model of hypothesised relationships was developed from the refined model developed in the six-case study (Chapter 3, Fig. 4.) and the published peer reviewed literature that supported factors and potential relationships with each other and successful QI. The often quoted saying by statistician George Box that “all models are wrong, but some are useful” holds true here. In developing testable hypotheses based on theory and assuming an intolerance for longer surveys a further level of simplification was sought. Decisions had to be made on the minimum specifications for the model: What must remain, and what could the model operate without? Therefore, the intervention factors that are well established as necessary for QI success of fit with context, relative advantage and adaptability of the intervention were not included in the tested hypotheses.

The interconnected inner and outer setting factors of identified patient/community need (outer setting) and community responsibility (inner setting) were also not tested by the hypotheses. Patient/community need is an accepted driver for change particularly in primary care where the connection is that much closer (Mutter et al., 2019; Starfield, 2009). It is measured in a variety of ways both locally and nationally. Patient data was used as a driver for change in the case sites and was reported as aggregated data in charts by the sites but otherwise was not accessed in this study. For example, the C1 project was instigated by a district report identifying poor physical health experienced by people with a mental health diagnosis and C2 local feedback and practice data showed that access to appointments for those who needed them most was unsatisfactory.

In the case of community responsibility, the healthcare QI literature is sparse from only a few primary care studies (Bailie et al., 2016; Larkins et al., 2019; Miller et al., 2010). Family and/or community orientation is a core feature of strong primary care (Starfield et al., 2005). This feature of primary care is likely to be connected to the sense of community responsibility observed in the comparative multi-case study included in this research and the Australian primary care research (Bailie et al., 2016; Larkins et al., 2019). However, this is not clearly defined, suitable measures with proven specificity and reliability were not available and this is an area for future research.

The factors that remain in the model are those with the strongest evidence from the case studies and the literature and where the relationships between the factors and the impact on improvement outcomes in primary care had not yet been established. The final measures that were used are all well supported in the literature as shown in the literature review section of this article/chapter and had validated measures available. These are distributed leadership, learning climate, network relationships, sensemaking and the quadruple aim. The quadruple aim was chosen as a measure of success because it is well supported in the literature (Brown-Johnson et al., 2019; Merry et al., 2017; Mutter et al., 2018) and I sought potential to differentiate between types of QI outcomes. Network relationships is well supported in the literature but despite this it did not have a primary care (general practice) measure, so the 'synergy' measure from Coombe et al. (2020) community-based participatory research was used.

The survey quantitative results are discussed fully in the article but due to word limitations the results from the two open questions are unable to be included. These results will form the basis for a future article.

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STATEMENT OF CONTRIBUTION DOCTORATE WITH PUBLICATIONS/MANUSCRIPTS

We, the candidate and the candidate's Primary Supervisor, certify that all co-authors have consented to their work being included in the thesis and they have accepted the candidate's contribution as indicated below in the *Statement of Originality*.

Name of candidate:	Jane Cullen
Name/title of Primary Supervisor:	Nihal Jayamaha
In which chapter is the manuscript /published work:	5
<p>Please select one of the following three options:</p> <p><input type="radio"/> The manuscript/published work is published or in press</p> <ul style="list-style-type: none"> • Please provide the full reference of the Research Output: <p><input checked="" type="radio"/> The manuscript is currently under review for publication – please indicate:</p> <ul style="list-style-type: none"> • The name of the journal: BMJ Quality & Safety • The percentage of the manuscript/published work that was contributed by the candidate: 85.00 • Describe the contribution that the candidate has made to the manuscript/published work: The candidate was responsible for conceptualisation, data collection, analysis and writing a complete first draft of the article based on suggestions from the co-author supervisors. <p><input type="radio"/> It is intended that the manuscript will be published, but it has not yet been submitted to a journal</p>	
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The role of distributed leadership in primary care quality improvement: A New Zealand empirical study

Abstract

Background:

Primary care is key to improving population health and reducing demand on specialised services. Studies into factors influencing primary care quality improvement (QI) are scant and relationships between identified factors and success are still unexplained. This study's overarching hypothesis is 'distributed leadership drives QI success through the mediating variables of learning climate, network relationships and sensemaking in primary care'.

Method:

Partial least squares structural equation modelling tests the hypothesised relationship between variables that lead to successful QI using data collected from a small, self-selected sample of the primary care workforce (N= 93) via an online survey in New Zealand.

Results:

The results support the hypotheses showing how distributed leadership drives QI in primary care through the effects of the mediator variables. Distributed leadership was found to have a total effect ranging between 0.204 to 0.333 (hence large) on all four parts of the quadruple aim ($p = < 0.001$).

Conclusions:

Distributed leadership has a critical role in primary care QI through creating a learning climate and network relationships to enable effective sensemaking in primary care. Primary care leaders, administrators and practitioners can use these findings to prioritise developing or strengthening these factors that underpin successful QI in primary care.

Keywords: Quality improvement, distributed leadership, learning climate, network relationships, sensemaking, primary care.

Paper type: Research paper

What is known about this topic:

Contextual factors such as leadership have been identified as key to healthcare quality improvement. Recent literature proposes distributed leadership models as key, but little is known about leadership models and how they interact with other contextual factors in primary care.

What this study adds:

The results extend previous work and provide new empirical evidence on the relationships between key factors that underpin effective improvement in primary care.

How this study might affect research, practice, or policy:

The findings prioritise the need to develop and/or strengthen distributed leadership models, a psychologically safe learning climate, reciprocal network relationships and time and space for sensemaking in primary care.

Introduction

Primary care is key to improving population health, equity, and reducing specialised service demand (World Health Organization, 2022). There are few primary care studies into factors influencing the success of quality improvement (QI) (Gosling et al., 2021). When factors influencing QI have been identified, research is still needed to explain the relationships between the factors that lead to improvement in specific settings, such as primary care (Auraaen et al., 2018; Rogers et al., 2021; Subramanian et al., 2021). Healthcare QI has shown success, but also inconsistent results in varied settings (Crabtree et al., 2011; Dixon-Woods et al., 2013). Primary care differs from other healthcare settings due to wide variation in structure, capability, and unique complexities (Auraaen et al., 2018; Crabtree et al., 2011; Fiscella & McDaniel, 2018).

QI and Implementation Science (QI&IS) identify context as a determinant for success (Nilsen et al., 2022; Subramanian et al., 2021). However, relationships between context, improvement intervention and process have not been explained (Pfadenhauer et al., 2017; Subramanian et al., 2021). Context has been variably defined; it is defined here as the factors that surround and influence QI success but are separate from the QI intervention itself and its implementation mechanisms (Kaplan et al., 2013; Øvretveit, 2011). This supports thinking that people-related factors such as teamwork, leadership, culture, and motivation are important aspects of context (Kaplan et al., 2013; Subramanian et al., 2021). Research is needed on key contextual factors, their relationship with each other, the intervention, implementation process, and outcomes in primary care (Brennan et al., 2012; Pfadenhauer et al., 2017; Subramanian et al., 2021).

The next section covers the core literature for developing the study theoretical model. QI&IS literature and theory, particularly from primary care was the lens used for this study. Following this, the methods section covers the data collection strategy, testing the theoretical model and statistical model validation methods: partial least squares structural equation modelling (PLS-SEM). The results section outlines the hypothesis test results. The penultimate section discusses implications to theory and practice from a theoretical and practical perspective in primary care before the conclusion.

Background

Models and frameworks

QI&IS has generated numerous studies into factors determining successful QI with associated frameworks and models (Damschroder et al., 2009; Nilsen et al., 2022; Skolarus et al., 2017). Two of the most influential identified through network analysis by Skolarus et al. (2017) are the Greenhalgh et al. (2004) conceptual model and the Consolidated Framework for Implementation Research (CFIR)

(Damschroder et al., 2009). CFIR was developed as a framework to guide identification of factors influencing intervention implementation and effectiveness by combining nineteen models, including the Greenhalgh et al. (2004) model (Damschroder et al., 2009). CFIR has been used to inform primary care QI in all implementation stages and to adapt interventions improving their effectiveness (Keith et al., 2017; Kowalski et al., 2018).

Primary care models are few, but there is a strong body of work arising from decades of American primary care transformation efforts (Crabtree et al., 2020; Crabtree et al., 2011). This research emphasises complexity thinking to guide QI (Crabtree et al., 2011; Lanham et al., 2009), and developed a relationship centred model for improvement (Lanham et al., 2009; Lanham et al., 2016). The findings found an 'adaptive reserve' consisting of facilitative leadership, learning culture, ability to improvise, communication, sensemaking, and teamwork lead to improvement (Lanham et al., 2016; Miller et al., 2010). The model was tested by path analysis, finding associations between relationships, sensemaking, and learning when there were higher degrees of trust and reflection, without establishing any causal link to improved quality or outcomes (Lanham et al., 2016).

Research into primary care quality improvement from other jurisdictions has also identified key contributing factors (Avby et al., 2019; Brennan et al., 2012; Hespe et al., 2022; McCalman et al., 2018). Key factors specific to primary care QI are suggested that are a combination of factors from these studies. These factors, distributed leadership, learning climate, sensemaking, and network relationships along with the implementation outcome constructs, the quadruple aim, are reviewed next followed by formulation of hypotheses between factors. The factors are hereinafter referred to as constructs to align with the terminology used in social sciences as well as PLS-SEM.

Distributed leadership

Engaged leadership, described as leadership at all levels of the organisation, is one of the ten building blocks for high-performing primary care (Bodenheimer et al., 2014). CFIR includes engaged leadership at different levels of the organisation (Damschroder et al., 2009), and Greenhalgh et al., (2004) leadership, and decision-making devolved to the front-line. Distributed leadership has been identified as key to service improvement in the NHS, including primary care (Fitzgerald et al., 2013). Leadership needs have not been well researched in primary care and historically leadership has been hierarchical and led by general practitioners (Crabtree et al., 2020; Fiscella & McDaniel, 2018). With progress toward team-based care, the focus has changed to collective leadership models such as distributed leadership (DL) (Bodenheimer et al., 2014; Crabtree et al., 2020; Miller et al., 2010; Swanwick & Varnam, 2019).

Definitions vary for DL and other inclusive leadership styles with some overlap (Boak et al., 2015; Chreim et al., 2010; Fitzgerald et al., 2013). There is some consensus on DL flattening hierarchy, with people at different levels of the organisation emerging to share leadership roles and activities based on what is needed in the context at the time, (Chreim et al., 2010; Crabtree et al., 2020; Fitzgerald et al., 2013). DL structures and practices vary according to the organisational context, needs, and goals, but must be supported by those with formal power (Boak et al., 2015; Chreim et al., 2010; Swanwick & Varnam, 2019). We define DL as leadership shared across the system levels with engaged individuals sharing resources, abilities, and tasks (Chreim et al., 2010).

