What are the obstacles to Health Information Systems interoperability in the Auckland region primary health care sector?

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Abstract

This thesis examines the reasons why a key policy goal of New Zealand's National Health IT Board - to provide electronic health records to all New Zealanders, with an essential prerequisite being greater connectivity between sector information systems - has not materialised and, indeed, seems to be such a distant prospect. The research focuses on the Auckland metropolitan region, and where information exchange intersects with the primary care sector.

The research was conducted by interviewing some of the key policy actors involved in this issue, all of whom could speak from different parts of the sector and held different perspectives and roles in the implementation of the policy. A theoretical framework based on the Policy Implementation literature was utilised, which identifies the extent to which there is both policy congruence and policy clarity amongst stakeholders.

The thesis first encompasses the complex and fragmented history of New Zealand's health system, and identifies relevant international literature which recommends avoiding either 'top down' or 'bottom up' implementations of IT systems in health. A strong theme was that the focus must begin with implementing standards, and incentivising sector stakeholders to work on that basis.

Participant interviews revealed a perception that the centre is relatively weak, and that there has been no clear articulation of a 'burning platform' for change and there has been no targeted incentivising, such as has been seen in the US since 2009. The structure of the health system itself - particularly the primary care funding model - was also repeatedly noted by participants as providing a *disbenefit* to support a goal such as interoperability. Another key issue was the dissatisfaction expressed by primary care informants about their PMS products and vendors. Those working in primary care appear to sharply feel a power imbalance, both in the relationship with DHBs and with their software vendors.

The interoperability policy goal is therefore considered to be a 'symbolic implementation' (Matland, 1995), featuring high levels of ambiguity and conflict. The route out of this situation is for the centre to clearly assess the relative coalitional strengths of different groups in the sector, and allocate resources and provide incentives in such a way as to shift power imbalances, so that the desired outcome can be achieved. This will require proactive and bold initiatives from the centre, which participants did not perceive had been forthcoming.

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Attestation of authorship

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.

Signed:

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1. Introduction

The context of this research encompasses three key issues. Firstly, healthcare information systems in New Zealand are decentralised and fragmented (Gauld, 2006; Leong, 2010). Secondly, there has been a concerted national effort to integrate systems; the National Health IT Board [NHITB] identified this as a goal in 2010 (National Health IT Board, 2010), anticipating the objectives set out in the National government's 2011 'Better, sooner, more convenient' health care policy (Ministry of Health, 2011a). This policy specifically envisages a comprehensive electronic health record for all New Zealanders, and recognises that integrating the fragmented information systems together is an essential prerequisite. Thirdly, whilst the national policy direction has been clearly articulated, the literature indicates that, where there is fragmentation in the information ecosystem, implementation will be extremely complex (Kaplan and Harris-Salamone, 2009; Kellermann and Jones, 2013). This experience has been reflected in New Zealand's history. Four national reviews conducted between 1991 and 2005 have noted a need for greater interoperability between healthcare systems, yet it is still an issue we are struggling to address.

1.1. Purpose of the research

The questions and issues I will seek to uncover in this research are derived from a review of the literature, and from my own experiences and knowledge of working within the health information system. Patton notes that "purpose is the controlling force in research" (2008, p. 150) and, as such, I here specify what I intend this research to achieve. According to Patton's typology, it is hoped that the findings will provide practical and actionable insights into what a range of policy actors believe to be problematic about achieving the interoperability goal. The focus is therefore very much on an *evaluative* approach, and this will be discussed in more detail in chapter 4. I will:

- Identify current progress towards interoperability within the Auckland region primary health sector and - by implication - its consequent progress amongst interlinked agencies such as District Health Boards [DHBs],

- Understand the current issues and risks associated with interoperability from the perspective of key informants,
- Ascertain from the key informants what can be done to ameliorate these issues and risks,
- Identify gaps between the national policy direction and local implementation,
- Make recommendations as to how these gaps may be bridged, attempting to also seek where these recommendations might be generalised to policy implementation in other sectors.

At this point, it is also important to clarify some terminology. In the literature, I have ascertained that the term 'interoperability' is used to denote not only the specific, technical, connectivity *directly between information systems,* but encompasses more general connectivity. Throughout the interviews, these terms were also extended by participants and led to somewhat more general discussions around simple data *sharing*. Since this research is not a technical study, but one that seeks to elicit the viewpoints of important sector policy actors, I have allowed the definition of 'interoperability' to remain broad. This has permitted valuable discussion with participants around the more qualitative components of this debate, the importance of which will be highlighted in chapter 2.

2. Literature Review

2.1. Introduction

The ubiquity and effectiveness of technology in many service industries has led to consistent suggestions that similar approaches in the healthcare industry could achieve massive savings. The ease with which one can now bank remotely, for example – apply for accounts, check balances and perform transactions – has reinforced claims that patients should be able to access health services in a similar way. This aim is a central part of the 2011 'Better, sooner, more convenient' primary health care strategy (Ministry of Health, 2011a), and a key focus of the NHITB (National Health IT Board, 2013). Other health jurisdictions are wrestling with this issue, and direct comparison is made difficult by the varying policy and funding regimes. Nevertheless, in answering this research question with respect to New Zealand's primary health care sector, it will be instructive to review the international literature first to identify key themes and trends. The US, for example, whilst being a fundamentally different policy environment also experiences limited or conflicting incentives to pursue interoperability (President's Council of Advisors on Science and Technology, 2010). This section therefore reviews literature relevant to the research question, across three key domains – international, national (New Zealand) and the local (Northern Region) context. A full scale national research study will be outside the scope of this thesis; however, reviewing international literature will help to locate the New Zealand position within a broader framework. The importance of understanding the national picture will become clear in chapter 3 where a policy implementation theoretical framework is discussed, and the research focus switches to how policy messages from the centre are operationalised.

2.2. The international context

Some projections have suggested that utilising IT more effectively in healthcare could see significant cash savings. A team of RAND Corporation researchers published a widely cited paper in 2005, estimating that efficiency gains and safety improvements from healthcare IT transformation could total more than $81 billion annually in the US (Hillestad et al., 2005). Other studies have concurred with this in the US (Walker et al., 2005), whilst in New Zealand IT transformation has been identified as a key enabler of public sector efficiency and associated cost savings (New Zealand Herald, 2012). At the time of establishment, senior figures at Health Benefits Limited [HBL] (which was disestablished in 2015) and the NHITB were openly noting the potential to make savings in administration systems and procurement because of the key issues in the healthcare IS landscape; issues that are replicated across clinical systems used in hospitals and the primary care sector. These key issues are: technical immaturity, lack of interoperability, lack of policy to support interoperability, organisational readiness, changes required to current workflows, and the political context (Jackson, 2011).

The RAND estimates from 2005 however have failed to materialise. Whilst the pervasiveness of IT in healthcare has increased (Hsiao and Hing, 2012), US studies have suggested that productivity and safety are only slightly better (Black et al., 2011; Landrigan et al., 2010), and costs are actually increasing (Yasnoff et al., 2013). Data from New Zealand suggest however that productivity is increasing in hospitals, although this is not linked explicitly with advances in healthcare IT (Desai, 2012). The RAND estimates – crucially – did rely on a projection assumption that there would be widespread interconnectedness and interoperability between systems. If there is therefore a 'failure' of health IT, it is because interoperability has not been realised. *Why not?*

Knight et al. (2008), in a study of GP resistance to new IT systems, identified five key areas in which resistance was located and resulted in a barrier to the adoption of those systems. The areas were identified by frequency of coding, after transcription of interviews with 23 GPs (an approach similar to that I present in chapter 4), and are shown in the table below.

Table 2.1.: Domains of GP resistance to technology. Adapted from Knight et al. (2008).

Domain	**Description**
Profession	The practicing of medicine; the work of a GP
Internal	Practice competitiveness, processes and personnel
External	Policies and systems existing outside of the GP practice
Data	Collection, use and control of data
Patient	The patient relationship with a GP or other health sector actors

Whilst the study focused only on a single professional group, the domains of resistance identified are generalisable to the wider health sector and possibly even further beyond. Knight's typology is a useful reference point in the way it separates out the focus of an individual policy actor ('Profession', or 'Patient'), or group of policy actors, from other endogenous ('Internal') and exogenous ('External') influences. I will draw on this typology, as a framework for discussion of the international literature I have reviewed, in the following sections.

2.2.1. The collection, usage and control of data

In the US context, Kellermann and Jones (2013) assert that current health IT systems are not *designed* to talk to each other, and there is furthermore no particular incentive to either develop or procure interoperable systems - something also noted by the President's Council of Advisors on Science and Technology (2010). Kolakowski (2013) notes that there have been documented instances where interoperability barriers have been overcome, but even large technology firms have not been able to scale these projects up and generate enough momentum to really advance an interoperability agenda. For example, Google has officially ended its Google Health product, whilst Microsoft maintain a confusing array of health-related apps and systems - many of which do not connect to each other (Lein, 2014). It is ironic perhaps that these large businesses, who have achieved technological success in many other areas, have apparently failed to make electronic health records as ubiquitous as online banking, for example.

One of the key recommendations of the 2005 RAND study was that data should be stored in such a way that multiple systems and organisations can retrieve it (Hillestad et al., 2005). Whilst system integration is difficult at the best of times (Kellermann and Jones, 2013), it becomes significantly more difficult to maintain once a patient moves outside of a given network or requires care at a different provider. This is particularly pertinent in New Zealand, where large tertiary referral centres often coordinate the care of people from different regions.

Picking up on the importance of how data is stored, Mandl and Kohane (2012) have defined three key ingredients that a good health IT system should be based upon – all of which speak to and enable interoperability. They are:

- a core set of standardised data types,
- definition of clinical work flow, and
- encoded knowledge around best practice and shared care plans.

Thus there is a focus here on the need for rigorous codification and implementation of standards, effected via a clear policy framework and having significant input and leadership from the centre. This has been described by both Coiera (2009) in relation to the Australian context, and Koppel (2012) in the US. The other component - the importance of considering work flow - echoes the concern expressed by Reece (2011), that work flow is actually being *reverse-engineered* to live within the constraints of poorly designed products. It is critical to ensure that software is an aid to clinical work, and slots seamlessly into work flow with as little overhead as possible - a point that has been raised elsewhere in the literature (Campbell et al., 2006, Hillestad et al., 2005).

The influence of vendors in this domain has also been highlighted in the literature as a potential barrier to interoperability. Some have suggested that software vendors are *actively opposed* to interoperability, in order to preserve market share and business models (Terhune et al., 2009). Koppel goes further to suggest that vendors attempt to 'balkanize' the market because "interoperability would limit each vendor's suite sales" (Koppel, 2012, para. 7). Knight surveyed Australian GPs and discovered frustration around the "apparent indifference of software vendors" (2008, p. 498). Vendors have also been criticised further for fostering a perception that healthcare IT is *qualitatively different* to other enterprise applications and this helps to maintain prices, and preserve business models. Indeed, it is simply a "widely accepted myth" (Mandl and Kohane, 2012, p. 2240) that health care requires complex and expensive IT systems at all.

Oliveira (2012) takes a somewhat different approach and posits that healthcare is indeed qualitatively different. Factors that underpin its difference encompass: the mostly non-profit status of providers; intense regulation of the healthcare business; privacy laws around use and retention of patient data; an orientation towards public good rather than profit; the independence of the professional workforce, and; the fact that no single organisation can oversee the entire 'production function' of a healthcare event. Oliveira notes the inefficiencies seen in the fact health professionals will use data across multiple domains – from quality data, to clinical research, to cost or productivity reporting – and it is generally "the same patient data that ... is duplicated and managed in silos" (2012, p. 35). Having three separate use cases all derived from one data source is a business case for interoperability that should write itself – it is those barriers to interoperability that have resulted in this situation and resulted in waste, inefficiency and complexity.

2.2.2. The influence of external policies and systems

Policy has a significant role to play in achieving any change in a complex sector. Koppel notes that problems such as the multitude of railroad gauges, or even multiple time zones, have all been overcome by a government establishing standards and previously resistant industries subsequently flourishing – "industry claims that such standards would restrict innovation were turned on their heads" (Koppel, 2012, para. 12). This section will look at some of the factors, exogenous to the daily work of health professionals, which are impacting on health information interoperability. The notion that government can set a standard and encourage industry to follow is pertinent to this research, if one accepts that there is no *simple technological barrier* to interoperability. The barrier is, perhaps, more a political one.

There is thought to be a bias in health IT policy, which assumes we already know the answer – technology can solve our problems, if only we can encourage agencies to implement and *use* it. Miller and Tucker (2014), for example, have described a focus in the US of securing 'marquee' users in new implementations, with the aim of attracting other users. The focus is thus one of securing market share, as opposed to any other rigorous consideration of the broader policy environment, funding mechanisms, or system structure. The President's Council of Advisors on Science and Technology (2010) have noted the tension between the fact that, whilst the US funding model often provides disincentives for interoperability, the $20bn offered has gone a long way to increasing EHR uptake.

Indeed, data from the Office of the National Coordinator for Health Information Technology in 2016 indicates that adoption of 'Basic EHRs' in US hospitals increased from 9% to 84% between 2008 and 2015 (Henry et al., 2016). Whilst this certainly appears to be a very significant achievement, Mennemeyer et al. (2015) found that the 'Meaningful Use' incentive programme was only weakly correlated with EHR uptake and, furthermore, many EHR systems actually *reduce* productivity and lack data sharing capabilities. However, other research has surveyed physicians directly and concluded that federal incentives were in fact a significant factor in influencing decisions to adopt an EHR (Jamoom et al., 2014). This is all to say that it is very much within the power of government to influence change in the sector; the increased adoption rates demonstrated by Henry et al. (2016) make this clear.

Furthermore, other commentators suggest that this is exactly what government *should* be doing. Hillestad et al. conclude in their study, completed prior to the 2009 HITECH Act, that "there is substantial role for government policy to facilitate widespread diffusion of interoperable HIT [Health Information Technology]" (2005, p. 7). Nevertheless, the adoption of EHR does not tell the whole story; Alexander et al. (2013) outline in a Senatorial White Paper that the HITECH Act provisions continue to dispense funds without any clear plan to build an interoperable health information network. Quashie points out despondently that "the lack of effective interoperability to date ... has the potential to undo all the progress being made in EHR adoption" (2014, p. 7).

Kellermann and Jones (2013) introduce the notion that an incentive programme cannot be implemented without broader consideration of all the interdependent parts of a particular system. Notwithstanding the successes noted by Henry et al. (2016), they express concern that the health funding regime, a by-product of federal health policy in the US, is directly contributing to a lack of actual progress regarding interoperability. A 'fee for service' model does not incentivise efficiency or productivity gains, they argue, and this is a serious obstacle in the move to healthcare IT platforms and the need for clinician engagement in asserting the importance of interoperability. Whilst New Zealand has a somewhat different funding regime, patients in the primary care environment generally make a co-payment and this forms around half of the primary care revenue stream (Howell, 2005, Penno and Gauld, 2013).

Coiera (2009) conceptualises health systems such as those in the US and New Zealand as 'bottom up'; agility and flexibility is preserved at the cost of making standardisation and interoperability very complex. Such systems make for a weaker national picture overall due to the fact that interoperability and standardisation can only be maintained at considerable transaction costs in monitoring and compliance. This is important for the New Zealand context, where national health targets (and other policy priority and reporting obligations) require consistent data integrity, parameters and relatively low transaction costs for effective reporting.

Conversely, more of a 'top down' approach in implementing a single overarching information system was seen in the UK. From 2003, a large IT project was run (titled NPfIT) which intended to implement a paperless system across the UK health sector. However, the 'top down' approach resulted in missed deadlines, cost overruns, poor uptake of functionality, inaccurate data and clinical concern over data security (Greenhalgh and Keen, 2013). Such systems are intuitively more efficient, in the sense that changes to an entire system can effectively be made just once centrally. However, Coiera (2009) also notes that this is not always cheaper, and in any case there is no guarantee that such a 'big bang' approach can capture all needs and requirements appropriately. Knight identifies this particular policy approach in saying that a specific barrier to adoption is "changing or ambiguous policy issues ... and in particular the 'top down' yet 'piecemeal' approach of governments" (Knight et al., 2008, p. 498). The problem with this 'ambiguity' will be dealt with in chapter 3, where it forms a key part of the theoretical framework for this research. Any attempt to implement a 'top down' approach will be extremely difficult where no single dominant policy/agency is involved (Buse et al., 2005) or, at least, those setting policy are not able to demand or obtain perfect compliance (Hunter, 2003).

In response to the problems of both the 'top down' and 'bottom up' approaches, Coiera (2009) proposes a third way. This sees the exploitation of a middle ground, where the focus is on the well-resourced development of standards to which providers are incentivised to comply. Government should play to its key strengths in this space by supporting public institutions, incentivising the private sector, developing public goods and developing legislative tools to protect privacy; it should avoid doing something it has little experience of – "designing, buying or running IT" (Coiera, 2009, p. 273). It is this approach that appears to have failed so spectacularly in the UK – the NHS did not have the appropriate technical or regulatory infrastructure to encourage development of a suitably flexible approach, or to gather and implement the requirements of end users. Greenhalgh and Keen conclude that centrally driven ubiquitous computing in health is a utopian dream, and "money may be more productively spent on improving and augmenting the best of the NHS's current systems" (2013, p. 2).

2.2.3. The role of the health professional

Another key barrier to interoperability may well be the resistance of individual clinicians. Resistance to technological innovation *in general* can be due to a wide range of factors (Enns et al., 2001, Debreceny et al., 2002). It is however particularly prevalent in health (Greenhalgh et al., 2004), and "remains one of the most challenging and complex issues" (Knight et al., 2008, p. 493).

Many studies advocate the careful consideration of how a system integrates into existing workflow prior to implementation (Hillestad et al., 2005). The literature in Australia, for example, reinforces this by finding that GPs opt out of adoption of systems where any kind of process or workflow needs to be redesigned (Ford et al., 2006, Henderson et al., 2006). Indeed, the threshold at which GPs particularly choose to opt out of implementation seems to be particularly low.

Quite possibly, the experience of such GPs has been that new technology has simply not been targeted at what they need the most. Technology, for example, that provides clear and immediate patient benefit, are adopted quickly. Systems which have a focus on administration, or reporting, are resisted (Arroll et al., 2002, Bolton et al., 1998, Walsh, 2004). It may well be that this is rooted in resistance to a perceived threat to professional autonomy, as described by Swan and Newell (1996).

This is also suggested in the notion that *incoming* data - for example, pathology results - was generally accepted without any resistance. However, outgoing data - or, in effect, the ‘giving’ as opposed to ‘receiving’ - was a concern by virtue of its facilitating “hitherto unseen transparency of the GP and their organisation’s practices” (Knight et al., 2008, p. 497). The sharing of identifiable data beyond the practice boundary was generally accepted, but ‘in principle’ only - the “perceived need to protect political interests was the primary inhibitor to adoption” Knight et al. (2008, p. 497).