Learning climate

A learning climate is one where team members are valued, feel psychologically safe to contribute ideas, try new methods and time is given to reflect, evaluate and adjust (Damschroder et al., 2009). This has common elements to QI culture (Hespe et al., 2022) and the 'adaptive reserve' necessary for improvement in primary care (Miller et al., 2010).

Successful improvement is associated with a learning culture, the perceived value placed on learning, and the ability to reflect, learn, and use that learning to adjust and improve (Crabtree et al., 2020; Crabtree et al., 2011; Hespe et al., 2022; Miller et al., 2010). Learning is an iterative social process built on high trust, respectful relationships, and reflection (Lanham et al., 2016).

Sensemaking

Sensemaking has numerous definitions but is understood to be a retrospective social process where people come together to share information, make sense of events, experiences, and plan for action (Lanham et al., 2013; Lanham et al., 2016). Sensemaking is key to successful primary care change efforts (Cullen et al., 2022; Lanham et al., 2016; Miller et al., 2010). Sensemaking replaces formal decision-making processes for problem-solving in situations where there is complexity, uncertainty, or a lack of data (Lanham et al., 2013; Leykum et al., 2014). Reflection, an interrelated aspect of sensemaking, is an individual and social process, occurring in real-time before sensemaking, or after completing the action during sensemaking (Lanham et al., 2016).

Network relationships

Network and collaboration constructs are included in the Greenhalgh et al., (2004) model, CFIR (Damschroder et al., 2009), and by Miller et al., (2010). The CFIR 'Cosmopolitanism', and 'Networks and Communication' constructs (Damschroder et al., 2009, p. 8) share aspects of 'attentiveness to the local environment' identified as the characteristic most consistently identified in highly resilient practices (Miller et al., 2010, p.571).

Primary care providers are increasingly collaborating with their communities and other service providers to improve (Crabtree et al., 2020; Miller et al., 2010; Swanwick & Varnam, 2019). External relationships provide and share resources, learning, and development (Crabtree et al., 2020; Miller et al., 2010), towards achieving shared aims, which is identified as synergy in health promotion (Jones & Barry, 2011). We define network relationships as the degree to which an organisation and its staff are networked, combining complementary strengths with external organizations, their local community, and population collaboratively for QI.

Interrelationships between the factors

DL has a key relationship with learning climate (LC) and network relationships (NR) as necessary conditions for improvement (Avby et al., 2019; Boak et al., 2015; Crabtree et al., 2020; Fitzgerald et al., 2013; Swanwick & Varnam, 2019). DL behaviours and flattening of hierarchy support psychological safety and team members speaking up, both elements of LC (Avby et al., 2019; Chreim et al., 2010; Crabtree et al., 2020). LC includes time and space for thinking which supports effective sensemaking and leads to improvement as the team iteratively test ideas, learn, and improve together (Lanham et al., 2016; Miller et al., 2010).

DL behaviours include boundary spanning, ‘reaching across established borders to build relationships, gain information and resources, and form productive connections’ to build effective NR (Crabtree et al., 2020, p. 406). Effective NR are a resource for learning, contributing to a learning climate where new practices are more rapidly introduced (Damschroder et al., 2009; Lanham et al., 2016; Miller et al., 2010). NR contribute to effective sensemaking with additional knowledge, capacity, and resource (Crabtree et al., 2020; Lanham et al., 2016; Miller et al., 2010). The hypothesised relationships between the constructs, and QI are listed below. Due to the way DL needs to be conceptualised (a formative measurement perspective) and relatively small sample size PLS-SEM become the method of choice to test the hypotheses (Hair et al., 2022; Hair et al., 2019).

Hypotheses:

- H1:** Distributed leadership has a positive effect on learning climate (Crabtree et al., 2020; Miller et al., 2010).
- H2:** Distributed leadership has a positive effect on network relationships (Crabtree et al., 2020; Miller et al., 2010).
- H3:** Network relationships has a positive effect on learning climate (Bailie et al., 2013; Miller et al., 2010).

- H4:** Network relationships has a positive effect on sensemaking (Baillie et al., 2013; Cullen et al., 2022).
- H5:** Learning climate has a positive effect on sensemaking (Lanham et al., 2016; Miller et al., 2010).
- H6:** Learning climate has a positive effect on all four QI outcome goals (Crabtree et al., 2020; Miller et al., 2010).
- H7:** Sensemaking has a positive effect on all four QI outcome goals (Lanham et al., 2013; Leykum et al., 2014).

These seven hypotheses collectively represent the theoretical model of the study (Figure 1). This model consists of 13 structural relationships, where distributed leadership acts as the (cause) driver that affects the four QI outcome goals through the causal mechanisms (indirect effects) presented in the model. To test the effect of distributed leadership on QI outcome goals through the causal mechanism represented in the model, H8 is posited as follows:

- H8:** Distributed leadership, mediated by learning climate, network relationships and sensemaking has a positive effect on all four QI outcome goals (Lanham et al., 2013).

H8 is an important hypothesis which stands analogous to the QI hypothesis that leadership does not directly affect results – rather that it creates the conditions (Crabtree et al., 2020), or ‘drives the system which creates results (Meyer & Collier, 2001, p. 404). Finally, H9 is posited to test the effect of network relationships on QI outcome goals through the causal mechanisms represented in the model.

- H9:** Network relationships mediated via learning climate and sensemaking has a positive effect on all four QI outcome goals (Baillie et al., 2013).

The quadruple aim

The Triple Aim provides an international evaluation framework for improvement goals (Brown-Johnson et al., 2019; Merry et al., 2017; Mutter et al., 2018). The New Zealand (NZ) Triple Aim varies slightly and consists of: improved individual *safety* and experience of care, improved health *and equity* for all populations, and *best value* for health system resources (Merry et al., 2017). Concerns about clinician burnout prompted calls for a quadruple aim (QA), adding the well-being of the provider (Brown-Johnson et al., 2019). The QA with contextual variation, provides a common framework to evaluate the success of healthcare QI (Brown-Johnson et al., 2019). The achievement of one or more of the four parts of a NZ adaptation of the QA (Cullen et al., 2022) is our measure of success shown with the hypothesised relationships (Figure 1).

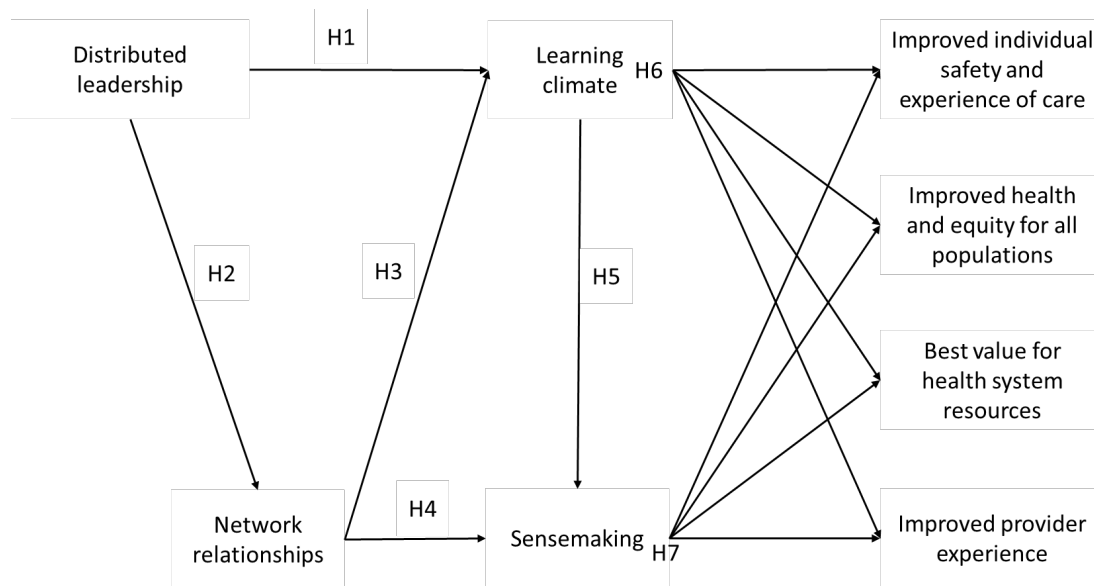


Figure 1. Model of hypothesised relationships

Method

A self-completed online survey was chosen to obtain representative data quickly and easily that would show the relationship between the variables and QI (Creswell, 2014). The minimum sample size required for PLS-SEM modelling based on standard error rates ($\alpha=0.05$ and $\beta=0.20$), assuming a minimum standardised structural relationship between 0.21-0.30 (authors' *a priori* understanding), was found to be 69, based on guidelines given by Hair et al (2022, p.27). A national survey using Qualtrics© (Version 2020), was distributed in 2021 via the Royal NZ College of General Practitioners (RNZCGP), the Practice Managers and Administrator Association NZ (PMAANZ), General Practice NZ (GPNZ), the national advocacy group for general practices, and Collaborative Aotearoa the national organisation for Health Care Home implementation. A wide distribution method was chosen to try to increase the likelihood of the survey reaching potential participants; those who have completed a significant quality improvement project aimed to achieve one or more the quadruple aims. There are approximately 1000 general practices in NZ and 30 Primary Health Organisations (PHOs), organisations that are funded to ensure the provision of essential primary health care services, mostly through general practices, to their enrolled population. With the survey entry condition of completion of a QI project to refer to the total population is unable to be accurately estimated. A low response rate was expected in the context of the impact of COVID-19 and the NZ health reforms (Huston et al., 2020; Matheson et al., 2022). 102 responses were received, and after data cleansing 93 valid responses remained. There was 5.9 percent of missing data which was treated by the regression based multiple imputation method incorporated (Austin et al., 2021) in IBM SPSS (version 28.0.1.1.) before further analysis.

The survey is shown in Appendix 1. Initial questions asked participants to rate the success of a QI they had participated in against each part of the QA on a five-point Likert scale from 'no improvement' to 'excellent improvement'. The next 12 indicator questions are all based on established survey questions. The DL formative indicators have been adapted from the Ohman-Strickland et al. (2007) primary care survey measures for decision-making. The remaining measures are reflective constructs, and most indicators were taken from Lanham et al., (2016). No general practice measures were found for network relationships (NR); hence measures were adapted from the partnership synergy work by Coombe et al., (2020) on equity-focused community-based participatory research. Two open questions allowed participants to describe important factors (constructs) for QI in primary care and offer final comments. The survey was pre-tested with eight primary care workers, consisting of three GPs, two practice managers/Registered Nurses (RNs), one Kaupapa Māori PHO manager, a contract practice nurse/practice manager, and a PHO clinical manager. Kaupapa Māori is a term used in health 'to reflect an approach to clinical practice that recognises Māori (the indigenous people of NZ) perspectives' (Beaton, et al., 2019). Minor amendments to the survey demographic choices and structure were made.