Reece (2011) has noted the conflict between the human aspect of medical care and the increasing IT requirements of providing that care. But it is possible that such resistance is just a symptom of working in a fragmented IT sector and a feeling that things are harder than they should be – clinicians have expressed frustration at how inefficient systems simply slow them down (Campbell et al., 2006). Other studies have quantified lower productivity resulting from EHR implemetations in the US (Mennemeyer et al., 2015). Consultation with key stakeholders is obviously key; the success with IT systems seen at Intermountain healthcare was a long and iterative process, featuring significant engagement by clinicians (James and Savitz, 2011). It is therefore encouraging in New Zealand to see that clinical engagement is a focus of work by the NHITB.

2.3. The New Zealand context

New Zealand has been at the forefront of some major advances in health IT – for example, the introduction of the National Health Identifier [NHI] (unique identifier for all patients), and high adoption of electronic Patient Management Systems [PMS] in primary care (Greenhalgh and Bowden, 2011). However, the ‘dream’ of a full electronic health record – itself dependent on a tightly coordinated and interoperable system – has been stymied by fragmentation, and a lack of appropriate regulation and governance over standards (Gauld, 2006). However, Gauld (2006) also notes that the major upheavals in the New Zealand health sector, particularly throughout the 1990s (Easton, 2002), have confounded any well-meant intention to develop interoperability and reduce fragmentation. It is easy to imagine, at least, that these changes disrupted any policy continuity and constrained effective coordination from the centre.

As far back as 1991, a ministerial strategy group highlighted that lack of data quality standards and definitions was a key problem. Furthermore, the “uncoordinated and overlapping” (Gauld, 2006, para. 8) data collections of that time were noted. That group recommended a single collection of data, close to its source, upon which a framework of open systems and protocols could be laid. Crucially, the NZHIS was set up in 1992 and established the NHI, as well as a group of key national data sets collected centrally. Despite their progress in this area (the legacy of which is still a key plank of much health services research in New Zealand), responsibility for managing information and its flows was left to the market (Gauld, 2006). Policy moves towards the ‘New Public Management’ during the 1990s simply reinforced these problems – an explicit split between purchaser and provider led to isolated information collections which were not designed to be shared or linked, and so were not.

Gauld suggests that, even by 1996, this situation led to “confusion, complexity and high transaction costs” (2006, para. 12). Another ministerial strategy group undertook a stocktake which highlighted the same problems as five years previously – fragmented systems, lack of standards, but also a growing concern over privacy and confidentiality, possibly aggravated by the utilisation of national core data sets held at the Ministry of Health [MOH].

The establishment of Health Funding Authorities, between 1997 and 2001, led to a new strategic plan for health IT. All of the previous problems were restated in the 1999 HFA strategy document. However, new funding models around budget-holding, capitation and service integration required a greater collection and exchange of population data. These recommendations were disrupted by the Public Health and Disability Act 2000, which established DHBs in New Zealand. In 2001, a high level advisory board was established which became known as the ‘WAVE Project’. Their remit, with representation from across the health sector, was to reflect on developments of the prior decade and to develop strategies and plans for the future.

Broadly speaking, the WAVE Project recommended: providers should have access to information via ‘open’ systems; health planners should have full and accurate population data; the public should have better information, and; IT vendors should be involved in shaping new national standards. Indicative of the systems fragmentation at that time, a WAVE project group found that – despite the effectiveness of NHI – many central government agencies were maintaining their own unique operational information systems. Ninety five of these were found to be in existence, with the MOH alone having twenty six. Whilst some laudable work was occurring at this time on joining up information systems, Gauld (2006) notes that it was left to MOH to lead change across the sector but its capacity to do so was severely limited by its decentralised governance structure.

In 2005, a Health Information Strategy Steering Committee published a strategy for New Zealand, which took a somewhat different direction – one which has subsequently formed a basis for much of the work of the NHITB. The focus was on stepping back from directly intervening in systems interoperability, upon recognising that decentralisation of the sector meant that MOH was not in a position to lead this work. This approach aligns with Coiera's view that government should generally avoid "designing, buying or running IT" (Coiera, 2009, p. 273), since it is not part of their core function. It takes a 'birds eye' view and sets a policy direction, where developments will be driven via collaborative activity at the local level. Interoperability, of course, remains a critical enabler of this work but the strategy simply appears to have conceded that this cannot be driven centrally without further restructure of the sector. A stated aim of this process was to compel centrally-driven action via the pre-existing contractual arrangements between funder and provider across different parts of the sector. Under this model, Gauld (2006) considers that interoperability requires: a highly developed and coordinated IT strategy that has widespread buy-in, and; input of experts into contract negotiations.

A 2008 change in government led to a Ministerial Review Group report, which was critical of the sector. This led to the creation and establishment of the NHITB, who are responsible for developing an IT strategy and plan for the sector. The creation of this body implied that IT was absolutely critical in delivering the government's 'Better, sooner, more convenient health care' strategy (Ministry of Health, 2011a). However, the future of the NHITB in 2016 is somewhat unclear. Notwithstanding the criticism from interview participants that the centre is not taking enough bold action (as discussed in section 6.6), a MOH announcement in 2016 indicated that a new senior IT role was being set up, reporting to the Director-General, and apparently with considerable overlap of the functions of the NHITB Director (Lee, 2016). Furthermore, the National Health IT Plan has received no update since July 2014.

The environment in New Zealand is one where healthcare dollars are primarily received by DHBs, these are then channelled to primary providers, as well as community/NGO services and, last but not least, to fund hospital service delivery. Whilst each DHB has a duty to meet the needs of its population, NHITB have recognised that a national approach could control costs and improve efficiency in any attempts to move towards interoperability. The NHITB has a role to provide governance over any IT procurement greater than $500,000; such capital investment must be endorsed by NHITB to "ensure appropriate governance is in place to guide decisions that are aligned both regionally and nationally" (healthAlliance, 2013, p. 20). Nevertheless, it is not only those major IT projects that must receive governance and assurance over alignment –

multiple smaller, custom and bespoke data sources in the sector have contributed to fragmentation in their attempts to work around gaps in data collection.

One key issue has been highlighted above (Koppel, 2012; Mandl and Kohane, 2012), and that is varying standards. Systems in New Zealand vary significantly across all domains and thus represent an opportunity for standards development leading to seamless transfer. Leong (2010) focuses on this and suggests that the main challenge in New Zealand is removing barriers between discrete organisations, particularly across the primary and secondary care continuum. A factor to consider though is that Primary Health Organisations [PHOs] are essentially in competition with each other for patients (where they are a guaranteed source of income under the capitation model), and this could challenge interoperability further.

A second key issue is that of fragmentation. Reflecting Oliveira's (2012) perspective noted above, Creed notes that it is "a patchwork of fragmented systems designed to support episodic events that make it difficult to coordinate patient care" (2007, p. 13). Whilst interoperability is not specifically mentioned in this work, it is clearly implied that a failure to integrate these diffuse systems represents a real problem in healthcare delivery in New Zealand. This can be thought of in terms of a 'vicious circle'.

The policy environment, together with the disconnected focus of central monitoring and the episodic focus of care by individual practitioners, has created these fragmented islands of information which are difficult to bridge. This results in a situation where key decision makers are monitoring, planning and funding on different sets of data (Creed also notes that this moves us toward a narrow focus on technical efficiency and throughput, rather than being able to reliably determine allocative efficiency). Further downstream, we see an entrenching of disconnected and episodic care, poorly guided investment decisions and the perpetuation of duplication of information across providers and sectors (Creed, 2007).

In redressing these issues, Creed (2007) recommends that action be taken across four dimensions. These are: being 'people-centred' (e.g., delivering on what clinicians actually need); being flexible; designing and enforcing high-quality standards, and; empowering users. Certainly, it would appear to be the third – designing and enforcing high-quality standards – that is most tangible. Gauld (2006) reflects this by recommending that work focuses on rectifying the problems of fragmentation, and dealing with complex policy issues around integration.

This issue of integration is indeed a policy priority, given its focus in the Minister of Health's letter of expectations for 2013/14 (healthAlliance, 2013). However, this goes into no more detail than requiring that a focus on integration is prioritised and that regional work plans are accelerated. The Statement of Intent for 2015-2019 (healthAlliance, 2015) contains even less specific information around integration, other than noting ongoing work on centralisation programmes for ICT infrastructure.

2.4. The Northern Region context

The 'Northern Region' in the New Zealand healthcare context is a specific entity, composed of four DHBs. This research encompasses the Northern Region DHBs in New Zealand – excluding Counties Manukau Health. Therefore, the DHBs in scope are: Auckland, Waitemata and Northland. The foregoing discussion encompasses a broad range of issues across a large and complex health sector. However, Leong (2010) is only one of many singling out the intersection between primary and secondary care for special mention. Although still relatively large areas in their own right, the exchange of information between primary and secondary care systems has been especially difficult. For example, in the Auckland metropolitan region alone there are seven PHOs, with a total of 336 GP clinics (Healthpoint, 2014), each of whom are free to choose from one of four PMSs (Patients First, 2016a). This reiterates the note above that realisation of the primary care strategy (Ministry of Health, 2011a) does necessitate overcoming this issue.

Firstly, on a point of governance, it should be noted that under the current regional model the IT delivery plan of all Northern Region DHBs is set by healthAlliance, the regional shared services agency. This is a crown entity, with all four Northern Region DHBs holding equal shares. In the 2015-2019 Statement of Intent (healthAlliance, 2015) IS projects are predominantly focused on centralisation activity such as the 'National Infrastructure Platform' which, although it could fit into an interoperability paradigm, is simply about centralisation and the proposed benefits are marketed around economies of scale and efficiency (Health Benefits Limited, 2012).

At this point, it is instructive to remember Coiera's (2009) assertion that developing effective interoperable health information systems is not simply about replicating a system across multiple institutions – an effective approach is more about "defining a policy and standards framework that can shape the convergence of public and private, local and central systems, into a functional national system" (Coiera, 2009, p. 273). That is to say - developing a monopoly information system, where only one system or vendor is used, technically achieves interoperability but only in the loosest possible sense. This is only possible in a highly centralised system with a very strong locus of control at the centre; even then, examples of 'top down' implementations have not been successful (Greenhalgh et al., 2010, Jackson, 2012).

Nevertheless, whilst DHBs at least have resource to provide IT strategy (healthAlliance) and implementation, the same is not true in the primary care sector. Individual GP clinics generally pay for, implement and support their own IT systems and procure software on the same basis. Some larger PHOs can provide support functions to their member clinics to assist in this area. But, because of the policy environment within which primary care is carried out, there can be no compulsion for any individual GP clinic to move towards integration or to favour interoperable products. Indeed, a large portion of the regional workstreams underway dealing with integration (healthAlliance, 2013) are made complex by having to traverse this primary care landscape, and gaining buy-in and acceptance from a large and fragmented group.

In the Northern region there are technologies and initiatives being utilised which appear to resolve many of the issues noted in the preceding section. For example, Patients First is a not-for-profit charitable company who have published and released software enabling GPs to easily transfer patient records, carrying out more than a million such transfers since 2011 and continuing to transfer over 30,000 per month (Patients First, 2016b). Furthermore, HealthLink is a New Zealand company who developed a standard information interchange protocol which utilises other ubiquitous health exchange standards (HL7) which are already widely used in in New Zealand; particularly with referrals (HealthLink, 2014). However, firms like HealthLink have criticised the NHITB's approach for being too 'hands on', and not doing enough to incentivise the private sector (Jackson, 2012) - something Coiera (2009) notes as being particularly important for developing an effective 'middle out' approach. Greenhalgh and Bowden (2011), however, view New Zealand as operating a very effective 'middle out' approach - praising particularly the incentivisation of the private sector via accreditation, and a flexible and iterative 'learning environment'. Critically, "New Zealand's organic and locally adaptive approach has not reduced interoperability, nor has it lowered standards" (Greenhalgh and Bowden, 2011, p. 1).

Importantly both these examples have developed or utilised extant information exchange standards; their focus is not simply on a software solution, but very much on standards development and compliance. All this is to reiterate that standards and protocols do exist, have been operationalised and are being used. Why, then, do interoperability problems remain? This research hypothesises that a policy implementation failure is to blame; where the transmission of clear policy messages to relevant stakeholders, the checking of understanding and congruence, and provision of the necessary support to implement has been poorly executed.

2.5. Conclusion

In this chapter I have attempted to provide an overview of the literature that either describes the interoperability experience of other jurisdiction, or otherwise sets the New Zealand scene for the discussion to come.

Internationally, I have focused on literature from the US and Australia and, to a lesser extent, the UK. The 2009 HITECH Act in the US has provided fertile ground for discussion and analysis of progress against a very clearly stated goal and how it has advanced the more implicit interoperability goals. Whilst government has pulled some very effective levers to increase EHR adoption, there is some doubt as to how ready the US health system is for *interoperability* (Mennemeyer et al., 2015, Quashie, 2014).

Another significant component of the literature reviewed is around the more individual perspective of health practitioners - in this case, GPs. Knight et al. (2008) have produced some interesting results from their survey of Australian GPs, and traverse a very wide range of possible barriers to adoption of technology systems. This is not specifically about interoperability in the strictest sense, but it is reasonable to assume that if a GP sees a particular barrier to adopting technology, then that barrier is likely to be applicable also to the prospect of interoperability. Knight concluded that the “perceived need to protect political interests was the primary inhibitor to adoption” Knight et al. (2008, p. 497).

This conclusion should be borne in mind, as I then switched focus to the New Zealand context. Here, it becomes clear that the sector is relatively fragmented and complex - and implementing a policy will be difficult at best. In the absence of the kinds of targeted incentives that Coiera (2009) highlights, it is difficult to see how the centre can encourage change where there is no single agency in a position to demand or expect compliance (Buse et al., 2005).

3. Theoretical frameworks

3.1. Introduction

An appropriate theoretical framework guides the specific questions that are asked, and offers a particular perspective on the topic. It helps to identify elements and relationships which should be considered when making recommendations or identifying opportunities for change (Walt et al., 2008). Being a framework, it must be connected throughout the entire thesis and all points made toward establishing the thesis should be informed by that framework. In this section, I will firstly identify some issues to consider when selecting a theoretical framework. Subsequently I will discuss the framework I have selected in some detail, before covering a range of alternative frameworks which were considered and rejected.

3.2. Some issues in selection of a theoretical framework

This research poses some particular issues to consider in selection of a theoretical framework.

3.2.1. The landscape is dynamic

Although this research focuses on the issue of interoperability, we have already identified in chapter 2 that there are many intersecting issues. Some of these are:

- Funding priorities
- Differing strategic priorities (between DHBs, and between the primary care sector)
- Workforce capability
- Differing influences of key stakeholders/clinicians between organisations
- Varying levels of vendor lock-in for different IT products, and relative strengths or weaknesses of the regional and local procurement/contracting regime.

The research will inevitably uncover more. But, whilst the above factors are part of a changing environment, there are also some more entrenched issues to overcome. Specifically, primary and secondary care operate under significantly different funding models, where DHBs receive a majority of their funding from central government, some of which is then devolved to PHOs whose members generally operate as private businesses and supplement baseline funding with patient co-payments (Ministry of Health, 2011b).

3.2.2. Stakeholders

A key issue for the research to consider is the varying motivations of all policy actors and stakeholders. Given the differences in funding models noted above, it is clear that there are differing incentives between primary and secondary care providers. Nevertheless, even between DHBs there will be preferences around particular systems and processes which will complicate delivery of the interoperability goal.

Indeed, Greenhalgh et al. (2010) noted in their final evaluation report on a large-scale health IT programme in the UK (NPfIT), that all of the most ‘wicked’ problems encountered were those that spanned different stakeholder groups who all brought very different assumptions and values to the implementation process. Kaplan and Harris-Salamone (2009) reinforce this by noting how important collaboration is in healthcare, yet it is always so difficult because of ‘culture clash’ between stakeholders, even within a single clinical service.

3.3. Selection of theoretical framework

The two issues noted in the previous section both speak to problems around a common understanding of the end state, as well as some very real competing interests amongst stakeholders. It is on this basis that ‘Policy Implementation’ (or Implementation research) is suggested as a useful framework for this research. Policy Implementation deals with the concordance, or otherwise, of government intentions and the final result (O’Toole, 2000). It is very much about the process of policy actors dealing with a policy problem; it is a multi-actor approach.

The research literature rose rapidly to prominence following the large-scale policy programmes of the 1960s and 1970s, and a growing appreciation that “the nitty-gritty of implementation had been largely a background issue” (O’Toole, 2000, p. 264). However, its prominence diminished suddenly around 1990 in the context of the New Public Management (NPM) programmes that were taking hold across the world, and which favoured budget cuts and decentralisation.

Despite this, failures of policy remain apparent and a multi-actor focus is perhaps more relevant now than during 1970s, when Policy Implementation research was at its peak. This is partly to do with the NPM initiatives during the 1990s which have introduced changes in funding models, greater collaboration between private and public sectors and, thus, a proliferation of policy actors in the healthcare sector. It is important to "confront a world of multiple institutional actors … whose cooperation and perhaps coordination are needed for implementation success" (O'Toole, 2000, p.266). This is pertinent to healthcare and the research question, where the need to consider competing stakeholders across different parts of the sector is especially relevant; for a move specifically towards *effective health information system interoperability*, even more so (Coiera, 2009, Creed, 2007, Mandl and Kohane, 2012).

Previous iterations of Implementation research have focused to differing degrees on the centrality of policy-makers and policy-actors. Those researchers focusing on the importance of policy-makers (the 'top-down' approach) stressed the need to craft clear and consistent policy goals, along with making deliberate attempts to minimise the number of policy actors involved. This approach has been criticised for failing to recognise the complexity of policy development (particularly in coalition governments), as well as assuming that local policy actors will generally impede successful implementation (Matland, 1995). This perspective is reflected in Coiera's (2009) depiction of such systems leading to a 'top-down' technical solution in jurisdictions that permit this kind of government-heavy approach. An example of this is the NPfIT system, implemented in the UK with mixed success (Greenhalgh and Keen, 2013). There has similarly been some critique of the NHITB from the private sector for operating in this manner (Jackson, 2012).

The second approach, stressing the importance of local policy actors, identifies that centrally made policies are inevitably poorly adapted to local conditions and thus successful implementation can only be achieved by local policy actors who can adapt the policy to their context (Matland, 1995). This can be linked easily with the current research question. The NHITB have centrally set goals around interoperability (National Health IT Board, 2010) – the specific implementation of those goals is devolved to a regional level, where the policy actors are expected to develop work plans that are context-specific. This is a model that, in direct contrast to that of Jackson (2012), Greenhalgh and Bowden (2011) claim to be working very positively for the New Zealand policy environment at the cusp of this interoperability frontier. As indicated above, however, the complexity of this process is increased when we consider the differing assumptions and values of all stakeholders in this process – from primary and secondary care providers, down to individual clinicians in a service. Coiera (2009) again reflects this notion by identifying 'bottom-up' technical solutions, for example in the US, where an absence of strict proscription from policy makers has resulted in fragmentation and vendor lock-in.

A synthesis of these two key approaches has been developed by Matland (1995) which focuses in parallel on: the clarity of the policy message, and; the ability of local policy actors to collaborate and coordinate. The first key area of this synthesis involves 'Policy conflict'. This occurs when multiple agencies have a stake in the policy, and where their goals are not aligned. Conflict itself will occur, however, where: policy actors must be interdependent, their objectives are incompatible and there is a perceived zero-sum element (Dahrendorf, 1958). The research should uncover to what extent there is policy conflict between the stakeholders involved in the NHITB's interoperability goal.

The second area is 'Policy ambiguity'. Implementation is more likely to fail where the goal itself, or the means by which it is to be achieved, are not clear. In politically controversial areas, however, there is often an inverse correlation between ambiguity and conflict – potential conflict and 'turf wars' can be avoided by diluting the specific intent and content of a given policy. Where the process and means are strictly proscribed, there is a higher risk of conflict as people feel threatened (Matland, 1995). The level of ambiguity or clarity can thus also be a philosophical decision in policy design. Some have theorised that being too specific about implementation removes the possibility of identifying and answering important but difficult questions which might arise. There can be, therefore, almost an arrogance in a low ambiguity decision that everything is known about a particular issue, and the correct way forward can be easily identified. Finding answers must often involve a learning and experimentation process; when it comes to a technical implementation of a technology policy, however, "policy designers rightly may believe they lack the technical knowledge to produce a planned implementation package" (Matland, 1995, p. 159). Coiera (2009) reflects this by suggesting that a 'middle-out' approach to implementation of large health IT policies may be more effective than either 'top-down' or 'bottom-up'.

Matland (1995) refers to this synthesised model as the 'ambiguity-conflict matrix', and presents it as a tool to:

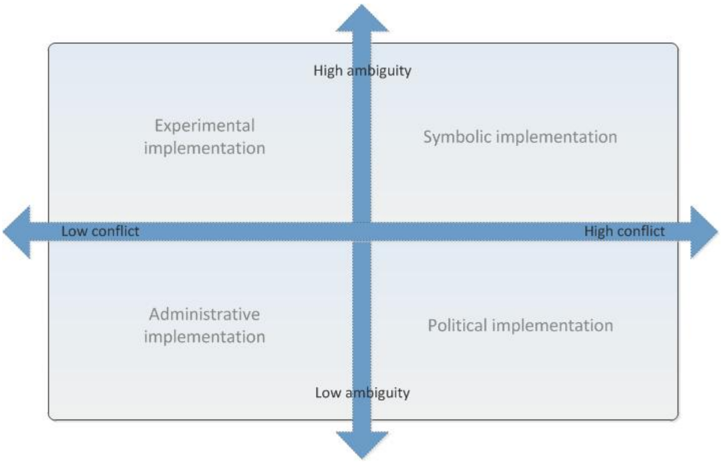
- Identify in which quadrant a particular policy lies, and
- Describe issues, risks and considerations for each.

3.4. Utilisation of the Ambiguity-Conflict matrix

This research will utilise the dual axes of 'ambiguity' and 'conflict' in order to conceptualise the problem, and to illuminate the research question.

The informant interviews should be designed to elicit information which will allow the researcher to identify where on the matrix the Auckland region health sector lies. Structuring questions around the key themes of joint understanding of policy goals (and how to achieve them), and also of identifying areas of conflict, will allow us to see where potential barriers lie. For example, identifying low ambiguity but a high potential for conflict indicates that implementation outcomes will most likely be based on power relationships amongst the actors. This would guide the discussion and analysis in an appropriate direction for generalisation and suggestions for further research.

Figure 3.1.: Ambiguity-conflict model of policy implementation. Adapted from Matland (1995).



3.5. Other frameworks considered

The above section describes the relevance to the research question of the ‘Policy implementation’ literature and associated theoretical framework. This has not been arrived at in isolation; consideration has been given to other frameworks. These will be discussed in turn below, explaining why they were not found to be suitable.

3.5.1. Systems Theory

Systems theory is applied in a range of disciplines and, as a term, has a range of meanings (Adams et al., 2013). It conceptualises issues or problems as a complex web of interdependent subsystems which operate within specific environments. Subsystems are designed and operated according to the accomplishment of specific goals, they are defined by fixed factors that can ultimately constrain the system at an aggregate level.

Ludwig von Bertalanffy [1901-1972] developed the ‘General Systems Theory’ in the 1950s, which was originally focused in the scientific field but was intended to be universal and multidisciplinary from its inception. It was developed as a counterpoint to the ‘mechanical paradigm’ where modes of explanation were strongly linear, causal and rational. Berman (1996) makes the point that this linear causality is useful in arguing a case, or investigating relatively simple problems. However, something as complex and subtle as ‘What caused the French revolution?’ cannot be answered in such a way. A common example illustrating this point is that of ecology and weather systems - a butterfly flapping its wings in the south Pacific ocean has the potential to influence weather patterns in the US; this sytem is complex and highly interdependent. Thus, Systems Theory certainly has the potential to help us understand complex problems in a new way. Patton (2015), for example, has stressed its ‘holism’ in the way that analysis of constituent parts of a system is always less meaningful than analysis of the whole.

Adams et al. (2013) identify six different classifications of Systems Theory developed since Bertalanffy’s original work; we are concerned here with what they refer to as ‘Social Systems theory’. This was developed most significantly by Niklas Luhmann (a student of Talcott Parsons during the 1960s) who wrote that “systems are oriented by their environment not just occasionally and adaptively, but structurally, and they cannot exist without organisation” (Luhmann, 1995, p. 78). However, a key critique is just this; the interdependent subsystems are theorised to almost ‘fall into line’ - “the job of each part is to play its assigned role” (Berman, 1996, p. 39). Social Systems theory does not tell us about how these systems are organised, who coordinates them and what happens to those who dissent from the system level picture. Furthermore, and perhaps more importantly, it does not permit us to investigate power imbalances. In a Social Systems theory example of message information exchange, there is no insight into the relative power of the interdependent systems or parties - what if the person or group being requested for something are from an ethnic minority, or there is a gender difference? Systems theory “presupposes a society of equals in which all conflicts can be resolved by means of improved communication” (Berman, 1996, p. 39). Arney and Bergen (1984) have referred to this as a ‘tyranny of harmony’, in the sense that it restricts our ability to critically analyse a particular situation or to uncover where inequality lies.

Systems theory also lets us consider the extent to which subsystems can be self-organizing where there is not a dominant central entity capable of guiding the whole system. In this way, Sorzano (1975) has likened David Easton’s application of Systems theory to political science, to Adam Smith’s theory of the ‘invisible hand’ - there is an assumption towards general equilibrium where there are lower levels of external intervention. However Sorzano also notes that this assumes certain cultural milieu and institutional frameworks, and cannot be generalised across political systems.

Stewart and Ayres (2001) identify that Systems theory has the potential to explain why policy implementations fail. They argue that the interconnectedness of policy areas make it difficult to anticipate unintended or perverse consequences. Furthermore, even when a policy might be designed with a systems view firmly in mind, the tools of government to implement it are stuck in Berman’s ‘mechanical paradigm’ - in most cases this is simply a cost/benefit equation. However, there are in fact relatively few empirical examples of this occurring and Systems theory has lent itself more usefully to systems analysis ‘for’ policy - generating actions or ideas about specific policy problems, rather than *ex post* analysis. Nevertheless, Stewart and Ayres (2001) suggest that systems theory can offer new insights into the three major constituents of policy design: causation, intervention and evaluation. In other words, where a policy is designed to address a particular issue we should not identify what is the ‘problem’ - the *identifiable causal factor* - but, rather, acknowledge “there is a problem situation... [and] there will be many causes, rather than one, of the identified difficulty” Stewart and Ayres (2001, p. 84). In this respect, policy interventions primarily constitute a change in relationship between policy actors and the policy itself is thus an agent of transformation operating across boundaries, rather than an externally applied solution.

With respect to the research question, then, Systems theory can help us understand how subsystems are linked and what the interdependencies are. However, as a framework it does not help us uncover critical issues such as dissent, conflict and power imbalances. It may well be - with some irony - that this research suggests a distinct lack of congruence amongst policy actors which could have been assuaged *ex ante* by a Systems theory application in policy design. However, I am particularly interested in the dynamics between the stakeholder groups in this policy area - more so given the differences in funding and how that influences engagement or action - and conclude that a Systems theory approach would not be able to offer comprehensive research data.

3.5.2. Policy process

The policy process, also referred to as the ‘policy cycle’, or ‘stages heuristic’, is an analytical framework which I initially considered to be strongly relevant to this study by virtue of its explicit connection between people (or stakeholder groups) and the policy process - something I was particularly interested in. It defines key stages of the policy development process but posits each stage as one centred with individuals - for example, step 1: how *people* struggle to define policy issues, step 3: how *people* implement policy.

This is a highly influential and ubiquitous analytical framework in the public policy literature (Hupe and Hill, 2006). However, one of its original architects concluded in 1999 that it “has outlived its usefulness and needs to be replaced with better theoretical frameworks” (Sabatier, 2007, p. 7). This model then conceptualises policy in distinct phases or ‘steps’ - from agenda setting and formulation, through to implementation and evaluation; it attempts to describe the lifecycle of a policy. In this way it encompasses how issues are raised to governments’ attention and how policy responses are thus constructed. By taking a ‘problem-oriented perspective’ it helps to move away from more narrow conceptualisations, such as those grounded in jurisprudential, legal or economic analysis (de Leon, 1999). However, it has been criticised for its advocation of analysing policy one step at a time, and viewing the policy process as disjointed or episodic (Hupe and Hill, 2006). Furthermore it is thought to assume a linearity that does not actually exist, and underestimates the blurring of boundaries and demarcations between stages (Walt et al., 2008).

This framework offers the ability to identify from whence a policy failure was initiated and to evaluate its outcomes. However, in the present research I start from the perspective that the policy (in this case, the drive to health information systems interoperability) has already been promoted and implemented - analysis of these stages is out of scope. The research question encourages us to identify why the chosen policy has faltered in its implementation - the greater detail that can be elicited via usage of Matland's ambiguity-conflict model, depicted above, will be more relevant to the research question.

3.5.3. Network frameworks

Network frameworks, sometimes referred to as 'network analysis', is a methodological tool for describing interactions and levels of connectedness between policy actors. Again, I was interested in the relevance of this framework to this research since my interest was predominantly in how the varying stakeholder groups collaborated and worked together from their own differing policy and funding perspectives. In this framework a policy network is simply an aggregation of policy actors with a stake in a given sector or issue - in this case the policy network would consist of MOH, NHITB, DHBs, PHOs, individual GPs and others. Importantly, the framework recognises that members of a policy network have the potential to determine the success or failure of a given policy. In this way, it moves somewhat beyond the Implementation research literature and focuses very much on relationships - there is no assumption that a given policy can be 'good', 'bad', 'effective' or 'ineffective'; it is a question of congruence and engagement amongst members of the policy network (Marsh, 1998). This framework "reflects the phenomenon of shared decision-making and exchange of resources to achieve ... goals" (Walt et al., 2008, p. 310). However, whilst it is a relevant way to conceptualise a situation or issue it does not offer a tangible method of determining recommendations above and beyond the level of connectedness of a particular policy actor or stakeholder group. For example, network analysis may determine that certain groups are marginalised or have disproportionate power, but it would not illuminate issues of policy clarity or congruence amongst those stakeholder groups.

3.6. Conclusion

This chapter sets out the theoretical framework I will use in this research. Whilst several other suitable frameworks were considered, I elected to utilise 'Policy implementation' with a particular focus on the Ambiguity-Conflict matrix devised by Matland (1995). The policy implementation literature, although apparently suffering from a lack of attention compared to its heyday in the 1970s, helps us usefully understand exactly how a policy is implemented at a local level. For this research, the focus is explicitly a negative one, as I ask - *what was the barrier to its* *successful implementation?* This question is to be asked to multiple key policy actors and, it is hoped, will produce not only a range of opinion on what those barriers are, but also a pathway to make recommendations.

4. Methodology and Methods

4.1. Introduction

Methodology can be considered as the principles and processes that guide research practice; methods are the practical tools by which the research is executed. McGregor and Murname have made the distinction that “methodology...refers to the rationale and the philosophical assumptions that underlie any natural, social or human science study, whether articulated or not” (2010, p. 2). The primary aim of this research is to identify where the policy goal of interoperability in health IT is *in practice*, and what has been the practical experience of those involved in its implementation. The methodologies chosen for this research, therefore, reflect this practical focus. They are: implementation evaluation, and reflexivity. The first part of this chapter explains the rationale for selection of these methodologies, and discusses them in detail. The second part of this chapter discusses the specific methods used including: the practical details of designing and implementing the research, selection of participants, and any issues that arose as part of the research process.

4.2. Methodology

This section features a discussion of each selected methodology. The methodologies that are presented are intended to indicate a broad theoretical basis for the research process, rather than a strict or dogmatic adherence to either of them.

4.2.1. Implementation evaluation

The principles of this methodology constitute a nuance to the broader evaluation literature. Patton asserts that, although great weight is placed on summative or outcomes evaluation, these can only be truly meaningful once the efficacy of the policy implementation itself has been established - “where outcomes are evaluated without knowledge of implementation, the results seldom provide a direction for action because the decision maker lacks information about what produced the observed outcomes (or lack of outcomes)” (2015, p. 105). The status of implementation evaluation as an identifiable methodological approach in its own right is not entirely clear from the literature; there is often interchangeable language used between 'implementation evaluation', 'formative evaluation' and 'process evaluation' (Dehar et al., 1993). Stetler et al. (2006) describe implementation evaluation as a *type* of formative evaluation, also noting that it has a focus on the dynamic context within which implementation is occurring - something that is certainly relevant for the health sector. Specifically, implementation evaluation helps us to "describe and understand more fully the major barriers to goal achievement" (Stetler et al., 2006, S4).

The methodology has been applied in a range of contexts. UNICEF have utilised it to evaluate how far the intentions of a 2007 Gender Policy have been actualised, and to what extent gender equality has been integrated into its programming. Significant gaps were found between policy and implementation, and were found to relate to financial and technical resourcing, organisational capacity, inconsistent executive direction and corporate policy as well as a lack of clear accountability mechanisms. A total of twenty seven recommendations were made (UNICEF, 2008). Another, technology-related, application was a 2003 study of the extent to which computerised school information systems were being deployed and used in the UK. Financial incentives were provided by Local Education Authorities during the early 1990s, and this created opportunities for software vendors to promote their systems to the extent that a small number achieved market dominance relatively early. A key evaluation finding was that inadequate user training and orientation resulted in the tool not being used to its full potential, and this had a consequent impact on its ability to facilitate strategic decision making and contribute to greater evidence-based policy formulation in the education sector (Visscher et al., 2003). Of more direct relevance to the current research question, implementation evaluation has been utilised by the MOH in New Zealand; an example being an implementation evaluation of the Primary Health Care Strategy. This report noted that the Primary Health Care strategy was a broad vision rather than a detailed implementation plan (Smith, 2009). Whilst "the devolved approach to service planning and delivery has clear merits" (Smith, 2009, p. 64), the extent of variation and adaptation found had ironically been used as an excuse to deprioritise evaluation of any sort.

The outputs of formal implementation evaluation are clear feedback to decision makers about what is actually happening, and how and why there may be deviations from expectation. The end point of interest here is not whether or not interoperability has been achieved, but *how far has it been achieved* and, where there is variation, *what factors can account for that variation*? Owen describes this methodological approach as one where "the degree of implementation becomes the 'dependent variable"' (1993, p. 131).

This methodological approach therefore dovetails very well with the theoretical framework which is explicitly about understanding in much greater depth those factors which might impinge on effective policy implementation. The need for effective implementation evaluation to be "open-ended, discovery-oriented, and capable of describing developmental processes and program changes" (Patton, 2015, p. 197) suggests a perfect use case for qualitative research methods. The counterpoint to this is where standardised, quantitative measures are utilised to evaluate complex policy initiatives. Patton (2015) discusses the US example of 'Follow Through', a large-scale planned variation experiment in compulsory education between 1968 and 1977. Whilst programme effectiveness was found to be due predominantly to local circumstances (because of the planned variation component), the standardised and quantitative evaluation approach was entirely unable to identify and deconstruct what these variations actually *were*. Thus, the multimillion dollar evaluation programme could not point decision makers to critical information about what variation occurred, and what was more or less successful.

This is important because other writers have demonstrated the frequency with which policy implementation does not follow the stated intent. For example, Ampaire et al. (2015) identify a gap between policy formulation and implementation facilitated via a 'top-down' approach which does not directly, or sufficiently, involve those expected to implement these policies. Ferman noted, more caustically, that "results, unfortunately, almost never resemble intentions" (1989, p. 198). Owen identifies a "large body of literature to show that a centrally developed program undergoes changes when implemented at the local level" (1993, p. 132). The issue for the current research question is that, essentially, there is no centrally developed programme. Nothing has been prescribed, in attempts by the NHITB to preserve sovereignty and respect local decision-making. Analysis of key concepts in the evaluation literature, such as *adaptation* and *variation*, is not in scope of the current research since only one region is being substantively analysed. An important area for further research is therefore likely to be around the extent and impact of adaptation and variation across the different regions within New Zealand. Although Greenhalgh and Bowden (2011) have conceptualised the New Zealand Health IT policy environment as being more 'middle-out' than 'top-down', it will be left to the research to ascertain how this is viewed by policy actors.

Patton (2015) has noted that different types of formative evaluation tend to be localised to a particular setting, and are not generalisable. More specifically, "formative evaluation does not seek to generalize at all beyond the specific intervention being studied" (Patton, 2015, p. 156). Despite this, it is hoped that some key principles from the findings can be identified, which may be applicable to a range of other policy implementation domains. Certainly, the focus is specific to the health IT sector in the Auckland region. However, this notional boundary will have elements of fragmentation, complexity - and possibly competing interests - similar to many other domains, and some general recommendations might be discovered that can contribute more broadly to the policy implementation literature.

This research will be well placed to identify any gaps between the stated policy goals and how things are viewed in practice, and this will certainly be a focus of chapter 6. Owen summarises this approach neatly, stating that it is important to focus on “factors affecting implementation; that is, the identification of conditions which encourage successful action. A motive for such a study could be the need to suggest ways of overcoming barriers to the implementation of an important ... intervention” (1993, p. 133).