Respondent demographics are shown in Table 1. Respondents were able to select more than one type of organisation as they can belong to several categories and some categories are subcategories of another category, e.g., general practice and very-low-cost access (VLCA) practice (practices in low-socioeconomic areas that receive extra funding to maintain low fees). The largest size 'practice', which does include some PHOs which by their nature will be large, is overrepresented with 55 percent coming from the fourth quartile of practice size (should be near 17 percent), perhaps reflecting the QI capacity constraints for smaller primary care practices found in other studies (Balasubramanian, et al., 2018). Most respondents came from general practice (76 percent), 16 percent VLCA practices, 10 percent HCH, 10 percent PHO followed a mix of the remaining categories. Respondent roles were most commonly general practitioners (28 percent), followed by practice managers (25 percent), and nursing roles, which was underrepresented (15 percent). Business managers/chief executives (12 percent) is a role more common to large practices.

Table 1. Survey respondent demographics

Demographic information	Number	%
Organisation type		
General practice	71	76%
PHO	9	10%
Sub-groupings (can be in multiple categories)		

Demographic information	Number	%
Organisation type		
Health Care Home	9	10%
Very low-cost access (VLCA) practice	15	16%
Rural provider	8	9%
Kaupapa Māori provider	7	8%
Pacific provider	1	1%
Enrolled population		
Less than 2,000	4	4%
Between 2,000 – 4,000 inclusive	8	9%
Between 4,001 – 6,500 inclusive	19	20%
Great than 6,500 (all PHOs included in this group)	62	67%
Participant roles		
General practitioner ^a	26	28%
Practice manager	23	25%
Nursing ^b	13	15%
Business manager/Chief executive	11	12%
Quality improvement/change project	4	4%
Other: clinical management roles (4)	4	4%
Pharmacist prescriber	4	4%
Administration	2	2%
Allied health practitioner	2	2%
Rural hospital specialist	1	1%
Missing	3	3%
^a Including 5 GP business owners and a rural generalist		
^b Including 3 nurse managers and 2 nurse practitioners		

The research model was tested using partial least squares structural equation modeling (PLS-SEM) on the SmartPLS software V.4 (Ringle et al., 2015). The measurement model validity is shown in Table 2. Common method bias (CMB) is a systematic variance that is due to the way the data were collected rather than the measurement constructs and is a risk in self-administered questionnaires (Kock, 2017). Full collinearity assessment for CMB (Kock, 2017) was conducted via PLS-SEM to show that there are no collinear constructs (variance inflation factors (VIF) < 3.3) in the hypothesised theoretical

relationships to imply CMB. Figure 2 depicts the operationalisation of the constructs as well as estimated model parameters. All constructs in the model apart from the exogenous construct DL are reflective constructs (conventional constructs). DL is a formative construct because DL can be variably defined to suit the context and other factors (Boak et al., 2015; Chreim et al., 2010; Fitzgerald et al., 2013). A formative construct is a construct where the indicators explain the construct; the indicators need not necessarily be related to each other and removing any of the indicators would alter its meaning (Jarvis et al., 2003). For validity, it is expected that the variance inflation factors (VIF) of the indicators that predict the score of the formative construct should show absence of collinearity (Hair et al., 2022).

Construct Reliability and Validity

The concept of reliability does not apply for single-item constructs (the four elements of the QA) or the formative constructs (Hair Jr et al., 2022). Reliability in the form of internal consistency (convergent reliability) was assessed for all conventional constructs using Cronbach's alpha and composite reliability (*rho_c*) and all values were well above the required threshold of 0.70 (Hair Jr et al., 2022). Convergent validity of the reflective constructs was confirmed based on the factor loadings (the correlation between the indicators and their theoretical construct) and the average variance extracted (AVE). The factor loadings should be 0.708 or higher for convergent validity to suggest that indicators of a construct are highly correlated (Hair Jr et al., 2022). The AVE should be > 0.50 to imply that the indicators share/extract > 50 percent of variance of the construct (Hair Jr et al., 2022). Both these conditions were met (Table 2). Discriminant validity of the reflective constructs was confirmed using the Heterotrait-Monotrait (HTMT) ratio of correlations (Table 2); the HTMT ratios are easily below 0.85 the upper-bound mark for discriminant validity (Hair et al., 2022).

The validity of the formative construct DL was confirmed by demonstrating that the indicators of the constructs are not collinear ($VIF < 3.0$) and that the indicator weights are significant (Table 2) indicating that further analysis was not required (see Hair et al., 2022, p. 148). The weights of the DL indicators are positive as expected. However, the weights are unequal suggesting unequal contribution of indicators to form the meaning of DL. Indicator 6.2: This was a very hierarchical organization, decisions were made at the top with little input from those doing the work, which was reverse coded has less weight than the other indicators and therefore given less importance than staff input and teamwork and concern for people.

Table 2. Information to support construct validity (and reliability for reflective)

Formative		VIF	Weights (P value)				Loadings (P value)
	Indicators						
Distributed leadership	6.1	1.275	0.431 (0.003)				0.764 (<0.001)
	6.2	1.291	0.262 (0.010)				0.665 (<0.001)
	6.3	1.330	0.576 (<0.001)				0.861 (<0.001)
Requirements: VIF < 3.0 and significant weights (p < 0.05); if a weight is not significant, its loading ≥ 0.05, and if that cannot be met, the loading must be significant (p < 0.05).							
Reflective		Convergent validity		Internal consistency reliability			
Construct (Independent variable)	Indicators	Factor Loadings (Requirement > 0.70)	AVE (Requirement > 0.50)	Cronbach's Alpha (Requirement > 0.70)		Composite reliability (<i>rho_c</i>) (Requirement > 0.70)	
Sensemaking	6.4	0.848	0.749	0.833		0.863	
	6.5	0.915					
	6.6	0.831					
Learning climate	7.1	0.833	0.677	0.764		0.863	
	7.2	0.823					
	7.3	0.813					
Network relationships	7.4	0.905	0.791	0.869		0.919	
	7.5	0.850					
	7.6	0.911					
All construct indicator loading P values are <0.001							
Discriminant validity – HTMT correlation for testing discriminant validity							
	Learning climate	Network relationships	QA - 1	QA-2	QA-3	QA-4	Sensemaking
Learning climate							
Network relationships	0.664						
QA-1	0.402	0.534					
QA-2	0.479	0.454	0.612				
QA-4	0.490	0.496	0.572	0.500			

QA-3	0.498	0.544	0.670	0.587	0.670		
Sensemaking	0.596	0.604	0.457	0.407	0.455	0.465	
Discriminant validity requirement: all HTMT correlations < 0.850							

Results

The hypotheses path testing is summarised in Table 3 and Figure 2. The necessary and sufficient conditions to support H1 through to H7 is to show that the direct effect paths 1 to 7d in Table 3 are significant and the necessary and sufficient conditions to support H8 and H9 is to show that the indirect effect paths 8a to 9d in Table 3 are significant. The significance of the direct and total effects was examined using the bootstrapping method (a non-parametric resampling procedure) with 10,000 bootstrap samples (Hair et al., 2022). All direct and total effects explored by the hypotheses were positive and significant, thus supporting all nine hypotheses. The total effect of DL via the mediator variables of NR, LC, and sensemaking on all four parts of the QA (QA1-4), are statistically significant.

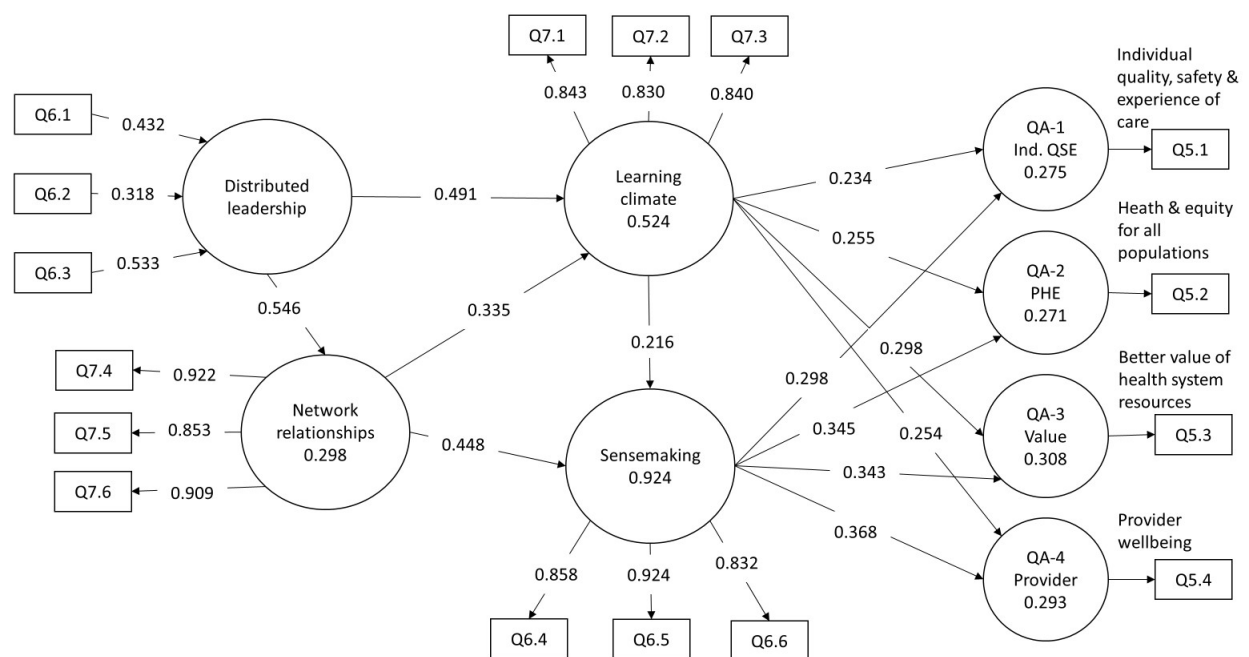
Table 3. Path coefficients (direct effects) and total effects

Path	Direct effect		Total effect		Implication
	Coefficient	P-value	Coefficient	P-value	
1. DL → LC	0.558	< 0.001	0.692	< 0.001	H1 - supported
2. DL → NR	0.509	< 0.001	0.509	< 0.001	H2 - supported
3. NR → LC	0.335	0.002	0.264	0.004	H3 - supported
4. NR → SM ¹	0.448	< 0.001	0.457	< 0.001	H4 - supported
5. LC → SM ¹	0.216	< 0.001	0.257	0.008	H5 - supported
6a. LC → QA-IndQSE ²	0.234	< 0.001	0.289	0.001	H6 - supported
6b. LC → QA-PHE ³	0.255	< 0.001	0.378	< 0.001	
6c. LC → QA-Value ⁴	0.298	0.002	0.383	< 0.001	
6d. LC → QA-Provider ⁵	0.254	0.009	0.374	0.001	
7a. SM ⁵ → QA-IndQSE	0.368	0.002	0.333	0.001	H7 – supported
7b. SM ⁵ → QA- PHE	0.345	0.001	0.230	0.013	
7c. SM ⁵ → QA- Value	0.343	0.001	0.290	0.001	
7d. SM ⁵ → QA- Provider	0.368	< 0.001	0.281	0.001	
8a. DL → QA-IndQSE			0.266	< 0.001	H8 - supported
8b. DL → QA- PHE			0.307	< 0.001	
8c. DL → QA- Value			0.323	< 0.001	

8d. DL → QA-Provider	0.314	< 0.001	H9 - supported
9a. NR → QA-IndQSE	0.206	< 0.001	
9b. NR → QA- PHE	0.190	< 0.001	
9c. NR → QA- Value	0.214	< 0.001	
9d. NR → QA- Provider	0.208	< 0.001	

¹Sensemaking, ² Individual quality & safety of care, ³ Health and equity for all populations, ⁴ Better value for health system resources, ⁵Provider wellbeing.

The direct effects of the paths 8a to 9d are the same as their total effects because these paths do not have direct effects (total effect = direct effect + indirect effect).



- (1) The figures within the circles are the R² values of the endogenous constructs resulting from the hypothesised relationships.
- (2) The figures on the arrows connecting the constructs (the hypothesised relationships) are the standardised structural regression coefficients.
- (3) The figures on the arrows connecting the constructs and their indicators (boxes) are the factor loadings between the construct and its measure, except for DL. For DL, (formative construct) it is the contribution (weight) the indicator makes towards forming the meaning of the construct.

Figure 2. Estimated parameters of the theoretical primary care improvement model

Discussion

The results shown in our analysis contribute empirical evidence to the understanding of the contextual antecedents for QI in primary care. Distributed leadership is identified in the literature as key to improvement (Bodenheimer et al., 2014; Crabtree et al., 2020; Miller et al., 2010; Swanwick & Varnam,

2019) and the evidence here explains how distributed leadership achieves this in primary care. The formative indicators describe what distributed leadership looks like in primary care, being shared decision-making, underpinned by teamwork, concern for people, and less hierarchy. However, less hierarchy while still significant, contributed less weight than these other indicators. This may be due to the presence of historical GP led leadership styles (Fiscella & McDaniel, 2018; Crabtree et al., 2020) or may be driven by the need for formal hierarchical structures required to manage organisational operations and co-exist with efforts to flatten hierarchy by formal leaders (Crabtree et al., 2020).

Sensemaking is an important tool for the primary care environment where there is often complexity, uncertainty, and a lack of data (Lanham et al., 2013; Leykum et al., 2014; Miller et al., 2010). The direct relationship that learning climate has with improvement suggests that other approaches may also be used, however, it is unlikely that effective sensemaking will occur without a learning climate (Lanham et al., 2013; Lanham et al., 2016). Although team huddles are a well-established and promoted forum for sensemaking, unless a learning climate is present, they will be just another team meeting.

Network relationships built from social capital support sensemaking by bringing in resources, knowledge, and perspectives from outside the organisation, this can start from something as simple as providing the time and space to meet and 'make sense' of events. This has common elements with collaborative QI methodologies but with some key differences. Here the collaborative effort is not only focused on shared learning but also shared and distributed effort from diverse and related organisations, on the same topic in the same community towards achieving a common goal.

Primary care practitioners can use these findings to instigate change when distributed leadership, a learning climate, network relationships, and sensemaking are not well established. Small incremental adjustments can be made to the way organisations work internally, with other providers and their communities. The survey developed for this study could be used to start conversations in organisations looking to strengthen improvement efforts based on their current structures, processes, and relationships. This study supports network and collaborative activities underway in primary care. However, a structure is not sufficient if it is not driven by distributed leadership and enacted via a learning climate and sensemaking. Indigenous and deprived communities are successful at connecting with others in the community with a common goal to achieve improvement and this is something that could become widespread when based on a foundation of respect, and reciprocal learning (Bailie et al., 2013; Cullen et al., 2022).

Conclusion

Distributed leadership with formal, informal, and emergent leaders achieves improvement in primary care, via mediator variables of learning climate, network relationships, and sensemaking. A learning

climate is a psychologically safe climate that supports shared social processes (sensemaking) for enacting change. Distributed leadership models that vary according to context, support the development of network relationships and learning climate as informal leaders emerge from the team in response to the current need, reflecting teamwork, safety, and learning. Network relationships provide external relationships and resources to support learning climate and sensemaking. Primary care practitioners can use these findings to develop and strengthen distributed leadership models, learning climates and cross-sector relationships and networks.

The study met the minimum sample size requirement, subjected to an assumption being made: the standardised structural regression coefficients would not fall below 0.21. This assumption was vindicated by the results. However, survey low response rate, is a limitation, because the low response rates can result in a nonresponse bias. The survey topic was QI, and practices, or individuals without a completed QI initiative/project to refer to, or perhaps capacity and capability for QI are unable to contribute without a project to refer to. These limiting factors are noted in other primary care studies, particularly in the small-medium sized practices during a time of major disruptive change (Balasubramanian et al., 2018; Bitton, 2018; Gosling et al., 2021). The survey data were collected between March–May 2022 just as NZ moved out of the COVID-19 alert level system, experiencing rising numbers of COVID cases and onset of the influenza season, a further contribution to the low response rate and overrepresentation of larger practices. The results are from a non-probability sample and generalising these results to other settings should be undertaken with caution.

Although CMB was not detected, results on the quadruple aim were self-reported and it is recommended that future studies be conducted using practice objective QI results, treating a practice as a unit of analysis rather than the QI project. Some control variables such as practice size, types of practice (e.g., VLCA, Kaupapa Māori) or location (rural, urban) could be considered in larger studies to examine whether these variables influence the results. Primary care is heterogenous both nationally and internationally and further research should be undertaken to test this model more widely to establish generalisability. Further research is also recommended into distributed leadership and the importance of hierarchy in different primary care organisations and settings.

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Appendix 1: Final Survey items

Concept	Questions
Demographic questions	<p>1. Which categories does your organisation belong to? (Select all that apply)</p> <ul style="list-style-type: none"> • General practice • Health care home • Kaupapa Māori provider • Pacific provider • Primary Health Organisation (PHO) • Rural setting • Urban setting • Very low-cost access practice (VLCA) • Other (please specify) <p>2. Please select the approximate size of the enrolled population served by your organisation:</p> <ul style="list-style-type: none"> • Less than 2,000 • Between 2,000 to 4,000 inclusive • Between 4,001 to 6,500 inclusive • Greater than 6,500 <p>3. Which of the categories below best describes your main role:</p> <ul style="list-style-type: none"> • Administration staff • Allied health practitioner • Business manager/CE • General practitioner • General practitioner/business owner • Health worker • Nurse manager/lead • Nurse practitioner • Practice Nurse • Practice manager • Receptionist • Other, please describe

<p>Quadruple aim success</p>	<p>Consider a quality improvement project that you have been involved in and rate the level of success for each element of the quadruple aim</p> <p>4. Consider a quality improvement initiative that you participated in and rate the success of that initiative for each element of the quadruple aim of quality improvement as outlined from A to D below. This quality improvement initiative achieved the following level of improvement:</p> <p>A. Quality, safety and experience of care</p> <p>B. Population health and equity</p> <p>C. Value for health system resources</p> <p>D. Provider experience</p> <p>0) <i>Not applicable</i></p> <p>1) <i>No improvement</i></p> <p>2) <i>Marginal improvement</i></p> <p>3) <i>Moderate improvement</i></p> <p>4) <i>Good improvement</i></p> <p>5) <i>Excellent improvement</i></p>
<p>5. Considering your organisation at the time of your identified quality initiative, please rate your response to the following statements.</p> <p>All the questions below rated on the Likert scale of:</p> <p>0) <i>Don't know</i></p> <p>1) <i>Strongly disagree</i></p> <p>2) <i>Disagree</i></p> <p>3) <i>Neither agree nor disagree</i></p> <p>4) <i>Agree</i></p> <p>5) <i>Strongly agree</i></p>	
<p>Distributed leadership</p>	<p>a. This organisation encouraged staff input for making changes and improvements.</p> <p>b. This was a very hierarchical organization; decisions were made at the top with little input from those doing the work (R)</p> <p>c. The organisation defined success as teamwork and concern for people</p>
<p>Sensemaking</p>	<p>d. After trying something new, we took time to think about how it worked.</p> <p>e. We regularly took time to reflect on how we do things</p> <p>f. When we experience a problem in the organisation, we made a serious effort to figure out what is really going on.</p>

6. Continue thinking of the organisation at the time of your identified initiative to rate your response to the following statements.	
Learning climate	<ul style="list-style-type: none"> a. It was hard to get things to change in our organisation. (R) b. People at all levels of this organisation talked openly about what was and wasn't working. c. This organisation valued people who have different points of view.
Networked relationships	<ul style="list-style-type: none"> d. This organisation had relationships with other health and community organisations that enabled us to enhance and extend each other's work. e. Organisational relationships with other health and community organisations influenced the way this organisation's staff thought about and did their work. f. This organisation achieved extra outcomes for the organisation and its patients as a result of working in partnership with others.
QUALITATIVE Open questions (Free text)	<ul style="list-style-type: none"> a. Tell us more about the factors in your organisation that are important to the success of your quality improvement initiatives. b. Finally, do you have any comments about quality improvement, your initiative or your responses to this survey?

Chapter 6: Discussion and conclusions

6.1 Introduction

This PhD research has produced two published papers (Chapters 2 and 3), and a further two papers (Chapters 4 and 5) have been submitted to peer reviewed journals. This chapter concludes the thesis by discussing the research findings, contributions to primary care QI knowledge and closes with the conclusions, research limitations and recommendations for further research. This chapter is structured to provide the answers to the research questions. The theoretical, policy, and practical implications of the findings from each research output or chapter are summarised in Table 6.1. A personal reflection on the PhD journey is provided as an addendum.

The research questions were:

1. What are the contextual factors influencing primary care improvement initiatives?
2. How do the contextual factors, improvement content (topic and planned changes) and the implementation process influence each other and the improvement outcomes in primary care?
3. How applicable for primary care assessment is the Model for Understanding Success in Quality (MUSIQ), a tool for assessing modifiable contextual factors developed in secondary care?

The first section of the discussion in this chapter outlines the influential primary care factors identified in the domains of the QI intervention (QII), implementation process, and context. This provides the answer to the first research question and identifies the factors that are interrelated with context to provide a foundation to answer the second research question. The identified factors were discussed in each of the preceding chapters with progression of thinking and refinement of key factors shown in each successive chapter. The first iteration of the revised model (Fig. 3) shown in Chapter 2, shows a range of inner and outer setting contextual factors overlapping with the QII and the implementation process. The connection to the community was identified early and was expressed as a deeper connection of whanaungatanga and manaakitanga by the first Kaupapa Māori organisation. Community orientation and connection is a key principle of good primary care, achieving health equity (McWhinney, 1998; Starfield, 2009; Starfield et al., 2005), and key when working with Indigenous communities (Harding & Oetzel, 2019; Masters-Awatere et al., 2019; Turner et al., 2019). Although community-based care is described as “aspirational” by Hashim (2016), this orientation was clearly demonstrated by all six sites. The kaupapa principles were also raised in the second Kaupapa Māori organisation (Chapter 3), with several staff in both organisations commenting that they work in those organisations because of their desire to serve their people.