4.2.2. Reflexivity

‘Reflexivity’ is about being a self-aware and self-critical researcher. The self-awareness element pertains to understanding and recognising ones own beliefs, and their effect on the area of research. The self-criticism relates to deep evaluation and understanding of how the research methods have been applied in an attempt to further enhance the understanding of the researcher and their audience. This process, of researchers being explicitly self-aware and self-critical, “is particularly important in qualitative research” (Payne and Payne, 2004, p. 191). Furthermore Davidson and Tolich (2003), have noted that reflexivity is a key component of good social research, by virtue of its exhortation to make all choices explicit in the research design.

Whilst not used widely as an explicit methodological approach, there is certainly precedent. Firstly it should be noted that Alvesson and Skoldberg (2009), in their influential text on reflexivity, argue that embedding reflexivity more formally in research can make qualitative research more theoretically informed. Conversely, they present a case which demonstrates that even scientific research can be influenced by factors such as language and ideology. Anderson writes about ‘Methodological reflexivity’, noting that this should be clearly articulated as a methodological approach which also “emphasizes the researcher’s closeness to the subject matter yet a conscious professional distance is maintained” (2008, p. 184). Other literature has employed or advocated for reflexivity explicitly as a methodological approach (de Bruin-Judge, 2006, Forrester, 1999, Segal, 1990, Warwick and Board, 2012).

Reflexivity is especially pertinent to this research, because I have worked in the health IT sector for a total of seven years and by virtue of my previous role at Counties Manukau DHB I have specific knowledge and understanding of interoperability in the Northern region. In addition to this, I have worked with and made connections with many of the interview participants. These experiences can therefore be justifiably said to have the potential to *positively and negatively* impact on this research. I will now discuss this in more detail.

In terms of positive impacts, my experience in this area has afforded a deep understanding of the gap between the policy goal and its implementation. For example, a document review of Annual Reports and strategy papers would provide only the high-level overview that has already been critiqued and does not provide sufficient critical reflection to assess the practicalities of implementing such a complex goal - for example, see healthAlliance (2013). My experience will furthermore have enabled me to go more directly to pertinent questions in my research design and, when interviewing participants, to locate their responses in a more realist context and ask more searching follow-up questions. It is also likely that my prior experience first of all supported my access to the subject matter experts interviewed, and enabled me to interview those experts with more integrity and buy-in that might otherwise have been possible. Finally, my sector experience underpins my motivation to develop a very practical approach to understanding in more depth the implementation of policy in the New Zealand public sector. I wish to offer findings which can inform and shape existing policy development and implementation practices in New Zealand, and thus see a practical application of this research.

Conversely, my sector experience has certain key disadvantages and potential negative implications of which I must, as a reflexive practitioner, be constantly aware. Firstly, I have been personally frustrated in my work by the fact that interoperability has still not been achieved. My own experience of finding it extremely difficult to link key data sources, and to repeatedly attempt to work around significant gaps in information exchange - particularly between primary and secondary care organisations - is likely to have influenced my perception of how far the interoperability policy goal has been achieved. In this way, it is possible that this experience affected my interpretation of the experience of participants without necessarily checking or affirming that I have objectively understood their experience as expressed by themselves. Secondly, this leads to the possibility that in analysis I place disproportionate emphasis on those points which support or validate my own experience. In balancing this risk, I have constructed my analysis in such a way as to be open to all the possibilities of interpretation and keyword elicitation. This will be discussed in more detail in section §4.3 below.

4.3. Methods

The previous section outlined the importance, in answering the current research question, of focusing on implementation and local adaptation - and this, in turn, strongly encourages a qualitative focus. The key research method selected is semi-structured interviews, although the existence of a policy formulation and implementation gap is developed in context of the research findings together with a document review.

4.3.1. Choice of method

The chosen research method was founded on that approach that would best meet the stated goals of this research project: to identify the status of interoperability within the Auckland region; to understand the issues and risks as identified by participants, and; to identify any gaps between policy intent and implementation in practice.

A key factor to consider, which has already been discussed, is that implementation of the interoperability goal has been devolved to the four health sector ‘regions’. Also discussed already is the fact that each of these regions features a broad and complex range of stakeholders who will very likely have different strategic objectives, different incentives and different areas of priority at a given time. The differing funding regimes that exist between different component parts of that health sector are likely only to aggravate these differences. All of this points us, in selecting a research method, back to the exhortations of Patton (2015) to examine how effectively policy is being implemented. He in turn asserts that qualitative methods are best placed to achieve this, and specifically discusses a large-scale standardised quantitative evaluation in the US which comprehensively failed to examine or identify local adaptation. It is on this basis that standardised, quantitative methods are rejected for the purposes of the current research. It is hoped that rich qualitative data will facilitate much greater understanding of the ‘softer’ issues at a local level, and will offer insight into how much this has affected the extent of interoperability in the Auckland region.

This rich qualitative data will be obtained primarily by in-depth semi-structured interviews. The key reasons for this chosen approach are:

- To enable capture of information which is currently unknown to the researcher, or not indicated in the literature (Patton, 2015)
- To enable a greater depth of focus on the key issues identified
- To seek the expert opinion of people working in specialist areas and who deal with health information. Specialist IT staff and senior clinical persons will not be large in number, and so there is opportunity to elicit a greater depth of information from them
- This is reflected in the literature also, which indicates that knowledge management and dissemination is a particular problem in the health sector (Bordoloi and Islam, 2012) and thus interviewing is most likely to produce high quality information
- This last point is further reinforced by the fact that many of the participants were known to the researcher in a professional capacity and, thus, were more likely to engage and provide rich data.

4.3.2. Participants

4.3.2.1. Criteria for choice of participants

The focus of this research is the Auckland region health care sector - specifically those people involved in, or cognisant of, issues in health IT and implementing new initiatives. Being a complex sector with policy actors who potentially hold differing or competing viewpoints, it is important to have a good cross-section of these different groups in order to build up a picture on which to overlay Matland's ambiguity-conflict matrix. Broadly speaking, they were divided for the purposes of participant selection into the following four groups:

1. **National**. People working at the centre, in a policy advisory or policy setting role. For this research, most likely to be representatives of the NHITB or the MOH.
2. **Primary care**. People working in some capacity mostly in the primary care sector, most likely either as GPs, or in a senior role at an Auckland region PHO.
3. **Secondary care**. People working in senior roles within the hospital sector, most likely for an Auckland region DHB.
4. **Private or non-government**. People working either for key IT vendors engaged in the health sector, or otherwise for non-government organisations also involved in health IT.

In this way, the cohort of participants could directly contribute to providing a rich understanding of individual viewpoints at each level of the health system, and thus any differences or alignment can be directly compared and discussed. There was no specific criteria applied to experience or technical ability - those working at the centre were easily identifiable from public information, and those at the other levels were all generally known to the researcher already. It is certainly possible, however, that I placed undue confidence in my capacity to identify the right people to speak with and some opportunities were missed. Nevertheless, this research is not presented as a comprehensive and exhaustive study into perspectives from every conceivable part of the system - and that is certainly not the intention. At the very least, based on discussions the researcher already had with many of the participants, I could be confident that each would be able to speak authoritatively from their own particular perspective.

An additional factor in participant selection was the decision to utilise 'Snowball sampling'. This is described by Robson as a process where participants "are used as informants to identify other members of the population, who are themselves used as informants, and so on" (1993, p. 142). Clearly this has particular benefit for clandestine or hard to reach groups, which is not the case for this research topic. However, three of the original purposively selected participants did ultimately suggest the inclusion of people who might be invited to participate. This is discussed in more detail below.

One further important criteria in the participant selection, however, was that they should be in a position of influence within their organisations and thus able to directly influence the successful or unsuccessful implementation of the interoperability policy goal. I had considered inviting participants from further down the hierarchy of those organisations - for example, data analysts often have much to say about interoperability because of the very ‘hands on’ nature of their work with health information. However, these individuals would be able to speak much less directly about those factors which may or may not be obstacles to interoperability, and most likely will have a more limited understanding of any issues that occur across and between different parts of the sector.

4.3.2.2. Number of participants

As indicated in the preceding section, participants were to be chosen based on their ability to talk expansively and authoritatively on the research topic. It was reasonable to assume from the outset, therefore, that a semi-structured interview could quite feasibly take ninety minutes to complete. On this basis, and because of the academic regulations pertaining to thesis length, a decision was made to restrict the number of participants to twelve. Patton helpfully approves of such an approach, indirectly, stating that “there are no rules for sample size in qualitative inquiry” (2015, p. 184).

As indicated, one of the focii of participant selection was to ensure that a range of influential viewpoints were captured from different parts of the health system. On the basis that twelve semi-structured interviews would provide a sufficiently rich level of data, one of the key considerations therefore was to ensure the *mix* of participants was appropriate. This required relatively equitable distribution of participants amongst the four identified groups, although a greater weight in the primary care sector was considered permissible because the research question explicitly identified that as an area of focus.

Should a larger scale study be found necessary, the research design and structure is simple enough to be replicated.

Finally, a further important consideration is that the resources at the disposal of the research - both time and financial - would not easily permit more than twelve interviews.

4.3.2.3. Identifying and enlisting participants

As already noted, my own work experience in the Auckland region health sector enabled me to identify individuals within each of the four groups relatively easily. Some I had worked with directly, and some I knew of only indirectly. However, the key thing to note in this section is that my own networks were used, at least initially, to identify participants in a manner consistent with *purposeful sampling*. This is a process whose validity and integrity "lies in selecting *information-rich cases* for study in depth" (Patton, 2015, p. 169). Having prior knowledge, in most cases, about individual positions as subject matter experts, ensured that participants would be able to offer a deep and rich perspective on the research topic.

The initial list of proposed participants fell into the four groups in the following way:

Table 4.1.: Initial participants grouped by main portfolio area

Group	**n**
National	2
Primary	5
Secondary	2
Private/NGO/Other	4

It will be noted that the total in this list is greater than the twelve initially planned for. However, it was anticipated that not everyone would be willing or able to participate, a likelihood that is reiterated in the literature (Robson, 1993). In fact, two of the invited participants did not respond at all. Conversely, three participants ultimately recommended others to speak with and these were approached as part of the 'snowball sampling' process (Patton, 2015, Robson, 1993). The final participant list is as follows:

Table 4.2.: Final participant list grouped by main portfolio area

Group	**n**
National	3
Primary	4
Secondary	1
Private/NGO/Other	4

Whilst this list presents a mix of participants that appears to under-represent the Secondary care sector, it should be noted that several participants worked in dual capacities. Thus, one individual from the 'National' group also has senior experience in secondary care, whilst another has senior experience in primary care. Two individuals from the 'Primary' group have had prior experience at senior level in the secondary care sector. Two individuals in the 'Private/NGO/Other' group have had prior experience in the primary care sector also. Whilst participants were encouraged to speak from the perspective of their current positions, the impact of dual practice or prior experience meant that the mix was more even: the National view could be commented on by three individuals, Primary - six, Secondary - five and the ‘Private/NGO/Other’ group - four. On this basis, therefore, it was felt that there was appropriate representation across all levels of the system. However, there are two key exceptions to this.

The first is that no appropriate participant from the Auckland region IT shared service provider healthAlliance could be sourced. This potentially is a significant limitation in the breadth of data collected, given that healthAlliance are tasked with providing IT services across the Northern region to all secondary care services (DHBs). However, it is also true to say that this does not operate as a truly ‘centralised’ model and that each DHB has very differing levels of interaction with, and dependence on, healthAlliance for services.

The second is that, whilst there is representation from private sector vendors, none of these were from vendors of a primary care PMS. These are the software systems that are used to record clinical and administrative information about patients in general practice. The absence of PMS vendors from the interview participants became a noticeable problem only retrospectively, after analysis and coding of interviews revealed that this part of the sector was vitally important to the interoperability problem. If this study were to be repeated, at least one representative from this sector should be included to understand their perspective.

A further note on this topic relates to the ‘meta data’ concerning participants’ professional roles. Whilst the participants have been above categorised according to their main portfolio area, I anticipated that data analysis following coding would be greatly enhanced by being able to identify various other dimensions of the data - for example, does the participant work in a role with clinical responsibilities? This is discussed in more detail in section 5.3.1.

4.3.3. Interviews

4.3.3.1. Interview guide

My first practical step in executing this research was to design an interview guide, which could subsequently be tested. I began by focusing on the substance of my chosen theoretical framework. I had identified that it would be instructive to ascertain the location of the policy actors being interviewed within the ambiguity-conflict matrix. Therefore, the interview guide should have an explicit focus on both axes of the matrix. My chosen first question however was dealing with what interoperability meant to the individual. This was done on the assumption that individuals may be more or less invested in the concept, and that participants may have differing levels of understanding about the concept. It might have been reasonable to assume, for example, that an IT vendor would be very interested in the interoperability goal in the event that it would favour their product or raise the profile of issues with which their product could assist. Conversely, a primary care stakeholder may see less advantage and therefore be less interested in the goal. Whilst questions around the ambiguity-conflict matrix would deal with this directly, I felt it important to begin with an introductory question which would clarify the individuals engagement with this concept.

Two questions were drafted to follow this opening one, both dealing directly with the ambiguity-conflict matrix. These had to consider on whose behalf the question would be answered. For example, it would be simple to ask interviewees where they would place themselves. However, given the interconnectedness of the sector this might risk the opportunity to explore their perception of how others they interact with feel and think about this topic. The questions were therefore formulated as shown below, with the second and third asking for consideration of a range of groups that interviewees interact with. The flexibility of the interview method would permit further exploration of those groups and, of course, the individuals own perspective.

1. What would achieving the goal of interoperability mean to you?
2. From the people you work with and interact with, and thinking about the NHITB goal of health IT interoperablity, where would you position different groups on an axis running from ambiguity (no understanding of the interoperability goal or how it will be achieved) to clarity (full understanding of the goal and how it will be achieved)?
3. Similarly, where would you position different groups on an axis running from conflict (the different groups do not agree on the goal or how it can be achieved) to congruence (there is good alignment on the need for interoperability and how it can be achieved)?

This was a relatively simple interview guide, yet it kept a focus on the theoretical framework and simultaneously allowed plenty of flexibility for discussion and expansion on the topic.

4.3.3.2. Interview pilot

This guide was piloted in the following way. Firstly, I conducted a solo ‘walkthrough’. This featured myself reading aloud the questions from one chair, and moving to a different chair to answer the questions from my own perspective - as if I was being interviewed. This process had the advantage of encouraging me to think consciously how I would respond to each question and, thus, to test the practical usefulness of the wording. Secondly, I conducted mock interviews with two colleagues using the interview guide. These two individuals were selected as having practical experience in research and evaluation, and also health sector experience - but however were not conversant with this specific research topic.

The findings from this pilot process enabled me to understand a great deal more about the practicalities of my chosen method, and also to make changes that I felt to be appropriate. Firstly, I found that the mock interviews took approximately thirty minutes each. I reasoned that actual participants would most likely talk in much more depth, and that the interviews could therefore take approximately one hour. I also reasoned that, since I was dealing with relatively senior people, requiring more than an hour of their time would not be feasible. Changes to the interview guide were made in the following way.

Firstly, I found it necessary to include a standard opening statement about the research topic, the theoretical framework and the interview process. This was built into the interview guide, and provided an opportunity to clarify some of the terms used. Another modification was to add a fourth question, which checked whether the participant wished to add anything else. Finally, in order to formalise the reflexive methodology I wished to implement, I determined that I would keep notes during the interview that related to my impressions and internal thought process. The participants responses would in any event be recorded and later transcribed, and it would be useful to record where they said something I did not expect, or I realised that I had preconceptions. Saldana (2013) refers to this analytical process as ‘field notes’; the “researcher’s written documentation of participant observation, which may include the observer’s personal and subjective responses to and interpretations of social action encountered” (Saldana, 2013, p. 42). Literature on qualitative data analysis suggests that a concurrent coding and note-taking process help to generate reciprocity between the technical coding system itself, and development of understanding a particular phenomenom or research topic (Weston et al., 2001).

A more practical learning from the pilot process related to my mechanism for recording the interviews. I used an iPhone 4C as a recording device and, in solo testing, there were no problems with sound quality and storage capacity. However, in one of the pilot interviews (which occurred during business hours) the phone rang during recording. It was not immediately clear what this did to the recording process and, although I ultimately ascertained that a phone call stops the recording, the process of starting the recording from where it finished was not particularly intuitive. Of course, the fact that the flow of the interview can be interrupted is certainly not ideal and should be avoided as much as possible in considering the organisation and management of the interview process (Robson, 1993). The solution to this particular problem was simply to ensure that the phone is set to ‘flight mode’ prior to the interview; this ensures that no calls can come through and addresses this problem entirely.

4.3.3.3. Participant interviews

Interviews took place during business hours, as part of participant’s work days. This further reinforced the need to keep the interview itself to within one hour, which tended to be the usual meeting length in the health sector based on my own experience. This worked well also because, by engaging subject matter experts, the research topic dovetailed with their day to day work. However, the associated risk with this approach was that participants’ focus might be diverted in the case of an urgent issue requiring their attention. Furthermore, given that I interviewed relatively senior people, there was an attendant risk that other meetings scheduled before and after might eat into available interview time.

In actual fact, only two interviews were formally curtailed in such a way. The first was because of a competing and unavoidable commitment, which left only seventeen minutes of interview time. The second was because another group had booked the meeting room that was being used; however, more than forty minutes of interview time was secured. A total of 604 minutes of interview time was obtained across the twelve participants; the average duration being fifty minutes (range 17-82).

All interviews were recorded with an iPhone 4C, and the recordings were later transcribed for purposes of coding and analysis.

4.4. Ethics

This study was subject to the Ethical Principles Governing Research at AUT (AUT, 2014). The research protocol submitted to the AUT Ethics Committee, and given full approval on 16 March 2015, specified that participants would be required to give informed consent to take part, and also that the interviews would be recorded and transcribed. The approval letter is attached as Appendix A. The participant consent form furthermore outlined that they had the right to withdraw consent at any time. A copy of the consent form is attached as Appendix B.

After identifying participants they were each sent an Information Sheet explaining the purpose and scope of research, and which also outlined the proposed process. A copy of this is attached as Appendix C.

A further step was taken to provide all participants with a copy of the interview transcript, and to make any amendments or redactions they wished, before coding and analysis would begin. Only five participants responded to the sending of the transcript, three of whom made minor changes mostly pertaining to grammar and spelling of names.

4.5. Conclusion

The methods described in this chapter inevitably resulted in a large amount of rich qualitative data, describing how a range of key policy actors view and understand the interoperability policy goal, as well as how they overlay this understanding with Matland's ambiguity-conflict matrix (Matland, 1995). The data gathered, furthermore, followed an implementation evaluation methodology which explicitly attempts to describe how policy formulations are executed and to elicit qualitative data about the experience of implementation amongst a range of policy actors.

Following completion of the field work, all transcripts were coded and analysed. This process is discussed in chapter 5.