An understanding of the relationships between the QII, implementation, and context was developed at the conclusion of all six cases, and this can be seen in Chapter 3 that begins to answer the second research question. While there was literature to support these relationships, the literature can vary on the direction of the relationships and factor definition depending on the context. This is particularly the case with distributed leadership and network relationships, as was discussed in Chapter 5. The model developed and tested by PLS-SEM and presented in Chapter 5 provides a primary care definition for distributed leadership through the formative indicators. This demonstrates how distributed leadership drives learning climate and network relationships that support QI in primary care, providing the answer to the second research question and a useful model for QI contextual assessment and development in primary care.

Chapter 4 assessed the applicability of MUSIQ in primary care and an adapted version is proposed more suitable for the smaller primary care practices that make up most practices in NZ. The MUSIQ calculator, a quantitative Excel tool (Cincinnati Children's Hospital Medical Center, CC-BY-NC-SA 3.0) was used to collect the data. With the adaptations presented in Chapter 4, the applicability of MUSIQ to primary care is enhanced but still requires testing. The answer to the third research question is not straightforward and the applicability of MUSIQ in primary care varies to greater or lesser degrees depending on the setting within primary care, but the MUSIQ can be adapted to improve its applicability.

6.2 Discussion of research findings and contributions to the field

The search for answers for why the results of QI efforts in healthcare are variable, slow to spread, and hard to sustain has seen healthcare researchers apply a variety of theoretical approaches, models and frameworks (Damschroder, 2020; Kao, 2014; Nilsen, 2015). Implementation science research is a relatively recent arrival that developed from the knowledge translation and evidence-based healthcare movement seeking to establish what works, for whom, under what contextual circumstances (Bauer & Kirchner, 2020; Damschroder, 2020; Edwards & Barker, 2014; Nilsen & Birken, 2020). Improvement science, also relatively new, also aims to produce generalisable knowledge of how improvement is achieved, the mechanisms, and context, to identify barriers and enablers of effective QI (Berwick, 2008; Marshall et al., 2013; Nilsen & Birken, 2020). At the same time, the increasing recognition of healthcare and healthcare organisations as complex adaptive systems has seen researchers look to complexity science to explain variation in implementation and improvement outcomes (Braithwaite et al., 2017; Crabtree et al., 2020; Greenhalgh & Papoutsis, 2019; Lanham et al., 2013; Melder et al., 2022; Reed et al., 2018).

Current thinking suggests that implementation science, improvement science, and complexity science should be viewed as complementary rather than opposing theoretical paradigms (Braithwaite et al., 2018; Kao, 2014; May et al., 2016; Melder et al., 2022; Nilsen et al., 2022; Øvretveit et al., 2017). This research combines and extends evidence on the importance of distributed leadership and workplace learning climates from the human-centred principles and theories of QI and implementation science with an understanding of interrelationships, networks, and sensemaking from complexity theory.

6.3 Intervention, implementation process and contextual factors

The findings of this PhD research support and extend primary care research and provide new evidence for a strengths-based approach to primary care QI based on the current primary care environment, key underpinning principles of primary care, and how it functions within the existing constraints.

6.3.1 Intervention factors

Key intervention factors are well described in the literature and this research confirms that QIIs should show a strong relative advantage over the current state, be a good 'fit' with the specific context and yet be adaptable so that 'fit' can be improved (Coles et al., 2020; Lau et al., 2016). Adaptability can be described as the intervention consisting of necessary core attributes surrounded by an adaptable periphery (Damschroder et al., 2009; Greenhalgh et al., 2004; Ilott et al., 2013) and this was observed in the primary care multi-case study. Primary care organisations sourced ideas for change from other primary care settings and examples that seemed likely to fit with their local need, goals, and existing capabilities which were then adapted and refined as required to work within the local context. The connection to, and responsibility for, patients and community drove participants' perception of relative advantage in the intervention, as poor patient experience and outcomes have a strong impact, not only on the experience and wellbeing of patients, but also on providers and the viability of the organisation (Brown-Johnson et al., 2019; Perzynski et al., 2018).

The relative advantage of the QIIs can only be understood through this community connection and orientation which prioritises access and continuity of care, the focus of the QIIs chosen by the cases discussed in Chapters 2 and 3. Community orientation, access, and continuity of care are all key principles of effective primary care (OECD, 2017; Starfield et al., 2005) and are shown to be a driver for primary care QI. This community connection was embedded in Kaupapa Māori providers to a greater degree. The principles of whanaungatanga and manaakitanga drove selection of the QII, why the staff worked in those organisations and cannot be adequately described through a western worldview. This demonstrates the importance of the context (inner and outer socio-technical setting) to the selection of the QII. Similarly to other parts of the health sector, the relationship or 'fit' between

the QII topic and the context is a key factor in the success of primary care QI (Coles et al., 2020; Dixon-Woods & Martin, 2016; Reed et al., 2018).

Table 6.1. Summary of research contributions

	Chapter 2: Contextual antecedents of quality improvement: A comparative case study in rural, urban and Kaupapa Māori general practice	Chapter 3: Developing a model for primary care quality improvement success: A comparative case study in rural, urban and Kaupapa Māori organisations	Chapter 4: Assessing the applicability of the Model for Understanding Success in Quality for primary care	Chapter 5: The role of distributed leadership in primary care quality improvement
Theoretical Contribution	The critical factors influencing the success of QI in primary care from the intervention, process, and context are identified including factors specific to Kaupapa Māori practice (See Fig. 3 in Chapter 2).	The 6-case cross-case analysis explored culture types of primary care organisations successful with QI and determinants of success leading to the redefinition of key intervention, process, and contextual factors specific to primary care. The underpinning values of whanaungatanga and manaakitanga in Kaupapa Māori organisations were consistent. The revised model for QI in primary care depicts key factors specific to primary care and proposes directionality of interrelationships (See Fig. 4 in Chapter 3).	MUSIQ has been tailored to the small to medium sized primary care practices that are the majority of primary care practices within NZ. This overcomes its shortcomings for this setting by removing duplicated levels and irrelevant factors and adding relevant factors (See Figure 1 in Chapter 5).	The critical role of distributed leadership is brought to the fore through its role in creating a learning climate and network relationships that enable effective sensemaking and QI in primary care. The results provide new empirical evidence on the relationships between key factors determining effective QI in primary care.
Policy implications	The environment for QI needs to be supported and resourced, (rather than enforced) to enable	Primary care capacity and capability constraints mean that formal QI methods are	Network relationships based on two-way relationships share knowledge and can provide QI	Distributed leadership, network relationships and the time and space for effective

	time and space for team-based reflection and sensemaking, that is both motivated and strengthened by community and network relationships.	generally not applied, and knowledge of successful change ideas remain tacit and within the practice team. Generalisable knowledge gained through scientific methods requires time, capability, and focused measurement which needs to be resourced centrally through policy and funding mechanisms.	infrastructure, expertise and support, particularly in under-resourced settings to enable effective QI. Policy enablers would include providing support and resources for primary care teams to build mutually beneficial collaborative relationships, partnerships, and alliances.	sensemaking should be supported from the centre. Explicit knowledge from the NZ primary care context supports distributed leadership models, cross-sector and community relationships, a strong learning team-based climate and effective sensemaking as key to QI.
Practical Implications	The identification of these inherent primary care factors supports a strength-based approach to primary care QI, where knowledge, know-how and resources are shared, drawing from the internal and external relationships of the multidisciplinary primary care team.	The lack of capacity and capability for formal QI methods can be ameliorated by a distributed leadership model, engagement with key collegial and community networks and a psychologically safe learning climate that supports iterative and effective sensemaking to test and adapt change ideas.	The MUSIQ adapted for primary care enables primary care practitioners and teams to assess the practice context surrounding planned QI efforts. The discussions and results from this assessment can guide action to strengthen areas with identified gaps with support through community and network relationships.	Primary care practitioners can use these findings to prioritise developing or strengthening distributed leadership models, a psychologically safe learning climate, two-way network relationships and regular time and space for sensemaking.
<p>Theoretical implications relate to how the findings connect to other theories or ideas in the research field.</p> <p>Policy implications are medium or high-level considerations (community, region or national) for how the research can influence existing systems.</p> <p>Practical implications are related to what those who work in the area of study can do with the results.</p>				

6.3.2 Implementation process factors and sensemaking

The CFIR describes four essential and common implementation process activities as: planning, engaging, executing, and reflecting and evaluating (Damschroder et al., 2009). These activities were observed in the case studies as well as adapting, which is a recent addition to the framework (Damschroder et al., 2022). Adaptation of the QII is included as an intervention factor in CFIR (Damschroder et al., 2009) and adaptation of the QIIs was identified in the case studies. Change is a social process (Damschroder et al., 2009; Harvey & Kitson, 2015) and the implementation of these activities varied according to the individuals, team involved, and the specific characteristics of the context. For example, planning and measurement activities were most comprehensive in the largest organisations (C4 and C6) and in one of the smaller organisations (C5) that all had financial risk associated with the change and the measurement capability to undertake more sophisticated measurement. This research extends the knowledge of these key implementation process activities to show how they were applied and refined through the reflective and iterative sensemaking of the teams involved. Processes were based on their understanding of the intervention, their context, the individuals involved, and testing these activities through their team relationships to implement and adapt these activities in the way that worked best.

This research focused on primary care improvement in the real world of primary care as it currently exists and identified 'real-world, not 'ideal-world' enablers for QI. The need for any particular methodology was not specified, although effort was made to find and interview organisations who had undertaken QI via structured QI methods. The findings showed that, while elements of known change methods, including the Kotter (2012) change model and PDSA cycles (McNicholas et al., 2019) were mentioned, most cases followed relationship-based, iterative processes, supported by the use of the available and often limited data. The use of quantitative data varied according to available skillsets and sophistication of information systems, but qualitative staff and patient feedback was used in all cases. The availability of resources such as information systems, time, and technical skills to support QI in primary care is an internationally recognised problem (Balasubramanian et al., 2018; Casalino, 2018; Parchman et al., 2019) and while this study focused on primary care strengths, resource constraints were noted. Poor fidelity of QI methods and PDSA cycles reported across healthcare studies, even with associated QI training and support, demonstrates the difficulty associated with application of QI methods and is associated with these resource constraints (Casalino, 2018; de Wet et al., 2018; Gosling et al., 2019; Manandi et al., 2023; McNicholas et al., 2019; Vachon et al., 2013).

The findings in this research show primary care teams implemented QIIs via engaged teams, exhibiting agency supported by team meetings, frequent planned communication, and iterative learning

processes. While the technical skills of QI may not be well supported in primary care, the social skills of QI are a strength. Formal PDSA cycles or other QI processes are not often completed or documented and instead an iterative process of sensemaking was implemented where teams reflected and 'made sense' of the effects arising from the actions taken, to problem solve and refine ideas for change until they worked as planned.

Sensemaking has been identified as key to primary care successful change efforts due to the inherent uncertainty and complexity of primary care and primary care settings (Crabtree et al., 2011; Fiscella & McDaniel, 2018; Lanham et al., 2016). Sensemaking replaces formal decision-making processes for problem-solving in situations where there is complexity, uncertainty, or a lack of data (Lanham et al., 2013; Leykum et al., 2014; Miller et al., 2010). The transition from Chapter 2 to 3 shows refinement of thinking about the implementation process as the process factors identified in Chapter 2 are consolidated into the factor of sensemaking. This is based on an understanding that sensemaking is a social (or relationship-based), retrospective process involving reflection to guide action (Lanham et al., 2016; Leykum et al., 2015; Miller et al., 2010). Parallels can be drawn between sensemaking and more formal QI processes when sensemaking is defined and performed as, "Drawing together disparate views to create a conceptually plausible understanding of the situation and then testing that understanding to refine it or, if necessary, abandon it and start over" (Ancona et al., 2020, p. 34). Primary care models and structures need to be developed and/or supported that enable time, space, and the internal and external relationships for collaborative and effective sensemaking.

6.3.3 Contextual factors

This research shows how a distributed leadership model supports and enables the learning climate, that extends within the organisation and externally through its community network relationships that support effective sensemaking and are key for successful QI in primary care.

Distributed leadership

Leadership has long been identified as a key enabler for the success of QI (Blumenthal & Kilo, 1998; Deming, 1994) and recent work has specified the need for collective leadership models such as distributed leadership in healthcare QI (Crabtree et al., 2020; Fitzgerald et al., 2013; Melder et al., 2022; Swanwick & Varnam, 2019). Distributed leadership has been variably defined in the literature and can take varied forms depending on the setting (Boak et al., 2015; Fitzgerald et al., 2013). The formative indicators used in stage 2 of this research (Chapter 5) defines distributed leadership in primary care as shared decision-making, underpinned by teamwork, concern for people, and less hierarchy, which are all components of modern primary care models (Chreim et al., 2010; Crabtree et al., 2020; Swanwick & Varnam, 2019). While less hierarchy had less importance compared to the other

two indicators, it was still significant. Further research is recommended to understand the balance between formal hierarchical structures required for organisational operations and efforts to flatten hierarchy by formal leaders in different types and sizes of organisations within and outside of primary care. Distributed leadership has a relationship with learning climate and network relationships as necessary conditions for QI (Crabtree et al., 2020; Fitzgerald et al., 2013; Swanwick & Varnam, 2019). The findings support the importance of the distributed leadership model in primary care QI and has extended the knowledge base to describe what this looks like and how it functions to drive QI in primary care. The relationship between distributed leadership, the other contextual factors, the process, and outcome, is discussed in section 6.3.4.

Learning climate

Learning is a reflective social process which requires time and space to undertake and is based on trust, or psychological safety (Crabtree et al., 2020; Damschroder et al., 2009; Lanham et al., 2016; Miller et al., 2010; Wright et al., 2022). Damschroder et al. (2009) defines a learning climate as a “climate in which a) leaders express their own fallibility and need for team members’ assistance and input; b) team members feel that they are essential, valued, and knowledgeable partners in the change process; c) individuals feel psychologically safe to try new methods; and d) there is sufficient time and space for reflective thinking and evaluation.” (p. 9). A learning climate was clearly observed and was how the work environment was perceived by the people working within it. Formal leaders expressed the need to include and learn from others; team members were valued for the knowledge, skills, work, and life experience; time was found to collaborate for sensemaking; and the psychological safety to test ideas, reflect, learn, and adapt actions was apparent. These elements of a learning climate are also part of the clan and adhocracy cultures (Cameron & Quinn, 2011) that were observed as strongly present in all case study sites. At its core, QI is reliant on ongoing learning, requiring a systems view and broad participation (Baillie et al., 2013; Braithwaite, 2018; Larkins et al., 2019). Teams must feel safe to participate and share their reflections and ideas (De Brún & McAuliffe, 2021; Edwards et al., 2021; Lanham et al., 2016). The findings demonstrate that distributed leadership creates and supports a learning climate to achieve successful improvement.

Network relationships

Network relationships are defined in this research as: the degree to which an organisation and its staff are networked, combining complementary strengths with other external organizations, their local community and population to collaborate for QI. This definition of network relationships combines and builds on previous definitions such as cosmopolitanism (Damschroder et al., 2009), networks and communication from CFIR (Damschroder et al., 2009), attentiveness to the local environment from

primary care research (Miller et al., 2010) and synergy from health promotion research (Jones & Barry, 2011a).

From the first three cases described in Chapter 2, it was becoming clear that the CFIR definition of cosmopolitanism was not capturing the essence of what I observed in primary care practices but lacked confidence to define it at this stage. As the term cosmopolitanism was not intuitive, I labelled it networks to be better understood by the primary care audience. The recent CFIR update has recognised this and, along with other improvements, has changed cosmopolitanism into 'partnerships & connections', defined as: the inner setting is networked with external entities, including referral networks, academic affiliations, and professional organization networks (Damschroder et al., 2022). By the six-case article (Chapter 3), I have used the term network relationships and defined it as noted above. This is still not captured by the new CFIR partnership and connections construct. With this definition, I sought to incorporate some of the community connections and lack of separation between the inner and outer setting expressed by participants that reflects the community orientation which is at the core of primary care. The transition from Chapter 2 to 3, and the example of network relationships, shows how the additional cases enabled deeper understanding of the key factors and their relationships.

The observations made in this research found a much more synergistic, two-way relationship than what is described in CFIR, and the definition developed reflects this. The network relationships observed in high-performing primary care settings and strongly embedded in the Kaupapa Māori organisations are key for QI success, particularly in small under-resourced settings or those caring for Indigenous peoples (Bitton, 2018; Carlisle et al., 2021; Larkins et al., 2019; Lim & Islam, 2022; Miller et al., 2010). The definition provided in this study clarifies the meaning of network relationships and provides some guidance on how they should operate (combine complementary strengths and collaborate) for successful QI. In addition, the findings provide evidence for network relationships as a supporting factor to achieve QI. Central support is required at different levels to support the development of networks. Depending on context-specific needs, this may involve funding, providing collaboration space virtually or in-person, and removing barriers such as funding and competition.

6.3.4 The relationships and influence of content, process, and context

The factors described in this research are all factors that are known to contribute to effective QI. Relationships between different primary care factors including those discussed have been proposed (Crabtree et al., 2020; Swanwick & Varnam, 2019) and the variables of trust and reflection tested for how they influence factors leading to sensemaking and a learning culture in primary care (Lanham et al., 2016). This research explains how distributed leadership, learning climate, network relationships,

and sensemaking operate in successful primary care QI by defining what they consist of in primary care and explaining their relationships with each other and the success of QI initiatives.

Distributed leadership is key to driving effective QI in primary care as it supports and enables a learning climate and network relationships. Teamwork, concern for people, shared decision-making, and flatter hierarchy, defined as distributed leadership, encourage the boundary spanning activities required to build network relationships (Braithwaite et al., 2017; Melder et al., 2022; Swanwick & Varnam, 2019). Network relationships are a two-way relationship that provides a range of benefits including collaboration, peer support, knowledge, tools, and capacity to support a learning climate and sensemaking.

Authoritative leadership styles are associated with decreased psychological safety and learning (Lanham et al., 2016; Miller et al., 2010). Collaborative leadership models such as distributed leadership build psychological safety and social capital to develop and support a learning climate (Chreim et al., 2010; Crabtree et al., 2020). Learning climate, network relationships and sensemaking contribute towards the 'adaptive reserve' from which a more positive work environment emerges (Edwards et al., 2018; Lanham et al., 2016; Miller et al., 2010). Adaptive reserve is "the ability of practices to keep up with rapid developments and environmental changes" (Lanham et al., 2016, p. 1490). This research shows that learning climate has a direct relationship with improvement as well as contributing, with network relationships (via learning climate), towards sensemaking and quadruple aim improvement. This provides support for team-based care and collaborative improvement approaches that need more support from central agencies.

6.4 The applicability of the MUSIQ in primary care

The MUSIQ, a tool for assessing modifiable contextual factors developed in secondary care, was assessed for its applicability in primary care in Chapter 4. Despite the popular use of MUSIQ in healthcare QI, doubts have been expressed regarding the applicability of MUSIQ in primary care, particularly in the small to medium sized general practice environment (Douglas et al., 2019; Kaplan et al., 2012; Siriwardena, 2012). MUSIQ has been adapted for use in low-income countries (Reed et al., 2017) but there have been no publications of primary care adaptations of MUSIQ.

The MUSIQ focuses on the use of structured QI methods and was developed based on studies of large, mainly secondary care, organisations, and collaboratives (Kaplan et al., 2013). MUSIQ contains several factors that are not often present in primary care, and this was demonstrated in the findings. Despite this, there are some similar factors between the adapted MUSIQ-PC presented in Chapter 4 (Figure 1), the proposed primary care QI model presented in Chapter 3 (Fig. 4) and the final model discussed and tested in Chapter 5 (Figure 2). Leadership appears in multiple places and ways in MUSIQ: QI

leadership, team leadership, physician involvement and subject matter expert. The learning climate participants described of their working environment (Chapters 2 and 3) embodied the characteristics of a learning climate defined in the CFIR (Damschroder et al., 2009). These were: fallible leaders requiring support, team members feeling essential, valued and psychologically safe, with time and space for reflection and evaluation. These characteristics encompass and surpass the organisational and microsystem QI culture measures in MUSIQ (see MUSIQ calculator, Chapter 4, Supplemental S1). Network relationships has already been discussed and is added to MUSIQ to enhance its applicability to primary care as it draws on a key characteristic of effective primary care (Auraaen et al., 2018; McCalman et al., 2018; Miller et al., 2010; Swanwick & Varnam, 2019).