5. Data

5.1. Introduction

This chapter will focus on the data collected from the semi-structured interviews. It will describe in some detail the process I undertook of turning audio recordings into rigorously coded datasets, which could be linked together and analysed. Adhering to the reflexive approach I set out to adopt in section §4.2, I will demonstrate the thought process behind selection of keywords, application of coding and initial analysis of results. More in-depth analysis and discussion of the data itself will be presented in chapter 6.

5.2. Transcription

The first step towards structured collection, coding and analysis of interview is to ensure it is properly transcribed. Due to constraints on time, and upon advice of the supervisory team, I elected to have as many of the interviews professionally transcribed as possible. Two of the interviews were ultimately not sent to a transcription service, but transcribed entirely by the researcher due to audio quality issues resulting from the interview setting. The ten transcripts prepared by a professional service were nevertheless thoroughly reviewed by the researcher. This proved to be a valuable, if time-consuming activity, because there were many specific acronyms and terms that needed to be clarified in the transcript text itself. Furthermore, it meant that I gained deep familiarity with the material and this is very important for coding, analysis and preparing discussion.

The final collection of transcripts amounted to just less than 100,000 words, averaging around 8,000 words per transcript.

5.3. Coding

Coding is a technical task undertaken upon qualitative data to derive meaning from it. In this case, the 100,000 words described above can be grouped, classified and analysed to arrive at interpretations and conclusions. Saldana describes the coding process as one which “enables you to organize and group similarly coded data into categories or ‘families’ because they share some characteristic” (2013, p. 9). The technical process when utilising software tools begins with identifying the codes that are to be used. Clearly, there is some subjectivity involved in this and Saldana (2013) again points out helpfully that coding should normally be done over several cycles in order to test applicability, evaluate and then test again.

Given that I was not dealing with a very large number of transcripts, I resolved to let the research speak for itself - rather than entertain the possibility of limiting it to what I thought I understood. This process occurred in the following way. Firstly, having gone through all transcripts in detail, I prepared a list of what I considered to be ‘key statements’ from each participant. These were statements which pertained directly to the research question in some way. For example, a claim that we must collectively revisit notions of data ‘ownership’, or another claim that clinical leadership is most important. I prepared a list which catalogues these key statements, noting who made them; 300 in total were noted. This list has of course been retained in the event that further analysis is required.

The second step was to broadly categorise these key statements. For example, a statement that it is very important to encourage clinicians to think in a more holistic way was allocated the keywords ‘leadership’ and ‘incentives’; another statement, that there is concern about shared data being used to improperly performance manage those in the primary care sector, was allocated the keywords ‘relationships’ and ‘trust’. Each statement could be categorised against as many keywords as appropriate. 594 keywords in total were applied to the 300 statements; nine of these statements were allocated four keywords each, 92 were allocated three keywords each, 112 were allocated two keywords each, and the remainder were allocated a single keyword each. A master list of these keywords was compiled, and summarised by counting the frequency of each. The top ten are shown below:

Table 5.1.: Top ten key concepts from First Cycle coding

Keyword	**Frequency**
Relationships	59
Trust	47
Leadership	43
Primary care	42
Vendors	42
Health system structure	41
Incentives	29
Funding	28
Competition	24
Silos	23

This list helps us to identify what issues seemed to be most central to the interoperability issue for the participants involved. In this way, the keywords can then form a solid basis on which to build a First Cycle coding process (Saldana, 2013). Coffey and Atkinson outline how it is important to conceive of coding as a cyclical task, one which “is usually a mixture of data summation and data complication ... breaking the data apart in analytically relevant ways in order to lead toward further questions about the data” (1996, p. 29).

An additional Second Cycle coding process then occurred in the following way. Firstly the initial list was carefully rationalised, and potential overlaps and duplicates removed. For example, initial categorisation had led to a ‘Public/Private conflict’ keyword. However, there was another titled simply ‘Conflict’ and a decision was made to merge these together. In this way the original list was condensed further to result in a smaller list of single keywords, which still reflected the findings from the research rather than the preconceptions of the researcher. To supplement this list, and to ensure that a focus on the theoretical framework was retained, additional keywords were added which reflected the substance of the research question and the interview guide. For example, the term ‘ambiguity’ did not appear on the list described in First Cycle coding, yet the theoretical framework underpinning this research requires understanding of where the interoperability policy goal sits within Matland’s ambiguity-conflict matrix (Matland, 1995). Therefore, additional keywords were added - with the view that these would all eventually form nodes for analysis within NVivo - which directly related to this.

One was ‘clarity-ambiguity’, and the other was ‘congruence-conflict’ (please refer to section §3.4 for further discussion on application of this theoretical framework). I reasoned that these could be allocated an additional ‘sentiment’ score within the software to indicate which end of each axis the statement indicated. For example, a statement indicating that the policy message is clearly understood would be coded against ‘clarity-ambiguity’, together with a positive sentiment to denote it demonstrates *clarity*. Conversely, a statement indicating that there are competing views on how to implement the interoperability policy goal would be coded against ‘congruence-conflict’, together with a negative sentiment to denote it demonstrates *conflict*. Of course, the same statements could simultaneously be coded against any other node. Following this Second Cycle process, a list of 32 such key words were identified and retained for use within NVivo.

These key words were set up as ‘nodes’ in NVivo, as noted above. Doing this provides the researcher with a framework within which to code the transcripts. My initial hope was that the coding process would then subsequently be undertaken by way of simple text searches for the key words (or their synonyms); the software provides a query function which permits this. However, it became apparent that this approach is problematic where a concept cannot easily be diluted to one or two keywords. It is easy to imagine, for example, a statement which indicates a potential issue with clinical leadership but, however, does not contain either of those words (or even their synonyms). Upon review of this process, I was not satisfied that the chosen approach would provide comprehensive or accurate coding. I therefore resolved instead to code each transcript entirely manually. This approach holds the distinct potential advantage of significantly greater accuracy, whilst taking much longer.

During the coding process itself, it was important that I continued to be responsive to the content of the data and not adhere stringently to this node framework. This meant that new nodes should be created and coded wherever appropriate. This happened on five occasions in total, and was generally done when an existing node did not appear to draw out enough specific meaning, or a concept or statement would otherwise need to be identified and analysed separately to its nearest node. These additional nodes are now discussed in turn:

1. *Vendor dependence*. Coding under the node 'vendor' was diverted into this new node, where a more explicitly negative conceptualisation of the PMS vendor landscape was expressed. This encompasses both the relatively large sunk costs of investing in a PMS system, as well as the operational business processes and product knowledge required to make good use of it.

2. *Knowledge is power*. This node reflects comments from some participants that specific actors in the health sector do not wish to cede sovereignty of data under their nominal control, since they perceive it might diminish their own value or importance in the healthcare system.

3. *Technology is not the problem*. This refers to a viewpoint expressed by several participants, that barriers to interoperability are generally not technical in nature; appropriate technical IT solutions do already exist.

4. *Change fatigue*. This node pertains to an idea that different parts of the health sector, and the actors within them, experience constant change and fluctuation. It was thought by some participants that this may result in a lack of motivation to engage with initiatives that they do not perceive as especially pressing.

5. *Need for central action*. This node reflects a sentiment from some participants that, put simply, the interoperability problem can only be solved by very assertive and directive action from the centre.

A total of 37 nodes were thus utilised for analysis in NVivo. Results from this coding exercise are introduced in section §5.4, and discussed in depth in chapter 6.

5.3.1. Attribute coding

Richards (2009) describes another important aspect of coding, which can also be referred to as 'descriptive coding'. This deals with important variables by which we may wish to analyse and view the data. Whilst the transcripts have now been collectively coded in the software by utilising the keyword list described in section §5.3, we now may wish to understand those results in more depth. For example, if an attribute is attached to a source - let us say, for example, age or gender - I can now analyse the coding by these additional variables. This is particularly important in the current research, since we are interested in eliciting the viewpoints of policy actors from their respective positions. It is not adequate, therefore, to simply say that eight out of twelve participants have text coded against a 'relationships' keyword node. We may feasibly wish to know - of these - how many work at the differing sector levels, or specifically in DHBs? How many work in clinical roles? It is precisely the competing viewpoints that this process illuminates that is at the heart of the current research question, and attribute coding is therefore essential. Effective attribute coding has been described as "good qualitative data management" (Saldana, 2013, p. 70).

This is, similarly, performed in the NVivo software; the following attributes were applied to each participant and their transcript:

Table 5.2.: Attribute coding

Attribute name	**Description**	**Permitted values**
PrimaryGroup	Which group does the participant represent, or with which is primarily engaged?	1-4
SecondaryGroup	Which group does the participant also represent, or has represented in the past?	1-4, NULL
Clinical	Does the participant currently work in a clinical role?	Yes/No

The permitted values in the above table determine what can be assigned to each individual. The numbers 1-4 relate to the groupings described in section 4.3.2.1. Each participant can be linked to a key portfolio area, and some participants also were able to provide perspective from a different group - hence the SecondaryGroup value can also be blank where this does not apply. Assigning these attributes to each participant transcript, analysis can now be undertaken specifically by role (PrimaryGroup or SecondaryGroup) and by the type of role (clinical or non-clinical). Other attributes could theoretically be designed and allocated, however the ones shown above are considered to be most central to the current research question.

5.3.2. Analytical memos

Analytical memo writing is a key component of good quality reflexive qualitative research. The technical coding and analytical process should be considered not merely as a set of data points or correlations, but "as a prompt ... for written reflection on the deeper and complex meanings it evokes. The objective is researcher reflexivity on the data corpus" (Saldana, 2013, p. 42). The memo is distinct from field notes in that it can encompass any musing or thought process about what is being analysed or examined; it assists the researcher to generate and refine codes (Corbin and Strauss, 2008).

The goal of an analytical memo is very broad, and can essentially be a record of any thought about the coding or analysis of data. The intention should be to, in some way, document an evolutionary thought process. Clearly there can be a multitude of ways this can be done. I have utilised the memo writing process in the following key ways:

- To reflect on the research question
- To reflect on coding choices and definitions
- To reflect on emerging patterns and themes
- To reflect on emerging networks and correlations amongst codes and themes
- To reflect on personal or ethical dilemmas
- To reflect on future possibilities for further study (adapted from Mason, 2002).

It is often recommended that memos are coded and categorised themselves, however I elected not to do this and simply retained the memos as I originally recorded them. This took the form of a few words or comments against each of the First Cycle coding entries I made, as described in the preceding section. I present below two examples of memos I made during this process, however a full list is reproduced in Appendix D - Analytical memos.

1. *"How can we be incentivised to think differently? Perhaps via structural change?"*. This memo was recorded against a comment identifying a 'them and us' attitude between primary and secondary care sectors. Having an indication from participants that this may be an obstacle to interoperability, the thought about how this can be overcome was triggered. A linked memo was developed, which was associated with another participant comment around their view that twenty DHBs was still too many and contributed to avoidable complexity and fragmentation across the sector.

2. *"This is not my experience - how do I weight this comment as a researcher??"*. This was recorded against a participant comment that Secondary care organisations do not want to share their data with Primary care colleagues. This was particularly arresting because, as noted, it had not been my experience; it revealed a bias in my thinking that might have led to an undue focus on the openness to data sharing operating *in the other direction* (e.g. that it is Primary care who may be more circumspect about sharing data).

5.4. Results

Following the coding processes described above, the results were compiled and summarised. At an overall level, it is interesting to analyse which nodes were most frequently utilised. Firstly, there were no nodes (other than those pertaining directly to the ambiguity-conflict matrix, as discussed in section §5.3) that were referred to by all 12 participants. The top ten are shown below (source refers to a transcript, and can be read to mean an individual participant):

Table 5.3.: Top ten nodes by source

Node	**Sources**
Vendor	11
Funding	11
Leadership	10
Trust	10
Primary care	10
Policy	9
Standards	9
Relationships	8
Procurement	7
Vendor dependence	7

This provides an insight into how many participants thought each node was relevant to the research question. This indicates, to some extent, the *breadth* with which each is perceived as an issue. As a follow-up to this, it is also revealing to summarise how many comments in total were coded against each node. This provides an insight into how many times each was referred to as an issue, and thus elicits some strength of feeling and a greater understanding of *depth*. The top ten nodes by count of reference are shown below:

Table 5.4.: Top ten nodes by references

Node	**References**
Vendor	59
Leadership	49
System	39
Funding	38
Trust	36
Policy	35
Standards	34
Primary care	32
Relationships	26
Procurement	24

What is interesting about the above table is that several nodes are shown which were not in the preceding one. For example, here there are 39 references against the node ‘System’ - however, only five participants referred to this as an issue. Thus, a relatively narrow cross-section of participants referred to ‘System’ as an issue proportionately more than other nodes. For reference, the ‘System’ node refers to the shape, structure, and organisation of the health system in New Zealand. Thus, these 39 references each identify that structural change in the New Zealand healthcare system may benefit achievement of the interoperability policy goal.

5.4.1. The ambiguity-conflict matrix

As noted in section §5.3, specific nodes were created to capture exactly where participants felt the sector should be located along both axes of the ambiguity-conflict matrix. In terms of the outcomes of the interview process, it should be noted that responses to these questions were not uniform. Some participants, for example, could easily say that they felt the policy message was either clear or ambiguous; others preferred a more nuanced answer. The results however indicate firstly that there is a slight leaning toward placing the interoperability issue toward *clarity* on the clarity-ambiguity axis; 64% of responses coded against this node felt there was a clear policy message and that there was broad agreement within the sector about the need for interoperability.

The counterpoint to this is those responses dealing with the congruence-conflict axis. This was a much clearer message, and 98% of responses coded against this node indicated that there was *conflict* within the sector about exactly how the interoperability policy goal was to be implemented. These responses would, at first glance, appear to place implementation of the interoperability policy goal within the bottom right corner of the ambiguity-conflict matrix (depicted in section §3.3); that is, interoperability appears to require a ‘Political implementation’. Utilising the work of Matland, Deleon and Deleon suggest that under these circumstances “implementation is perilous unless and until a compromise can somehow be forged. While discourse is typically a time-intensive approach, the total time and energy consumed might easily be reduced if it alleviates some of the friction that would otherwise occur" (2002, p. 472).

5.4.2. Other key issues

In this section I will provide an overview of some other key findings from the coding and analysis process. These will each be discussed in more depth in chapter 6.

- *The centralisation dichotomy*. This refers to part of the conflict issue noted in the preceding section; there seems to be widespread disagreement on exactly how interoperability can be implemented. This item does not appear in the tables above (see figure 5.3 and figure 5.4), yet participants did discuss their view on whether they believed health information should, broadly speaking, be centralised or decentralised. A centralised system would see data being aggregated and stored as a canonical record in central or regional repositories. Healthcare providers would submit relevant data to this repository, and it could then be retrieved by other providers as needed. A decentralised system will tend to favour leaving all information in source systems, but providing a method to connect and retrieve data from those systems as necessary. 62% of responses against this node favoured a decentralised implementation. However, it is important to note that these responses were provided by only two participants who both, it can be assumed, felt very strongly about this point.

- *Lack of private sector competition*. 89% of responses dealing with the topic of competition indicated that the private sector/vendor market in New Zealand is not competitive enough. This could be for a number of reasons: from the structure of the sector itself, to the high costs and barrier to entry for new participants in a market with strong incumbents.

- *Funding*. There are two dimensions to this issue. The first relates to the amount of funding being allocated directly to support of the interoperability policy goal, whereas the second relates to the setup and structure of the health care funding model within New Zealand and to what extent that might incentivise moves toward interoperability. 68% of responses coded against this node indicated that there is not sufficient funding, or sufficient incentive under the health funding model. Somewhat related to this is the issue of incentives in general - what is the selling point to policy actors, to get them behind this goal? Responses were also coded against a separate node titled 'Incentives'. Again, 68% of responses felt there was not sufficient incentive within the sector for people to unite behind this goal.

- *Knowledge is power.* This relates to a notion that individuals are not ready to cede their nominal sovereignty over data, to a fully connected and interoperable health IT system. Reasons for this include a conceptualisation that there is tangible value (monetary or political) in being the gateway to access particular information. Furthermore, significant concern was expressed over the possibility that federated data could be used incorrectly, or improperly, by others - particularly those operating within a principal-agent funding relationship. There were 19 references from seven participants coded against this node.

- *Leadership.* This was raised as one of the biggest issues, both by count of sources and references (as detailed in section §5.4). Of 49 references, 42 were critical of leadership on implementation of the interoperability policy goal. This encompasses sentiment that either central government are not being assertive enough in this area or, at a more detailed level, that there are not enough sufficiently knowledgeable clinical leaders to make implementation effective.

- *Privacy.* Privacy was noted as an issue by seven participants. Some reflected that policy actors have genuine concerns that a fully interoperable health IT ecosystem would compromise the privacy of health information. Others reflected that privacy is not a genuine issue (or at least it is one that can be easily safeguarded), but one used in the sector to argue against interoperability in the knowledge that it can be difficult to rebut.

- *Relationships and trust.* Together, both these were noted as relatively significant issues by participants. 73% of all statements coded against Relationships were clearly negative, indicating that there is friction between different components of the health system. Similarly, 72% of statements coded against Trust were clearly negative, suggesting that there is a trust issue in the Auckland region specifically between primary and secondary care stakeholders.

- *A need for standards.* In the analysis undertaken standards refers either to technical standards supporting electronic interchange of data, or the standardisation of data itself. Nine participants raised the need for standards as an issue.

- *Vendors.* As discussed in section §5.3, a separate node was created to specifically capture those comments relating to vendor *dependence*; vendors in this context refers to those private sector companies creating software products for the capture of clinical and operational data in primary care. 11 participants discussed vendors as being part of the network of interoperability barriers; of 59 statements coded against this node, 83% were overtly negative. A further 23 statements from seven participants were coded against 'vendor dependence', indicating a negative perception that such vendors have a disproportionately large influence within the sector.

5.5. Conclusion

This chapter has described in detail the process that was undertaken to work the interview transcripts into rigorously coded datasets, which could be linked together and analysed. The coding process began with a detailed collation of what the researcher considered to be 'key statements' from interview participants. These were allocated up to four keywords each, which would then be edited to prepare a starting list of nodes that could be set up for coding and analysis within the NVivo software. These were further refined, as detailed in section §5.3.

Parallel to this, attributes of the participants themselves were set up in the NVivo software so that analysis of responses could drill down to the sector that different participants represented. This is particularly relevant under the Policy Implementation theoretical framework, since we are striving to understand how different policy actors understand and conceptualise a problem. The process of formalising a reflexive approach to coding and analysis was also introduced, and a list of 'analytical memos' can be found at Appendix D - Analytical memos.

Finally some initial results from the qualitative analysis have been presented. As an introductory overview, in section §5.4 we have identified those nodes which both have the most references coded against them, and were referred to by the most number of participants. Following this, more detailed information was presented outlining some of the key issues that will now form the basis for in-depth discussion in chapter 6.