The adapted version of MUSIQ developed by this research removes duplicated organisation levels and irrelevant factors and adds factors specific to primary care and emerging QI knowledge, including patient needs and resources, and network relationships. Network relationships were a key factor in this research and much more that is described in either the current or reviewed version of either MUSIQ or CFIR, particularly in the Kaupapa Māori organisations. Patient needs and resources is an outer setting factor in CFIR (Damschroder et al., 2009); this PhD research found patient needs and resources to be an inner setting factor. The recent review of MUSIQ includes patient engagement as a QI team level factor (Reed et al., 2018) and this aligns with current QI thinking (Damschroder et al., 2022). The recent review of CFIR, which was based on user feedback, separated this construct into awareness of patient needs and prioritisation of patient needs, relocated it into the inner setting domain and renamed patients as innovation recipients (Damschroder et al., 2022). Innovation recipients has additionally been placed in the implementation process domain as participants in the innovation and implementation team members (Damschroder et al., 2022). This research only found one example of strong patient participation present in primary care, but this is an area that could be included in the future with potential for increasing success and sustainability of QII in primary care.

This research showed that the MUSIQ QI capability success factors are not strong in primary care and there is a lack of confidence in team QI skills in those who have had more exposure to this skillset. International studies have also found a lack of QI capability in primary care and overestimation of QI skills from those with less exposure (Gosling et al., 2019; Parchman et al., 2019). This is an area for exploration at a macro-level (government) or meso-level (Te Whatu Ora (Health NZ) District, locality, or PHO) where structures and systems could be developed and supported to increase capability and capacity in the technical skills of QI. As MUSIQ contains several QI support, capacity and capability indicators, MUSIQ-PC could be used to assess primary care settings and develop systems to build and support QI capability and capacity in primary care. Combined with the questions developed in this research, this would ensure that this is done without the diminishment of the strong community

networks, connections and collaborative, relationship and sensemaking skills already present in effective primary care organisations.

6.5 Assessing the key factors driving QI in primary care

The key factors that should be assessed to strengthen primary care QI have been identified in this research as: distributed leadership, network relationships, learning climate, and sensemaking. There are already many assessment tools and frameworks available for healthcare and some for primary care (Bate et al., 2015; Brennan et al., 2012; Fulop & Robert, 2013). Selecting the appropriate tool or framework will depend on the primary care setting (general practice size, population, local policy settings and partners), the purpose and timing (before, during or after QI implementation) of the assessment, but the choice should be made from the existing validated tools, rather than creating additional tools (Bate et al., 2015; Brennan et al., 2012). The suite of assessment tools is much wider in the secondary care setting than the primary care setting; however, there are primary care tools available. Existing validated questions from primary health care settings were used in the survey for this research and Table 6.2 below lists the sources for these.

The work by Lanham et al. (2016) utilised a validated primary care survey developed from work to measure the PCMH national demonstration project in the United States (Jaén et al., 2010). Survey indicators from this survey were used to measure learning climate and sensemaking. Ohman-Strickland et al. (2007) developed a primary care organisational performance assessment tool (a survey) as part of the 'Using Learning Teams for Reflective Adaptation' or ULTRA study based on existing validated instruments. The decision-making indicators provided a good fit with distributed leadership and three of the eight indicators available were included in the survey for this research. The complete survey is shown in Chapter 5, Appendix 1.

Information and literature on how to implement improvements of contextual factors are less common (De Brún et al., 2019) and are not commonly seen in the peer reviewed literature. A mixture of potential sources of information for action to develop or strengthen contextual factors influencing QI, including examples of how this has been done in healthcare settings, are listed in Table 6.2. Primary care sources are listed where possible but other sources are included, due to the limited sources available. There is no consensus approach or one site where this knowledge has been consolidated and this is an area for future research in primary care.

Table 6.2: Primary care QI factor assessment tools and sources to guide strengthening efforts

Factor	Assessment Tool	Sources for improving context
Distributed leadership	<p>Ohman-Strickland et al. (2007) survey decision-making questions:</p> <ul style="list-style-type: none"> • This organisation encouraged staff input for making changes and improvements. • This was a very hierarchical organisation; decisions were made at the top with little input from those doing the work (reverse coded) • The organisation defined success as teamwork and concern for people. 	<ul style="list-style-type: none"> • (Carroll & Edmondson, 2002) • (Crabtree et al., 2020) • (Swanwick & Varnam, 2019) • (Turner et al., 2020)
Learning climate	<p>Lanham et al. (2016) survey learning, mindfulness, and diversity questions:</p> <ul style="list-style-type: none"> • It was hard to get things to change in our organisation (reverse coded). • People at all levels of this organisation talked openly about what was and wasn't working. • This organisation valued people who have different points of view. 	<ul style="list-style-type: none"> • (Carroll & Edmondson, 2002) • (Edmondson, 2018) • (Kiran et al., 2019) • (Lanham et al., 2016) • (Wright et al., 2022)
Network relationships	<p>These questions are adapted from Coombe et al. (2020) and Jones and Barry (2011a) survey questions:</p> <ul style="list-style-type: none"> • This organisation had relationships with other health and community organisations that enabled us to enhance and extend each other's work. • Organisational relationships with other health and community organisations influenced the way this organisation's staff thought about and did their work. • This organisation achieved extra outcomes for the organisation and its patients 	<ul style="list-style-type: none"> • (Burgess et al., 2019) • (Cunningham et al., 2018) • (Iedema et al., 2017) • (Kitson et al., 2018) • (Jones & Barry, 2011b) • (Oetzel et al., 2017) • (Beaton et al., 2019)

	as a result of working in partnership with others.	
Sensemaking	<p>Lanham et al. (2016) survey questions for reflection and sensemaking:</p> <ul style="list-style-type: none"> • After trying something new, we took time to think about how it worked. • We regularly took time to reflect on how we do things. • When we experience a problem in the organisation, we made a serious effort to figure out what is really going on. 	<ul style="list-style-type: none"> • (Lanham et al., 2013) • (Lanham et al., 2016) • (Leykum et al., 2015) • (Snowden, 2021) • (Turner et al., 2020)

6.6 Conclusion

This was strengths-based research to understand how high-performing primary care organisations, (general practices and PHOs) achieve QI within current funding, workforce, capability, and capacity constraints. While primary care systems vary across the world, many of the features that constrain or enable QI in primary care are similar, regardless of the jurisdiction (Bailie et al., 2013; Tenbensen et al., 2017). Primary care has embedded within it the leadership, relational and social skills, and network relationships that will enable successful improvement. More widespread and rapid improvement will require policy and funding changes and development of, or support for, infrastructure, improvement mechanisms, technical skills, and capacity. Development of these structures and mechanisms should be a national priority here in NZ, just as it has been in the US (Burton et al., 2018; Crabtree et al., 2020; Meyers et al., 2018), UK (de Wet et al., 2018; Gosling et al., 2019) and Australia (Bailie et al., 2021; Hespe et al., 2022; Knight et al., 2019).

The key contextual factors for primary care QI are identified as distributed leadership, network relationships, a learning climate and sensemaking (QII process). Although community responsibility and connection are not measured as part of the final PLS-SEM model, they are a key driver of QII selection and motivation, contribute to network relationships, are a key principle of primary care (McWhinney, 1998; Starfield, 2009; Starfield et al., 2005), and integral to Indigenous models and Kaupapa Māori approaches (Beaton et al., 2019; Carlisle et al., 2021; Harding & Oetzel, 2019; Masters-Awatere et al., 2021; Turner et al., 2019). These factors are intrinsically linked with both the QII process and selection of the QII topic, through the 'fit' with context (the identified need and resources available), understanding of the context and its history, adaptability of the QII to improve fit, and being able to show a relative advantage to warrant the effort required and meet the identified need.

Together, these contextual factors and their relationships achieve QI success expressed in achievement of the quadruple aim.

Network relationships has a direct effect on learning climate and sensemaking through the social connections, relationships, knowledge, and resources gained. Learning climate has a direct effect on achievement of the quadruple aim and sensemaking to achieve QI success. Other implementation methods, apart from sensemaking, are applicable and were present to varied degrees in the case studies. Importantly, sensemaking is a key QI process in the complex and often under-resourced primary care environment (Crabtree et al., 2011; Fiscella & McDaniel, 2018; Lanham et al., 2013; Lanham et al., 2016). Learning climate and sensemaking are both “pivotal dimensions of the adaptive reserve” (Lanham et al., 2016, p. 1491) identified by Miller et al. (2010) which, along with facilitative leadership, is associated with ‘zero-burnout’ practices in the AHRQ study (Edwards et al., 2021). This supports the connection between QI, patient experience, provider wellbeing and the quadruple aim in primary care (Perzynski et al., 2018). These factors draw on the values and characteristics of effective primary care, being person- rather than disease-focused, comprehensive, co-ordinated and continuous, underpinned by a family and community orientation, and driven by leadership and teamwork (OECD, 2017; McWhinney, 1998; Starfield, 2011; Starfield et al., 2005). An assessment of the local context utilising the knowledge and tools in this research and application, or development, of, distributed leadership, learning climate, network relationships and sensemaking to support local adaptation and learning will enable successful and sustainable QI in primary care.

6.7 Limitations

Throughout the study several limitations were identified, some of which are included in the published article chapters.

6.7.1 Measures of success

The reliance on mainly subjective assessments of QII success is a limitation in this study which was also reported in the development of the MUSIQ assessment tool (Kaplan et al., 2013). The evaluation of QII impact in healthcare is problematic due to the combination of multi-factorial interventions, complex dynamic settings, and limitations in data and a mixed qualitative and quantitative approach is recommended (Barry et al., 2018; Shah, 2019; Willett et al., 2021). The validity of subjective versus objective measurements are a matter of debate as both methods have inherent advantages and disadvantages which has stimulated development of mixed methods approaches (Andrews et al., 2006; Clark & Ivankova, 2015; Holloway & Galvin, 2010; Tashakkori & Teddlie, 1998). Healthcare has long relied on randomised clinical trials as the ‘gold-standard’ of evidence-based medicine and relying solely on subjective measures may prompt doubt in their validity from some audiences (Goldenberg,

2009; Holloway & Galvin, 2010). Despite this, the benefits of qualitative data are increasingly being recognised as important to evaluate QI in complex systems such as healthcare (Shah, 2019; Willett et al., 2021).

In stage 1 of the research, three of the cases had direct data showing improvement in the topic of their QII, one indirect data and the other two relied on qualitative data. In stage 2 of the research, due to the constraints of a survey, this also relied solely on subjective assessment of QII success. In addition, the use of the quadruple aim as a measure of success increased the number of non-responses in the survey as respondents were able to answer N/A for quadruple aim elements that were not part of their chosen QI project. This increased the number of survey responses that were removed from the SEM-PLS analysis due to too many unanswered questions.

6.7.2 Potential bias – case selection and survey responses

Limitations identified in the case studies from the time between the QII and data collection may have contributed to potential recollection problems. The use of PHO recommendations, to assist sample selection, potentially skewed the sample towards those practices and PHOs who have good relationships and perceive benefits from those relationships.

The large nursing workforce and the small to medium sized practices that make up most practices within NZ were both underrepresented in the survey responses, potentially biasing the responses towards the opinions of GPs, practice managers (some of whom are nurses by background) and larger, and likely more well-resourced, practices. Survey respondents were asked to rate a successful QII they had participated in and many respondents from practices with fewer than 6,000 enrolled patients did not complete any more of the survey after the demographic questions. It has been suggested that smaller practices have fewer resources to undertake QI (Meyers et al., 2018) and the smaller practices in the case study undertaking QII were supported by their network relationships. These initial questions eliminated those with no QII to reflect on. The topic of the survey is less likely to be of interest to respondents without an interest in QI and therefore will be biased towards those who have a positive perspective and the resources, including capacity, to undertake QI (Balasubramanian et al., 2018; Parchman et al., 2019).

6.7.3 Generalisation – qualitative case study research and quantitative survey

Qualitative case study research provides an in-depth analysis of the sample cases. The six cases in stage 1 of the research were chosen by purposeful theoretical sampling to provide a typical mix of NZ general practice settings and improvement topics. Consideration should be given to the heterogeneity of the primary care environment within NZ, that will also be present internationally. There are both strengths and limitations in case study research and the case descriptions within this study will allow

researchers and implementers to make their own judgements on the transferability of findings (Gobo, 2004; Polit & Beck, 2010). While there are likely to be local differences, it is also likely that there will be more similarities to these findings than not.

The survey had a low response rate and overrepresentation of larger practices and GPs, reflecting the bias discussed earlier. The small sample size prevented full mediation analysis and data stratification to seek patterns in responses aligned to practice characteristics such as size, locality, Kaupapa Māori or Pacific services. This may also limit the generalisability of the results to the wider general practice and primary care landscape.

6.7.4 COVID pandemic

The qualitative data was collected prior to, and in the early stages of, the COVID-19 pandemic. The latter stages of this research were undertaken as NZ and the rest of the world were experiencing the COVID-19 pandemic. The low survey response rate may have been due to a combination of the timing as NZ moved out of the COVID-19 alert levels system, rising numbers of COVID cases and onset of the influenza season, and burnout and capacity issues in general practice. Although, survey responses supported the identified factors and their relationships, NZ, and primary care has been considerably affected by the pandemic. There are now likely to be other factors present in primary care that will affect QI efforts, including increasing resource and capacity constraints. Research to confirm these findings in the current environment is recommended.

6.7.5 Kaupapa Māori concepts – Taiwi researcher

The Kaupapa Māori principles identified in the case study were not explored further in the survey as, with only a taiwi worldview, there was not sufficient understanding nor was it appropriate to attempt this. The richness of the Te Ao Māori whānau-centred perspective added a deeper perspective to the qualitative data that was not able to be given the consideration and inclusion within the findings that it warrants.

Related to this limitation is the use of western models to research Kaupapa Māori organisations and QI. The use of western models to attempt comprehension of matauranga Māori (Māori knowledge) risks misrepresentation, misinterpretation, and devaluing the Indigenous knowledge to continue the practice of colonisation (Llucmetkwe et al., 2023; Rolleston et al., 2020), an “ongoing structure of domination” (Paradies, 2016, p. 84). It is an example of the euro-centrality of QI as it is currently practiced and researched and risks subjugating Indigenous Māori knowledge through further legitimisation of western models in Indigenous settings (Llucmetkwe et al., 2023). This was not an attempt to do this, rather it was an attempt to learn from Kaupapa Māori organisations in a way that celebrates their history, uniqueness, and wisdom through the limited gaze of this taiwi researcher.

Only Māori can be Māori, but allies can support rangatiratanga (self-determination), recognise, and support the great work carried out by Māori providers and nudge the western worldview to incorporate adjacent concepts.

6.8 Future research

A model has been developed that extends previous work to understand the determinants of effective QI. This research has focused specifically on the complex adaptive systems of a specific part of primary care. Future research could test this model in complex adaptive systems from other settings within healthcare, other primary care settings, secondary care, and outside healthcare for a new perspective. Are there cross-sector learnings that can be shared and developed between different systems that can help our understanding grow and guide more effective efforts to improve services and outcomes?

This research focused on primary care settings where successful QI was occurring within the current environment. The next stage of this research should also include testing a selection of strategies, methods, and tools to support the development and strengthening of the factors in primary care providers that have an identified need. Strategies to overcome barriers in under-resourced settings should be developed and tested. The primary care MUSIQ adaptation proposed, extended with these findings, should be tested in both successful and unsuccessful QI work and the benefits of the adapted model, as both a quantitative tool and qualitative tool, assessed.

Research opportunities are suggested by the findings from the Kaupapa Māori organisations, and this is a priority area for NZ. The Kaupapa Māori principles identified require Kaupapa Māori research, and the learning generated for QI from matauranga Māori (Māori knowledge) has potential to address longstanding inequity and make progress towards decolonisation of the health system and the way we approach QI. This would be a rich area for further exploration and a valuable contribution to the health system and QI efforts in NZ. Kaupapa Māori research is needed to learn more about the matauranga Māori applied principles of whanaungatanga and manaakitanga and explore if this factor is present in less effective primary care organisations or in less successful primary care QI.

The contextual factor of community responsibility as a key motivation for change was a finding that was unable to be explored further. While motivation for change is a recognised driver of change (Kiran et al., 2018; Reed et al., 2018), community responsibility and connection is specific to primary care QI (Larkins et al., 2019; McCalman et al., 2018), recognised in Indigenous knowledge and matauranga Māori principles (Beaton et al., 2019; Carlisle et al., 2021; Harding & Oetzel, 2019; Masters-Awatere et al., 2021; Turner et al., 2019), and a key principle for effective primary care (McWhinney, 1998; Starfield, 2009; Starfield et al., 2005). This is an important area for exploration in NZ primary care.

Another area that warrants further exploration are the concepts and theories related to distributed leadership. An understanding of the different models, the balance between hierarchical organisations and efforts to flatten organisations, related to different organisational characteristics and models of care, within primary, secondary, and outside healthcare would enhance application. The culture typologies discussed in Chapter 3 showed some structural hierarchal processes for organisational management in the larger organisations, but the clan typology was consistent across all the six cases. Was the size of the participating organisations a contributing factor to the survey findings? Were the predominantly managerial and GP survey participants affecting the results? The NZ culture generally prefers a low power distance relationships between colleagues (Holmes, 2018; Mannes et al., 2023). Exploring primary care power distance relationships, their impact on QI in primary care, between different professional groups, organisational types and structures is another area for exploration.

The open survey questions were a rich source of additional data that provided support for the quantitative findings but also spoke of the impact of the pandemic on primary care. This information would help to paint a picture of the current primary care environment that may be useful to planners and funders in the context of the current health reforms and is intended to be the basis for an additional article.

The six case studies approached their improvement efforts from an implementation perspective, engaged multiple staff in a variety of ways, with only a few using scientific improvement methods. They were still able to achieve improvement with their natural skills in negotiating complexity and relationships to accommodate and respond to real-world conditions with just enough structure to ensure progress. Already, evidence-informed interventions are being adapted and implemented via improvement science approaches to respond to local contextual factors and complexities. Early assessment of the context can guide the focus and/or adaptation of the implementation approach to respond to the context and changes during implementation through iterative cycles of testing, sensemaking, and adaptation. Further research could use complexity analysis tools in combination with implementation science tools to understand how, and in what circumstances, implementation, improvement, and complexity science approaches complement each other. There is likely to be a range of combinations along the systems change spectrum depending on the setting and contextual factors. Further research can develop more sophisticated models to explain how these approaches may combine or should be used in different ways to strengthen QI in different health care settings and contexts.

Finally, I believe that the fields of implementation science, improvement science, and complexity science have much to offer together to advance the understanding of improvement and change in

healthcare systems. The ultimate objective for these fields is to improve health care services and outcomes. The field of implementation science looks to secure the implementation of evidence-based care into practice and improvement science seeks to improve care through the bottom-up and data-informed efforts of health care service providers. Complexity science takes a context-specific approach through iterative change to learn the way to success. I believe they are on a spectrum of change approaches, rather than entirely divergent. Linear approaches are often ineffective, but some form of structure acts as a roadmap to guide people through the change process, knowing the intended destination, and possible roads to achieve the goal. All three approaches seek to engage the people who are part of the system in slightly different ways and are complementary approaches to achieve healthcare improvement in a variety of systems.

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6.9 Addendum: Reflections on the PhD Journey

Figure 6.1 depicts a diagrammatic overview of the thesis accompanied by my thinking during the PhD journey. At the top-level rounded rectangle boxes contain the high-level findings at each stage with the methods used hanging beneath them. The development of the research diagrams is shown in the next layer linked to thought clouds of my thinking at that stage. The chapter and article outputs are at the very bottom of the diagram.

I commenced this PhD because of my twin-interest in primary care and QI. I had been working in the field of QI for some time, having initially transitioned around 20-years ago from nursing roles into healthcare QI. Within the health sector I have worked in and with primary, secondary (public and private), aged care and palliative care and in my experience, primary care has the least resources to support QI, with no dedicated time, resources, or personnel with specific QI expertise. I wanted to see what I could do in this study to help primary care to improve services and outcomes more effectively. This research focused on successful practices managing to provide good and improving care in the existing context.

As a QI advisor, I was expecting to see QI methods add value to QI whilst also seeing the need for more resource to support QI in primary care. Instead, I saw inspiring and highly motivated teams, with strong social relationships within their own teams and with external networks and their communities, that succeeded without formal QI methods. The collaborative distributed leadership within the teams that engendered the trusting internal relationships and strong external relationships was also extended to me in my work to gather their stories for this research. The teams shared so freely, welcomed me into their environments and continued to be so encouraging as I updated them with feedback, shared progress updates, conference presentations and publications. Case 2, the Kaupapa Māori practice invited me to their Board meetings, and I felt honoured when they took the research findings to inform their strategic planning.

The research was not focused on barriers but instead the factors that allowed these teams to succeed. Nevertheless, barriers were identified by these teams that they overcome with a certain amount of determination and persistence. A balanced approach to reducing some of these barriers and strengthening the identified drivers of improvement will be needed for the wider primary care sector to respond more quickly to the changing health and care needs of the population. The wider primary care community that I engaged with through this research, at conferences, through social media and in my improvement advisor role have embraced this work.

I was always surprised when people thanked me for doing this work, when I was so appreciative of the generosity of the very busy primary care teams who took the time to share so freely about their

efforts to improve services for their patients. I really enjoyed getting to know them and the work they do. Some of the interview comments will be forever embedded in my memory forever. Some of the feedback I have received along the way that encouraged me to continue is listed below.

- “It was a great read and the common factors contributing to the strength of quality care improvement are gold nuggets. We can certainly share these findings amongst our GP’s and especially to our [...] Quality Improvement Peer Group.”
- “This is such complex work, but I think that you have captured the essence of what we shared and made sense of it in your study.”
- “It is exactly as I see QI in our practice so you have captured it well.”
- “your conclusions are particularly relevant and interesting to us so I have shared this with our team.”
- “Thanks again for doing this research.”

Figure 6.1. The thesis and research journey