6. Discussion

6.1. Introduction

In this chapter I will provide a more in-depth discussion of the major themes arising from the interviews and, where possible, overlay this with the available literature - some of which has already been touched upon in chapter 2. Identifying a concise range of key themes that were identified during transcription and coding of the interviews was not a simple task; I found that many themes either overlapped or were contingent upon other themes. A small example of this is in the way that funding was thought to be an issue in delivery of the interoperability goal, but one that was also strongly linked with leadership and the structure of the New Zealand health system itself. I have therefore separated eight key topics, being the ones that I considered to be most distinct. However, links to the other issues are also made throughout this chapter.

6.2. The centralisation dichotomy

This issue does not appear in the tables presented in section §5.4 (see figure 5.3 and figure 5.4) since it is not, in its own right, a barrier to interoperability - it is more a debate around exactly how interoperability is to be achieved. Nevertheless a fundamental divide around implementation methods is indicative of strategic conflict, and it is worth drawing attention to it here so the discussion can present how it overlaps with other issues listed, such as 'trust', and 'leadership'.

There are two dominant approaches to connecting information systems which can be considered as opposite ends of a continuum. The first is *decentralisation*; where the potential myriad of source systems - individual PMSs in each GP clinic, for example - are left unchanged, but a mechanism to connect them together as required is implemented. In this way individual systems can send and receive information directly to and from other providers, or sources of data, creating a 'web' of connectivity in information exchange.

Conversely, *centralisation* attempts to work towards a canonical 'single source of truth' and tends towards the implementation of large data repositories. Such an approach, implemented across the health sector, would require the implementation of new software products (large Electronic Health Record products such as EPIC, or Cerner, for example) and attendant change in business processes.

The centralisation continuum is, of course, not restricted to these opposing views. An effective example of a solution which neatly combines both these endpoints is the New Zealand 'National Immunisation Register' (NIR). This is a data store which centralises immunisation records for children in New Zealand (Ministry of Health, 2015). However, communication with the NIR happens in a semi-decentralised manner. A GP practice will enter an immunisation event into their PMS and the data is kept locally. Recording of the event also triggers an electronic message into the NIR where it is also stored centrally. Other providers can then query the immunisation history of a new patient directly from their PMS, and store those details locally.

The NIR has therefore established a precedent in the New Zealand healthcare context. Since 2005, there has been a highly effective system in place which transcends all of the issues noted by interviewees - such as trust, privacy, and leadership, to name just a few. Most importantly, the data indicates that it has been highly effective at increasing childhood immunisation coverage rates. At the the inception of the NIR, coverage for eligible two year olds was 77% nationally (Ministry of Health, 2013); in March 2016 coverage had reached 94% (Ministry of Health, 2016).

62% of total responses coded against this node favoured a decentralised implementation. However, it is important to note that these particular responses were provided by only two participants. The following table summarises the perceived advantages of each approach, as described by interviewees.

Table 6.1.: Perceived advantages of centralisation vs decentralisation

Centralisation	**Decentralisation**
Data quality	Enables patient autonomy
Scalability	Preserves competition in the vendor space
Availability	GP cynicism about centralisation
A single source of truth	Preserves professional autonomy
Reduced potential for errors	Enables development of trust models

The arguments in favour of a centralised approach all tend to be focused on mostly objective, tangible, advantages - there would be better data quality, there would be a single record which could be relied upon, and so on. The arguments in favour of decentralisation, however, tend to be focused on mitigating the perceived disadvantages of the competing approach - we could retain professional autonomy, we would cater to the lack of trust GPs are thought to have in centralised systems, and so on. On the topic of trust, however, it is worth noting the final item in the above table under decentralisation. Whilst respondents were never wholly in favour of one approach over the other - and could generally see relative advantages, and use cases, for each - those favouring decentralisation presented as being more empathetic with the personal factors involved in this debate, trust being an important one. An approach described by one respondent was to move towards an interoperable health information system slowly, and by taking a ‘bottom up’ approach (Coiera, 2009). It was thought that this would better develop trust and relationships, and these two factors were presented at the same time as being central to progress. Not only were GPs thought to lack trust in centralised systems generally, but related issues such as the perception that their professional autonomy or sovereignty were being negatively impacted were also important components. This is reflected in the literature, which has shown that capacity or willingness in this area varies significantly (Aarts et al., 2004, Kaplan, 2001), and that issues around perceived threats to professional autonomy tend to be key factors (Swan and Newell, 1996).

6.3. The vendor landscape

Many of the information technology tools, or applications, used in healthcare are proprietary products sold by private sector vendors. In the New Zealand primary care context there are four vendors of PMSs (Patients First, 2016a). Equivalent systems are used in the secondary/tertiary care context for patient management, clinic bookings, billing and administration. Alongside these ‘cornerstone’ systems of healthcare administration, there are a plethora of specialist systems designed for use in radiology, pharmacy, dentistry, oncology and so on. Many of these cater to a relatively small market, and are highly specialised, and are therefore priced accordingly. A particular problem for New Zealand is that it is a small country in global terms, and thus it does not tend to receive specific attention of vendors in the same way that healthcare systems in the UK, the US or Australia might.

The following sections delve into this issue in more detail, and focus on two key areas arising from interviews, both of which are of course closely linked. Firstly, there is the general issue of dynamism in the vendor market place in New Zealand. Presence or absence of competition in a market is, to a large extent, a product of government policy. The neo-liberal policies of governments during the 1980s, and since, have opened markets to competition, underpinned by an ideology rooted in minimal government intervention and ‘economic freedom’. Many commentators have posited that such policies were pursued more rapidly and more vigorously in New Zealand than broadly similar jurisdictions such as Australia or the UK (Boston et al., 1999, Kelsey, 1993, Vis, 2007). This is to say that, all things being equal, there should be a healthy and dynamic market for IT products in the health sector - I will investigate why this may not be the case. The second related issue pertains to the health sector’s relationship with vendors. Many interviewees held strong opinions about how these partnerships are developing, and the extent to which our information systems - and vendors themselves - are encouraging or inhibiting innovation, and any moves towards integration and interoperability.

6.3.1. Market dynamism

In terms of voicing opinion on the dynamism of the information system marketplace, this was not in a strict sense a highly ranked topic (and thus does not appear amongst the top ten issues noted in figure 5.3). It is presented and discussed here because of its overlap with the issue of 'vendors', which did feature prominently.

In total there were twenty references to this topic, by seven participants. These references predominantly came from people working in the primary health sector, and were strongly negative about vendors in that space (sixteen of the twenty references were coded with a 'negative' sentiment). Three participants referred to a particular vendor specifically as operating in a 'monopoly', whereas two others similarly noted that that vendor was dominant. One participant furthermore noted that vendor's dominance, but stressed that it is objectively not a monopoly given there are other vendors operating in this market. It was noted that barriers to entry into this market place are relatively high and, given the size of the New Zealand market, the cost-benefit equation of developing a new product simply would not stack up. One participant specifically noted that the primary health PMS market - featuring four vendors - is, on balance, appropriate for New Zealand.

Another interesting result from the interview process was one Auckland PHO who had developed a strategy of not encouraging their GP members to converge onto a single product or platform. Whilst it was recognised by them that this would make many things simpler and more efficient, they voiced specific concern that this would only *further reduce* dynamism in the vendor market place and they were anxious not to contribute to that.

The perception of the vendor market place as a monopoly appeared to derive from the costs associated with the product. Participants complained that negotiations over pricing were done aggressively, and felt that this stemmed from the vendor acknowledging that they are a dominant player. Furthermore, however, there was also acknowledgement that the costs of migrating to a different vendor were extremely high - both financially, and in terms of change required to business processes and administration practice. It was felt that incumbent vendors utilised this as a basis to negotiate aggressively on pricing. This is where the issue of market dynamism begins to overlap with that of 'vendor dependence'. The costs associated with changing information systems are simply so high that incumbent vendors are felt to become aggressive in their pricing, and lazy and unresponsive in their product development and innovation.

Discussion on this last point led, in several cases, to calls for stronger action from the centre around intervening in, and organising, the vendor market place. Referring specifically to the aggressive pricing founded on a dominant market position, one participant noted that this is exactly what we should expect in a functional market - it is wrong to blame the vendor, rather, we need to look at how we organise and influence that market. Nevertheless, participants from the PHO sector viewed the PMS vendor pricing as being implicitly condoned by the centre, through its perceived lack of action on this issue.

6.3.2. Vendor dependence

Although clearly linked with the above perceived issue of dynamism in the vendor market, concerns about providers becoming ‘dependent’ on a vendor were one of the major issues resulting from the interview process. The interview transcripts were initially coded simply with any discussion pertaining to ‘vendor’, and the relevant sentiment. However, the separate node ‘vendor dependence’ was subsequently developed to more fully capture that emerging theme. In this section, both nodes are aggregated together. The following tables summarise the total count of sources and references coded against both nodes, along with a breakdown of positive or negative sentiment. Please note that the ‘Positive’ and ‘Negative’ columns will not necessarily add up to the ‘Total’ column, since a participant may make both positive *and* negative comments, and will be counted separately against each.

Table 6.2.: Coding against Vendor/Vendor Dependence nodes

	Total	**Positive**	**Negative**
Sources	11	3	10
References	78	6	67

The above table clearly depicts that the majority of responses coded against these nodes were negative. Such responses actually encompass a relatively narrow range of issues. Each will be discussed in turn.

6.3.2.1. Barriers to exit

Whilst respondents generally agreed that the barriers to entry into the PMS market were relatively high (and thus affected the dynamism of that market), there is an interesting interplay between this and the fact that the barriers for individual providers *to move to a different PMS* are thought to be just as significant. Responses encompass notions such as how it is very difficult, and expensive, to move to a different PMS. Although it is perhaps easy to assume that the focus here would be on capital costs, interviews also elicited anxiety about a required change in business practice - or workflow - and the transaction costs of reorienting staff to a new system.

6.3.2.2. Product capability

The negative responses, especially from PHO participants, indicated a situation where GPs and health sector staff do not fully understand how to use their current systems most effectively. Examples were provided of PMS functionality, for example, which was designed to increase efficiency and save time but users simply had no proficiency in their use. However, responses also suggested that part of the aggressive pricing strategy from some vendors encompasses what are perceived as prohibitive charges to hold training seminars, and have their customers really get the most from a product. Such costs are proportionally very expensive for individual practices, and examples were given of PHOs organising training sessions themselves or occasionally spreading the costs amongst members of their networks. Many of these concerns have been reiterated in a 2016 review of the PMS landscape, which highlighted a need for better channels to access training and increase capability with a given product (Patients First, 2016a). It was also noted that, in the best case scenario, system training and orientation demands time away from core work which many individual GP owner-operators, or practice managers, are reluctant to endorse.

6.3.2.3. Sector capability

Somewhat related to the previous item, this refers to how commercial activity, such as procurement or tendering, is conducted when it comes to health information systems. PHO sector participants provided several examples of where a PMS vendor had designed their product specifically to make direct access to the data held within it extremely difficult. There was a general sense that dominant vendors had been exploiting their incumbent positions. Whereas vendor activity was couched in terms of being ‘aggressive’ - or “having us over a barrel” - several responses from the sector indicated that the centre should be taking firmer action and pointing out a very clear pathway. In terms of sector capability, responses from those engaged at the centre felt that it was a lack of commercial fluency and leadership that has led to this situation.

All things being equal, it would be perfectly feasible to insist during contract negotiations that there are no issues with direct access to data in a PMS, and that the product adheres to a range of standards to ensure its full interoperability with other systems. That this has not been done, and arguably has now increased the dominance of incumbent vendors, is reflective of a lack of leadership within the health sector according to those responses from people at the centre. Nevertheless, there does appear to be real confusion or, at least, significant fragmentation and lack of coordination, around procurement activity within the health sector. This is of course linked with the structure of that system itself, and how decentralisation to regions, and the decision-making power of PHOs, has increased fragmentation and led to a stretching of health IT commercial expertise that was perhaps already thin on the ground. There have been high profile IT failures in New Zealand, perhaps the most well known being a school payroll replacement system called Novopay. Analysis published by the Office of the Auditor-General cited technical reviews, and a Ministerial Inquiry, demonstrating that weak governance and weak leadership were key factors contributing to Novopay's failure (Controller and Auditor-General, 2014). There is thus an overlap here with the notion of leadership, which is discussed more fully in section 6.6.

6.3.2.4. Vendor incentives

Several participants believed that there were no incentives for PMS vendors to promote an interoperability agenda - in fact, there are only disbenefits. Coiera (2009) has written about how data standards have been used effectively in Australia; many participants understood this and reflected that there are no purely technical issues with achieving the interoperability goal. Literature from the US similarly notes that the most common health IT systems do not easily permit data interchange, and President's Council of Advisors on Science and Technology (2010) noted this as a key barrier to both health IT innovation, and facilitation of a dynamic market. The fact is that vendors have no *commercial interest* in facilitating interoperability. There have been direct calls, critical of the NHITBs approach, for more incentivising of the private sector within New Zealand (Jackson, 2012). One participant felt that standards would only make vendor dependence more difficult and, as such, were not likely to be promoted by the vendors themselves. An example was provided of a tool designed to significantly ease the process of transferring patient records from one system or practice to another (Patients First, 2016b). This was very positively referred to by several individuals in terms of its utility. However, an informant noted that their PMS vendor had subsequently restricted how it interoperates with their product, such that only one record at a time could be processed. This removes the potential for the tool to effectively permit a 'bulk transfer' of patient information across the sector.

All of the above items, therefore, contrive to form what is perceived by participants as a dependence on vendors, or their systems. The broad tone from PHO participants in particular was one of frustration, and feeling as though there was a significant power imbalance in their relationship with vendors. Knight highlights frustration in Australia around the "apparent indifference of software vendors" (2008, p. 498). However, a 2016 review of the PMS landscape identified that the four PMS vendors operating in New Zealand actually have a relatively high workload and are required to strike a difficult balance between maintaining their products, and continually improving and upgrading them to reflect compliance and regulatory requirements (Patients First, 2016a).

Despite this, another participant also raised the point that *all* parts of the health system in fact hold their own vested interests. Whether it is a DHB, an individual GP or the MOH, each has their own agendas to pursue and we should weigh this against the vested interests of vendors, which are perhaps easier to feel cynical about. Whilst this is superficially true, any part of the sector above the level of an individual provider must either be a non-profit or crown entity. But this point is interesting. It reveals more of the political complexity across the health. If technology is not the issue, then this surely must be a big factor in why we are not making greater progress with an interoperable health information ecosystem.

6.4. Funding

The issue of funding came up repeatedly throughout the interviews. It can be seen in figure 5.3 that all but one interview participant referred to funding as an issue, with respect to progress made toward the interoperability goal. Similarly, figure 5.4 shows that, of all coded references, funding takes fourth place with 38 references. It is therefore certainly a key issue, as far as participants are concerned, and their comments on this issue revealed that it has two main dimensions.

The first relates to the amount of funding being allocated directly to support the interoperability policy goal. 68% of responses coded against this node indicated that there is not sufficient funding, or sufficient incentive, under the health funding model. Internationally, other jurisdictions have made explicit efforts to fund IT development in healthcare, in Australia via the use of Practice Incentive Payments (Australian Medical Workforce Advisory Committee, 2005), and in the US via the federal incentives schemes rolled out under the 'meaningful use' framework (The Office of the National Coordinator for Health Information Technology, 2013), which provides some US$20bn of funding to incentivise EHR adoption (President's Council of Advisors on Science and Technology, 2010). It should also be noted that, in the US, meeting 'meaningful use' standards explicitly requires funders to consider questions around interoperability and data interchange standards. Whereas some participants pointed out how, at one stage, New Zealand could be considered a world leader on the move to 'digitise' healthcare, they also pointed out that what is perceived as underinvestment since that time has left New Zealand lagging behind. There certainly is credence in the former claim - in 2003 an Australian research report noted that New Zealand was "clearly well ahead ... in its implementation and use of electronic health records in primary care" (Controller and Auditor-General, 2006, para. 5.6).

The second relates to the setup and structure of the health care funding model within New Zealand and to what extent that might incentivise moves toward interoperability. This asks the question - *what is the selling point to policy actors, to get them behind this goal?* A majority of responses coded against this item (68%) reflected a feeling that there is not sufficient incentive within the sector for people to unite behind this goal. One critique was that no 'burning platform' had been identified to front line practitioners. As already discussed in section 6.3.2, there are prohibitive transaction costs associated with moving to a new healthcare IT system. The value proposition to take action on this has, according to interviewees, not yet been fully articulated.

Aggravating this is the notion, discussed in section 6.5, that there is tangible value in the data that primary health care practitioners store on their patients. This takes two forms. The first is the actual capital value associated with selling a GP practice as a going concern; several interviewees referred to patient data as an ‘asset’ which could form part of the valuation of a business during a change of ownership. Secondly, it was thought that retaining exclusive ownership over patient data evaded the possibility that broader analyses might be undertaken and result in an unfavourable outcome for that practice. One hypothetical example provided was where health sector interoperability and widespread data sharing was achieved. This, according to the example, resulted in an analysis of service provision to patients experiencing specified chronic conditions, and their clinical outcomes. Such information could then be used to identify opportunities for contracting, tendering or full privatisation which would inevitably be to the detriment of the GP - in terms of utilisation of their services, associated revenue and, arguably, quality of care. Put simply, interoperability could enable a situation where general practice loses funding and revenue. What is the incentive for policy actors to facilitate that?

This perspective is firmly rooted in the funding model for primary care, where approximately half of primary care revenue comes from capitation. Central funding is allocated to Vote Health by government, which is then disbursed by the MOH to DHBs, utilising a non-transparent funding formula (Penno and Gauld, 2013), which is subsequently allocated to PHOs based on their enrolled population. Therefore, to be clear, around half of a GPs income is derived from patients physically attending a clinic (Howell, 2005). Responses relating to this ‘funding’ issue all touched specifically on this funding model, and how it provides very little incentive for custodians of patient data in primary care to willingly open the way to interoperability. There are many components of this; a full discussion of which is outside the scope of this paper. But the conflict arises from the view that the funding model incentivises the wrong things.

If half of a GPs revenue comes from patient co-payments on attending clinic, there can sensibly be no clear incentive to actually keep patients well. This is aggravated further by a strong sense, mostly evinced from PHO participants, that any purported ‘system benefits’ to keeping patients well are accrued only in the hospital context. Primary care will only see a drop in revenue. This perspective has also been noted in the US, where the economic disincentives that providers experience under a fee-for-service model are a major barrier to health IT uptake and innovation (President’s Council of Advisors on Science and Technology, 2010). Participants speaking on this topic from the centre exhibited a more market-driven nuance that, if patients stop turning up at a clinic, GPs will be forced to change their service delivery model. However, that demand-focused perspective can only be true in the long run and, in any case, patient demand would only behave in such a way as a response to levers pulled at the centre.

What is revealed here, however, is a distinct gap between different components of the sector. There is an identifiable 'them and us' approach exhibited by participants from both PHOs, and the centre. In fact, this was reinforced by one participant who noted that there is simply a basic lack of trust between funder (DHB) and provider (the PHO and broader primary care sector). It was felt that the power balance in that relationship is skewed heavily towards the funder, and consequently, little in the way of trust on which further work around interoperability, or even basic data sharing, can be built. It was also noted that this was in direct contrast to the very strong trust relationship between a patient and a provider, and this appears to support some of the views noted in section 6.2 which favoured a decentralised approach.

6.5. Knowledge is power

The vital link between the two concepts of knowledge and power was a key feature of the work of Michel Foucault, who brought them together as *le savoir-pouvoir* (Foucault, 1977). Freire also encompassed this knowledge-power neologism, in his work on Critical Pedagogy; a class-based analysis where those without knowledge are 'the colonized', or 'the oppressed', and those holding knowledge are 'the colonizer' (Freire, 2006). This clearly posits that groups holding knowledge that is not available to others, have power over them. Illich (2012) picks up this argument, and writes scathingly about the institutionalisation which disempowers individuals, and is grounded in the power of the 'colonizer' - "... the US poor can count ... on a doctor to assign them to a hospital bed ... But such care only makes them dependent on more treatment, and renders them increasingly incapable of organizing their own lives around their own experiences and resources within their own communities" (Illich, 2012, p. 4). The specific application of this concept in the healthcare context is about how it more colloquially indicates circumstances where control over information can provide a strategic advantage, or the strategic avoidance of *disadvantage*.

Whilst writers such as Illich and Freire conceptualise this issue very much in terms of a broad societal power dynamic, it filters through to our current topic in the way that a professional body (in the case of GPs), or an entire *component* of the public sector (in the case of the health system at large, traversing primary and secondary care), has control over the information of individuals. Interviewees certainly described the 'knowledge is power' issue in pejorative terms, and agreed that control of health data formed an antiquated model of information gate-keeping. This is reflected in some of the broader literature. For example, Greco (1999) has noted in a business context that democratising knowledge is only a modern concept, distinct from more traditional approaches where safeguarding knowledge was almost a precondition to the acquisition of power. That article also noted that breaking this culture down is particularly difficult where there are ‘turf wars’. Newnham has written about the professional divide between midwifery and medicine in Australia; one where midwifery knowledge is seen to be subjugated by a medical discourse made dominant by its “access to objective and scientific knowledge” (2014, p. 264).

There are several nuances as to how this concept has been perceived as a ‘block’ to interoperability by interviewees, however, and each of these will be discussed in turn. It is important to note too that, of all seven participants making such references, four have backgrounds as physicians.

6.5.1. Knowledge as a business model

The health system in New Zealand, and in many other jurisdictions, positions General Practitioners as a central hub for health-related activity. A GP can make a referral to hospital for access to specialist services; she can order blood tests, or other diagnostic exams. In most cases, information relating to these encounters are accessed via the GP. Until patients can access their information directly - something that has been one of the NHITB’s objectives (National Health IT Board, 2013) - this information must be taken from the general pratice computer system and conveyed to the individual. Since primary care encounters generally attract a fee, access to health information can therefore be an implicit part of the business model - if patients can access all their health information themselves, the fee for service does not apply and thus represents an opportunity cost to primary care. Interviewees noted that, whilst such a business model is not desirable, it almost certainly is not one that has developed by design but is more an unconsciously assumed position. Nevertheless, this issue is reflected in the broader literature where anxiety around business models has been noted as a key inhibitor of technology adoption in general (Debreceny et al., 2002). All interviewees strongly advocated for empowering patients with information; their comments here therefore reflecting more about the *culture* and *business process change* that will be required to effect that.

Interviewees, at the same time, agreed that other constituent parts of the health sector had not kept pace, or alignment, with these developments. One example was about how the funding model actually encourages the fee for service approach, which more readily leads to viewing direct patient access to information as an *opportunity cost*. If patients have access to information themselves, not only might this result in the fee for service model generating less direct revenue for a GP; it might lead to an increased demand for multiple brief phone or email consults, which many primary care providers are not yet ready to offer.

6.5.2. Defending autonomy

Another dimension to this issue was how open information exchange might lead to scrutiny of individuals; in this case, antipathy to interoperability derives from an anxiety that sharing information will be used to critique, become involved in or, worse, performance manage the practice of individual GPs. In many respects, then, this is about a defense of professional autonomy.

Interviewees generally conceptualised this in terms of a central agency interpreting primary care data incorrectly, and using it without proper authority to feed back unnecessarily. Worse, specific concerns were raised at the prospect of such data being presented to wider groups and inferring that the performance of individual clinics could be improved. This is all about a fear of 'interference' and links clearly to the concept raised in the following section around how a group can gain dominance and power. In New Zealand's decentralised health system, there may be anxiety that interoperability is simply the thin end of the centralisation wedge. Knight et al. note that "decentralised structures are seen to resist redistribution of responsibilities towards centralised control" (2008, p. 493). Other researchers in the technology field have similarly noted that even a perceived impact on autonomy, of any kind, is likely to inhibit adoption (Bayless, 1996, Edwards et al., 2002, Swan and Newell, 1996). In this literature, there are two key messages. One is that - irrespective of the efficacy of the actual product or initiative in question - it is individuals' *perception* of the outcome that can easily lead to non-engagement. The second is that resistance, or adoption, is very much a product of the alignment between this perceived outcome and an individuals goals, skills or values. This provides a nice link back to Matland's matrix, where the issues of alignment and conflict are highlighted.

6.5.3. Professional legitimacy

This notion touches on the idea that professional gravitas can be attributed where there is 'secret knowledge' or, at least, there is information that can only be obtained by going through an individual - in this case, a GP. Interviewees utilised terms such as 'priesthood' to suggest that being a critical and vital part of the patients healthcare experience, lends a certain mystique to their practice which translates to professional credibility, integrity and thus raises the profile of that profession. Indeed some writers have portrayed the medical profession in exactly these terms:

> The judge determines what is legal and who is guilty. The priest declares what is holy and who has broken a taboo. The physician decides what is a symptom and who is sick (Illich, 1976, p. 38-39).

Newnham has similarly noted that, what is referred to as a 'dominant medical discourse', ultimately "positions the profession in such a way as to be able to claim professional jurisdiction over midwifery access and practice" (Newnham, 2014, p. 264) and therefore maintains the entire profession in a position of power.

Again, it was noted that such comments from interviewees were made in a scathing manner; as if to suggest that the notion of being part of a medical 'priesthood' is particularly important to some practitioners, and they would therefore see systems interoperability, and its attendant federation of patient information, as a threat to that. The work of Knight et al., surveying attitudes of Australian GPs to adoption of technology and data sharing, found that all interviewees saw themselves as "dispensers of complex health knowledge that was irreplaceable by technology or other disciplines in medicine" (2008, p. 499). Brown (2015) (Chair of a British local Medical Committee), conducted a survey highlighting the demands on GPs - ostensibly intending to debunk the 'priesthood' argument by demonstrating the quantum of vexatious patient consultations. This has itself been criticised, however, as an inevitable consequence of the 'priesthood' approach apparently taken by some practitioners - "it is ironic that, having set themselves up over the past few decades as a moral authority ... the medical profession now objects to being treated like secular priests" (Walsh, 2015, para. 4). This highlights yet another nuance in this debate, which is around the perception of the public. Even whilst "policy makers question the need for gatekeepers and disparage the term as belonging to an old debate" (Knight et al., 2008, p. 492), it may well be that many patients are in fact very happy with this approach and thus, for them, the "old debate" actually embodies many factors which could be more supportive of their health and wellbeing.

Whilst GPs have been found to align their willingness to adopt technology/innovation with its perceived potential for direct or indirect benefit for patient outcomes, this is also very much inhibited by "the need to defend against any perceived threat to their professional role" (Knight et al., 2008, p. 499).

6.6. Leadership

In a 2012 review of public sector IT projects, the Office of the Auditor-General (OAG) compiled 'key lessons' - two of which were to ensure there is strong leadership and senior-level support, as well as working effectively with users and stakeholders (Office of the Auditor-General, 2012). This raises the profile of leadership as an issue in health IT implementation, and in response to the current research question. Furthermore, its importance in the healthcare context is noted in a previous OAG audit which found, when reviewing progress against the 2001 WAVE report, that "some difficulties have been encountered around effectiveness of leadership and clarity of responsibilities" (Office of the Auditor-General, 2006, p. 12).

The issue of leadership featured heavily in the interviews; figure 5.3 shows it in joint second position, and figure 5.4 shows it again in second position - with only the ‘vendor’ issue (discussed in section 6.3.2) ranking more highly. Since the health sector is so varied and complex, leadership can take different forms and operate in different ways. Responses coded against this node encompassed two key issues. Firstly, that of how sector leadership works positively to generate interest and buy-in to a policy direction; this reflects Matland’s argument that centrally-devised policies can only be successfully implemented by *local* policy actors (Matland, 1995). Secondly, there is the broader issue of the policy direction that is being set, and how assertively that is being done. Several interviewees reflected almost a desire for unilateral action from the centre around policy direction and implementation, and yet the literature has shown that approach to be correlated with failure (Office of the Auditor-General, 2006, 2012).

6.6.1. Generating buy-in

The issue of buy-in appears to be a particular problem in the Auckland region, since several interviewees felt that the value proposition to change the health information landscape in any significant way had simply not been articulated. It was thought that there is little incentive for providers or vendors to do anything that would change the *status quo*. Interviewees commenting on this issue felt also that there is a lack of buy-in particularly at Board or executive level, and that this would filter through to the sector and affect the extent to which there is policy clarity (Matland, 1995). The biggest component of the leadership challenge is, in one participant’s view, “people, and getting them lined up”.

Based on the views of those representing the centre, this was very much a priority. These participants stressed the importance of clinical engagement and, indeed, a focus of the NHITB’s work has been around sector engagement and collaboration. Those representing the centre, however, noted what was perceived as a lack of clinical leadership in the IT space; that is, the gap between the technical and non-technical parts of the sector has not yet been bridged by strong *clinical* leadership. Different reasons for this were posited, the most telling of which was that - even where highly IT-literate clinical leaders advocated for change - they often did so from relatively isolated positions within component parts of the sector. It remains a simple fact that it is up to individual GPs, or in some cases the PHOs of which they are a member, to make a change and, since there is no identifiable ‘burning platform’, they are unlikely to do so without tangible incentives.

The issue of buy-in becomes particularly interesting when we consider the tension between a positive engagement and consultation approach, and the interview responses which questioned the absence of a unilateral and mandatory policy approach. This tension appeared to be very much relative to the position of the respondent. For example, advocates of both centralised and decentralised approaches (see section 6.2) noted that a much clearer direction for health information should have been *imposed* from the centre. However, the specifics of that direction should align with their own preferences, the implication here being that there is frustration around the possibility of aligning parts of the sector around a single direction and its implementation. Similarly, GPs insist that their professional autonomy remain, but strong leadership should be exerted in the vendor space. Some participants who did not align with one particular implementation approach over another, however, still felt that the centre could be bolder in its policy-making.

This point was reflected by several participants who felt that the more *laissez-faire* approach adopted by the NHITB, of setting a high level policy direction and encouraging the sector to work its own way towards it, was not productive precisely because of the buy-in issue - which is itself felt to be a by-product of a lack of incentives (discussed in section 6.3.2). Whilst there is widespread agreement that leadership is a key factor, the calls for more assertive and unilateral action from the centre seem to be grounded in frustration at a lack of progress resulting from the complexity of the sector itself, and the debates which continue around implementation approaches.

6.6.2. Policy leadership

As already noted, participants felt strongly that the NHITB have adopted an approach of setting high-level policy directions and encouraging the sector to move towards them. Several indicated that there was further opportunity for the NHITB, and the centre, to steer the sector more forcefully in particular directions.

Firstly, a general sentiment arose from the interviews which described the kind of ‘burning platform’ that the same participants felt has been absent from the debate (as discussed in section 6.6.1). This is the fact that there is a very straightforward need to quickly and easily access data from across the whole sector, in order to achieve optimal patient care. Participants provided examples of patients accessing different health services in differing circumstances at different times, and the fact that there is significant potential for important information to fall between the gaps - particularly in an acute situation requiring rapid decision-making. That this did not constitute the ‘burning platform’ that participants referred to when discussing incentives, or buy-in, indicates that clearly the correct incentives have not been made available. At best, it is possible to imagine that in a highly devolved system such as New Zealand (Gauld, 2006) it is only natural that practitioners prioritise what is within their own immediate jurisdiction. It was considered by participants that this myopia could be addressed by policy leadership from the centre around the structure of the health system or, at least, formally providing incentives for components of the sector to work more closely together. This overlaps with the node ‘System’, shown in figure 5.4 with the third highest number of references across all interviews (although only five participants referred to it specifically).

These references to ‘System’ were generally negative, and pointed to the fact that, because the New Zealand health system is relatively devolved, we accordingly have more stakeholders with which to engage. It was thought, on one hand, very positive that a DHB could understand the health needs of its population, and plan accordingly. Conversely, in the Auckland metropolitan region there are three DHBs and it is difficult to see where the incentives for collaboration might be if the CEO of each has a radically different approach to structuring, planning and providing services. When the devolution through the primary care structure is also considered - encompassing PHOs and all their individual members - it is easy to empathise with one participant who concluded that “the capacity for national coordination is really constrained”. Interview participants representative of the centre felt, similarly, that Auckland does not *think as a region* in terms of its health service provision, and therefore opportunities to innovate and improve are being missed.

A more specific area of policy leadership which participants felt had been foregone, is that of enforcing data standards. Although this issue is dealt with more fully in section 6.9, several participants indicated that effective policy leadership around standards could have advanced the interoperability policy agenda considerably. For example, a key component of accessing EHR incentive funding in the US is that systems must meet certain criteria to do with standards and interoperability. An incentive system was overlaid, and the result has been a massive uptake in EHR systems (Henry et al., 2016), although the causal relationship between incentives and uptake has been questioned (Mennemeyer et al., 2015). The high level policy setting in New Zealand has not been as explicit around data or information exchange standards, and this has simply resulted in more fragmentation. Ironically, participants commenting on this felt that it is the absence of a strong policy agenda around standards that has facilitated the vendor issues discussed in section 6.3.2.

6.7. Privacy

As we start to rely more and more on electronic tools, the potential for breaches of privacy becomes greater. In New Zealand, high profile breaches have occurred and are thought to have made the public wary about the safety of their data. This appears to be validated by the Office of the Privacy Commissioner which noted in its Annual Report that it had dealt with 121 *voluntary* data breach notifications in 2015, 71 of which occurred in the public sector (Office of the Privacy Commissioner, 2015). Since privacy can be such an emotive issue, it is interesting to understand people’s perception of it; as one representative from the centre noted, it only takes one privacy-related incident to lose a significant amount of trust. Another PHO-based participant portrayed their perception of privacy by indicating their awareness of multiple data breaches in the hospital sector, but none arising directly from within the primary care sector.

Although not featuring in either figure 5.3 or figure 5.4, privacy is included here by virtue of how it overlaps with other key issues. Whilst some participants felt strongly about privacy as an issue in its own right, it was mostly discussed in the context of other issues such as relationships or trust. Other literature has placed a much greater emphasis on privacy being a barrier to health IT innovation. President's Council of Advisors on Science and Technology for example note that "legitimate patient concerns about privacy and security make patients uneasy about participating in health IT systems or granting consent for their information to be used"(2010, p. 2). In New Zealand, the special factors pertaining to information privacy in the healthcare context are reflected in the existence of a stand-alone 'Health Information Privacy Code' - a code of practice issued under s.46 of the Privacy Act 1993.

It is interesting however to note that none of the concerns raised in this area are to do with what are perhaps the more traditional topics around privacy - such as whether the information in a given system is actually *secure* from an outside threat. These issues have received media attention, specific healthcare-related issues being where external hackers are increasingly targeting health systems (Botezatu, 2016), and the extent of password misuse in hospital settings (Koppel et al., 2016). Two themes emerging from participant responses have been identified and will be discussed in turn.

6.7.1. The privacy smokescreen

Whilst acknowledging the importance of upholding patient privacy and confidentiality, three participants - each representing different parts of the sector - did not believe that privacy is itself a barrier to interoperability. This aligns very much with the 'technology is not the problem' theme identified in section §5.3. All participants taking this view felt that there were sufficient tools, technologies and regulation in place to safeguard privacy adequately. What they added, however, was that privacy can be a powerful argument when one is resistant to change - and one that can be understandably difficult to rebut. In this way, discussion centred around how individual GPs may be suspicious enough of interoperability to utilise patient privacy as a reason why it should not occur - or, at least, to significantly slow the pace of that agenda.

Participants referring to this issue did - it should be noted - refer to specific examples where information *had* been misused. These examples did not constitute a formal breach of privacy, but occurred in circumstances where information was shared across agencies in good faith and was not used for its intended purpose. This particular example was repeated by several other participants. A participant representing the centre also noted accordingly that the Auckland region seems to have relatively greater anxiety around privacy and confidentiality than other regions, and this was viewed as a leadership issue that the Auckland region must address. This participant's view was that only one privacy breach is required for the entire sector to lose faith in an initiative. This goes some way to explaining the care and attention paid to sector engagement by the NHITB, which others have interpreted negatively as a lack of leadership (as discussed in section 6.6).

The other component to the 'smokescreen' is the issue of the sancrosanct relationship between patient and GP. I have already discussed, in section 6.5, some aspects of how professional autonomy can be used as an obstacle. However some participants noted that, in similar fashion, the patient-GP relationship can be put on a pedestal and combined with the importance of privacy to construct a formidable barrier to health information innovation and interoperability.

6.7.2. Privacy versus innovation

Some participants identified what is thought to be an inherent tension between privacy and the ability to innovate within the New Zealand health system. The ultimate expression of a fully interoperable health information system would be where multiple providers were able to directly access patient information. Several participants pointed to a proposal to enable community pharmacist access to primary care systems. In the absence of a security matrix, and any required amendments to privacy regulation, it is easy to say (and several participants did) that such initiatives are contrary to the HIPC since the information is not being utilised for the purpose for which it was collected. The HIPC encompasses a wide range of health service providers, and rules on their collection and usage of health information on identifiable individuals. The Office of the Privacy Commissioner clarifies under Rule 10 that "agencies must use health information for the same purpose for which they obtained that information" (Office of the Privacy Commissioner, 2013, p. 2). The question thus becomes for a provider, for example a GP, am I using health information *for the same purpose for which it was collected,* when I share patient records with a community pharmacist?

Two PHO representatives were extremely anxious about such an initiative, and considered that patients would be unhappy with this type of data sharing. Two other participants took a more pragmatic approach and felt that this is exactly the kind of thing that needs to occur. Although the precise wording of enrolment forms vary by PHO, guidance information prepared for patients by the MOH specifies that "when you enrol with a PHO, your health information is held by your health service or GP. To ensure you get the best possible health care, your GP or nurse may send some of your health information to other health professionals who are directly involved in your health care" (Ministry of Health, 2014, p. 1). Participants commenting on this issue questioned whether patients would be informed enough to know exactly who might fall under this category - it could legitimately be expected to include a cardiologist or oncologist, for example. However a health professional involved in someone's health care could also technically include a physiotherapist or a community pharmacist.

Discussion on this issue began to overlap with that of 'knowledge is power' (see section 6.5). Those opposed to the present example of sharing data with pharmacists invoked this in two different ways. Firstly, they expressed suspicion that this agenda was in fact being advanced by pharmacists themselves as an attempt to acquire access to patient data, and thus a kind of professional legitimacy. Ironically it was those same participants who, secondly, believed that information sharing with hospital specialists was somehow more legitimate than with pharmacists. It was not clear to me whether this implicit support for a health system hierarchy, with medicine at its apex, was intentional or did simply reflect genuine concern around proper management of information which was felt to be more difficult in a community pharmacy context.

6.8. Relationships and trust

The issue of relationships and trust, and its force as a brake on interoperability and innovation, was one of the more noticeable themes arising from the interviews. This is perhaps because I had not anticipated it to be such a notable issue since my original focus was a more technical one. Originally, coding was done against two separate nodes but they have been combined together here as two components of the same broader issue. Put together, there were a total of 62 references to 'relationships and trust' during the interviews - making it the most referenced issue.

Having begun the literature review, the prevalence of this issue should not have surprised me; in defining successful policy implementation, several authors have highlighted the importance of the local context, local interpretation and having a broad agreement on objectives (Buse et al., 2005, Matland, 1995, Powell et al., 2009). Conversely, a key *barrier* to successful implementation is where a 'top down' approach is utilised in a context where there is no single agency who can mandate action across the constituent parts of a given sector (Hunter, 2003). We have already noted that the New Zealand health sector is relatively devolved and fragmented (Gauld, 2006), and interview participants have questioned the ability of the centre to exert any formal control. This section, then, will discuss each of the key issues related to 'relationships and trust' - as identified by participants - in turn.

6.8.1. The missing value proposition

Several participants noted that the 'value proposition' for interoperablity has simply not been articulated. Whilst this does not necessarily have to indicate an issue about trust or relationships, responses indicated that it is significantly aggravated by the silos existing within the health system. People speaking from positions within primary care, particularly, felt that there were power dynamics which did affect relationships across the sector.

One participant noted very matter-of-factly that they felt there was a power imbalance between funder and provider - in this case, between the DHB and PHO. This was reinforced further by another participant who described some frustration that there is a clear system of ethical redress between a health professional and their patient; but *not* between funder and provider. I sensed a theme from primary care-based participants that they felt as though *sharing* or *integration* was a one-way affair and tended only to benefit a single part of the system. I have already noted, in section 6.4, a feeling that benefits of integration - operational, financial, or otherwise - will tend to accrue at the DHB, but will only *harm* those in primary care.

Primary care participants seemed to speak emotively of relationships they regularly hear about, or experience, which are often patient-provider and which are based on high levels of trust and collaboration. Patients have clear expectations of their healthcare provider, it was thought, but the same kinds of clarity or alignment are not replicated across the different components of the health system. This was reflected very simply by a PHO representative who noted the very extensive work they had to undertake to *gain the trust of their GP members;* the implication being that there is still much work to be done on building effective trust models between GP and DHB, or PHO and DHB.

So, a value proposition to move people towards interoperability has not yet been articulated and, furthermore, it appears as though any such proposition would be met with some scepticism within different parts of the sector around exactly who would benefit. When it comes to a piece of work that could broadly be categorised as an ‘IT project’, people described IT projects they had been involved in where apparently unilateral decisions were made by the funder around how they would be implemented. These experiences are aggravated by some of the existing power issues touched upon in this section, and raise the profile of trust as a barrier.

6.8.2. Fear of performance management

Also noted in section 6.5, there is a distinct lack of trust evident in the fact that the interoperability proposal, ostensibly to provide much richer data to health professionals, has been met with suspicion around how the data will be utilised. This very much overlaps with the ‘power imbalance’ issue noted in the preceding section; an anxiety was expressed by primary care-based participants that data could be used by DHBs to manage the performance of PHOs or individual GPs. Assuming that this might be a widely-held suspicion across the primary care sector at large, it is easy to imagine that any value proposition would have to either be extremely weighty, or very well articulated, or preferably both.

Participants from two different Auckland PHOs separately noted an example of improper use of data that had been shared amongst PHOs, and with the DHB, to compare the performance of individual providers. That this specific example was still being remembered, indicates how damaging a single incident can be to trust levels within the sector and - perhaps more importantly - that the PHOs do not feel as if any major progress has been made on developing trust since that time.

6.8.3. Technology is not a barrier, but it's also not the solution

Several interview participants noted that there is no *purely technical* impediment to even the most ambitious level of interoperability; the difficulty tends to be more of a political nature, overlaid with many of the issues I have already covered in this chapter. Interestingly, however, it is also the case that if technology is not the barrier, it is also not the solution. This point was raised by interview participants to indicate that no amount of technical wizardry can supplant an absence of trust between stakeholders. The same applies to organisational structures, legislation, and other components that might contribute to making interoperability happen. The message was quite clear that everything must start from a position of trust.

Participants noted that, over time, various new technological innovations have become available and people have utilised them to galvanise goodwill across the health sector. However, they remain - particularly so in primary care - sceptical about these, and appear to default to a position of asking who actually benefits from such initiatives.

6.8.4. Trust in the data

Trust does not only have to be an issue between people, or groups of people. Interoperability imagines a constant to and fro of information being accessible on demand. However, it was reflected by participants, that this does not necessarily mean a particular health professional will trust a particular piece of health information. An example provided was where a patient might arrive acutely unwell at the Emergency Department. The treating clinician may have access to some very up to date diagnostic test results performed elsewhere. However, participants felt it would tend to be in their nature to repeat those tests anyway, probably because they would only feel assured if they had ordered or performed the tests themselves. Of course there will be perfectly valid clinical reasons not to rely on other information, but participants were highlighting more of a cultural issue where, if the exact provenance of a piece of information cannot be assured, there will automatically be some kind of doubt about its accuracy. It is easy to imagine that the training of health professionals will focus on the elimination of risk and doubt, wherever possible, when making a diagnosis and decision-making around treatment.

No one is suggesting, of course, that because information might be available it must be used.

However, one could also argue that the operational efficiencies promised by interoperable health information are somewhat mitigated if the data being shared is only ‘nice to have’.

6.8.5. How does the health system structure facilitate trust?

The final point to raise under the banner of trust or relationships, is the influence of how the health system itself is structured - not only generally, at a national level, but more locally at the regional level. As indicated in chapter 5, interview comments were coded against the node ‘system’ where discussion touched on the structure and organisation of the health sector in New Zealand. Although only five participants did touch on this directly, figure 5.4 places this node as the third most referenced of all. For those people who did mention it, therefore, it appears very much to be an issue linked with perceived barriers to interoperability. Since the majority of those references mentioned ‘system’ in terms of how it influences relationships and trust, I have moved its discussion into this section rather than separate it.

Firstly, it is important to point out that participants did not believe there was a general issue with trust and relationships in the health sector at large. Two participants spoke of the experience at Canterbury DHB, where a high level of system integration is perceived to have occurred. This was thought to be because of two key reasons: a less fragmented local sector with high pre-existing levels of trust, and the ‘burning platform’ resulting from the 2011 Christchurch earthquake. By comparison, the relationships and trust within the Auckland metropolitan region were spoken of very negatively by participants, one describing the situation as “absolutely appalling”. Importantly, the primary care-based participants who spoke of this negatively did so only when referring to their relationship with the DHB; none did so in relation to their counterparts at other PHOs. This appears to reinforce the issue highlighted in section 6.8.1, which focused on the ‘funder-provider’ component of that relationship.

Picking up on a point made there, one participant suggested that it is the types of relationship which influence levels of trust. For example, a patient-doctor relationship is very direct and trust can be more easily built. More indirect, or perhaps less face to face, relationships - such as those between funder and provider - were thought to be more open to mistrust, or simply a lack of alignment and understanding. Having a system structure with multiple PHOs was thought to make trust that much harder to develop and maintain, particularly when overlaid with the perceptions of power imbalance I have already noted in section 6.8.1.

Further references to how the system might facilitate trust, or not, suggested that it is actually the ‘proliferation’ of DHBs that is compounding some of the issues I have noted above. Given that each one of twenty DHBs is accountable to their own Board, the MOH, and continually attempting to live within their means, it is easy to imagine that regional - or broader - initiatives are considered only after the most pressing local issues. Participants considered that this part of the system is not optimal, and does not necessarily encourage relationship-building. Devolving power in this way, to twenty separate governance and funding structures, was linked to perceived constraints on the power of the centre to influence the sector in any meaningful way.

6.9. Standards

Standards were a strong theme throughout the interviews; references were coded against this node when they referred to technical information interchange standards which were thought to be relevant to the discussion on barriers to interoperability. The tables shown in section §5.4 show this issue was joint third based on the number of participants who referred to it, and seventh based on the total number of comments made referring to it. The centrality of standards to this debate is a tricky one, since standards are a more technical component which govern exactly how we store and share data at its lowest level (e.g. the specific database it might reside in, or the specific technical mechanism by which a record is accessed by other systems). In this way, the issue is a little more 'niche' than some of the others I have already discussed. It is also important to note that I had, by virtue of this, anticipated that standards would be raised as an issue by only a relatively small subset of participants - those involved in more technical and 'hands on' roles. The fact that it nevertheless ended up being one of the largest issues is therefore quite surprising, although it is also possible that there was some bias on my part in the coding of transcripts.

Standards are, of course, simply an approach to doing something in a specific way; they can be merely advisory, or mandatory. Standards are important in the field of information technology where, for example, developers require some certainty around how an application is built so they know how to build something else that integrates with it exactly as intended. Often, there are commercial factors which make it appealing to restrict the extent to which others can understand and interact with the code or applications you have developed. In the absence of formal and mandatory standards, there is nothing to stop a product being developed in such a way that it will not communicate or interact with anything else that sits outside of it. On the contrary, this could be considered good practice in a commercial space where additional administrative charges could be billed to a customer who wants to extract some extra information from their system, or who requires a specific variant of a report or output of the product. Healthcare is especially vulnerable to this by virtue of many of the issues already raised in this chapter but, specifically, because it generates large amounts of data, and providing high quality healthcare is very often critically dependent on putting that information together to form a complete and accurate picture at a given point in time; it is data rich and, especially, data *hungry*.

In a 2012 review of public sector technology projects, the Office of the Auditor-General noted that key to success in those projects was having *open access to data*, and specifically noted instances where open-source software was used (Office of the Auditor-General, 2012). In the US, the President's Council of Advisors on Science and Technology have praised those initiatives where universal information exchange standards has resulted in new products "that knit together fragmented systems into a unified infrastructure" (2010, p. 1). Use of standards in this way was found to provide a 'network effect' which exponentially increased in value and, importantly, helped to spur adoption. In the Australian context, Coiera (2009) has written about the importance of starting with standards, and incentivising development *around those standards.* We have already seen, in section §2.2, how a failure to take such an approach unravelled a very large-scale health IT implementation in the UK (Greenhalgh and Keen, 2013). This is all to say that the importance of standards to interview participants is certainly reflected in the literature. The interviews encompassed four major points, each of which will now be discussed in turn.

6.9.1. No interoperability without standards

Firstly, some participants reflected a very direct viewpoint that there simply cannot be any interoperability without a focus on standards. All participants who represented either a vendor or a central agency expressed this view, whilst some (but not all) of those working in the primary care sector did also. One participant, representing the centre, noted specifically that having high quality information in a fragmented multi-system environment is absolutely contingent on use of standards. This was interesting because - as we shall see below - participants indicated that the centre should be doing more around mandating use of international standards.

Another participant (a vendor) outlined how New Zealand has come a long way by utilising a particular interchange standard (HL7 v2), but is now at a stage where that must be reviewed and we should have a conversation around the standards that we focus on into the future. This comment reveals another component to the standards debate, which is - *it is counter-productive to work across multiple standards, so which one are we going to converge on?* This then becomes potentially quite complex where particular vendors, or parts of the system, have developed intellectual property around use of a particular standard, and the extent to which a change might impact on their business.

6.9.2. Rebalancing the vendor space

Some participants referred to the importance of standards from the perspective of how it might affect the vendor space. Several interviewees reflected that any kind of standardisation would make the prospect of vendor dependence far more difficult. Therefore, we may expect to see this being favoured by smaller vendors compared with larger ones. In this respect, standards are almost seen as a remedy to the frustrations people seem to have with PMS vendors (as discussed in section 6.3.2). One of the issues proposed is that the New Zealand primary care sector particularly now has such a skewed market in the PMS space - with one or two vendors holding a significant market share - that it will take proportionally much greater effort to implement a move towards open standards. Unfortunately, no PMS vendor representatives took part in the interviews, but it would be useful to balance this debate by seeking their perspective.

Another comment around vendors noted that, in healthcare particularly, it has been common to solve problems by *purchasing products*. This was, implicitly, at the expense of more comprehensive and collaborative problem-solving processes and was thought to have contributed to the systems fragmentation that others reflected. The literature indicates that we should simply incentivise vendors to innovate around clearly defined standards. However, it is also possible that the efficacy of this might rely on a marketplace that is already reasonably dynamic; participants held mixed views about whether or not this is the case, as we have already seen in section 6.3.1.

6.9.3. Leadership

Leadership has already been discussed in its own right, in section 6.6. There is an overlap here with the leadership issue, based on participants' view that setting out an implementation pathway predicated firmly on standards is the responsibility of the centre. It is the perception of interviewees that this has not taken place.

Whilst we have already noted how participants representing the centre appear to be very much behind a standards-centric approach (please see section 6.9.1), those speaking from positions elsewhere in the sector do not have an impression that this has been clearly articulated. The imbalance in the PMS vendor marketplace makes it that much more difficult to now move the system towards a standards-based approach; positions of dominance have already been gained. However, there was a strong feeling from participants - especially those within the primary care space - that standards are really critical and that this can only be driven from the centre through very strong leadership.

Naturally, of course, there is also here an overlap with the issue of funding. Coiera (2009) has noted the importance of *incentivising* vendors to innovate around commonly-agreed standards. This was reflected by participants discussing this issue, who felt that progress would accelerate if the centre tied funding to the adoption of, and adherence to, standards and encouraging the implementation of open APIs, thereby creating the kind of positive network effect that has been praised in the US (President's Council of Advisors on Science and Technology, 2010).

6.9.4. Standards and data quality/utility

In our discussion of standards thus far, we have touched only on the technical frameworks that might govern how we store, use and exchange data in the health sector. There is another key issue, falling under the broad topic of 'standards', which is more about exactly what information we store and how we do it. This has a lot more to do with the patient-facing component of healthcare, and moves the standards debate out of a very technical back room into the foreground.

There are a variety of approaches to storing, coding and categorising health-related information. The most widely used is perhaps the 'International Statistical Classification of Diseases and Related Health Problems' - or the ICD-10 (World Health Organization, 2004). This coding system was developed by the World Health Organisation and is used across a range of health jurisdictions including the UK, the US and Canada. It provides for a very wide range of diagnosis and procedure codes, including *W55.22XA: Struck by cow*, and *V91.07XA: Burn due to water-skis on fire*. There are of course a range of opinions globally on how well a balance has been struck between being comprehensive, and being practically and operationally useful, and this is outside the scope of this paper. Suffice it to say that two interviewees, representing the centre, felt that we needed much better coding standards; and this starts to touch on broader issues since the ICD-10 is utilised in the claiming and reimbursement pathways in different parts of the New Zealand health sector. An issue highlighted with ICD-10 is its lack of flexibility in being able to code clinically useful information. For example, one participant noted that capturing the cognitive function of a frail, elderly person within ICD-10 was not possible and therefore made it "worse than useless".

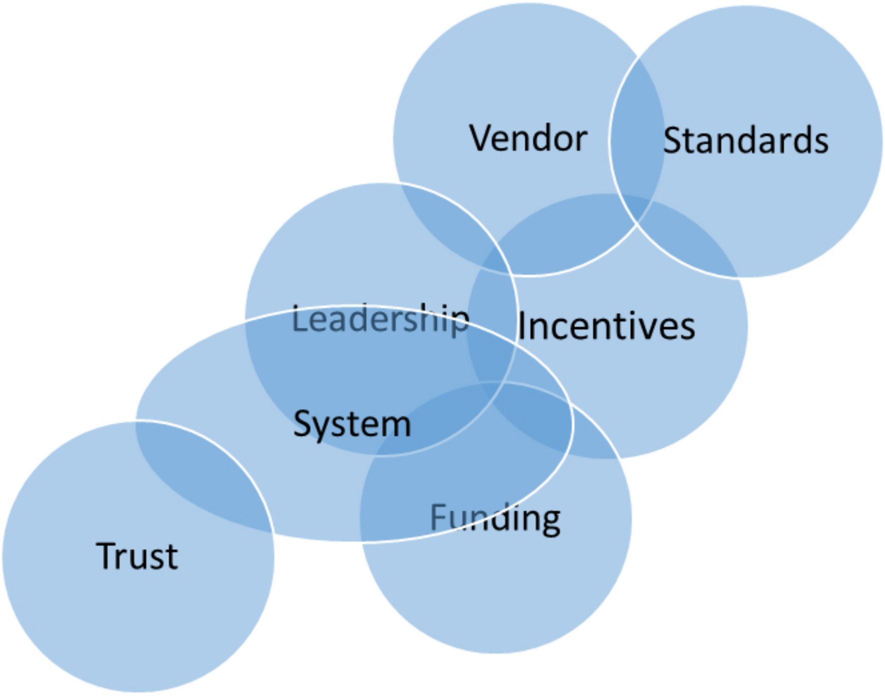
One of the alternatives mentioned is a system called SNOMED, which has been available since 2002. Two participants representing the centre noted that the MOH had in fact purchased rights to utilise SNOMED some years ago, but no progress has been made in spreading its adoption and usage within the sector. SNOMED is thought to have certain advantages by virtue of being designed for use in electronic health record systems, and because it is not grounded in either an administrative or reimbursement/funding paradigm (Bowman, 2005). Although neither system is mutually exclusive - and in fact are designed with quite different purposes in mind - participants who mentioned SNOMED indicated some disappointment that it is not yet more prevalent in the New Zealand health system.

The issue of what we record, and how it is coded, may seem somewhat tangential to the broader issue of interoperability but, given the clear message from interviewees that there is no *technical barrier*, others expressed a position that having high quality information will help to overcome perceived political obstacles and will in any case make the technical work required that much easier.

6.10. Putting it all together

The above sections have endeavoured to make distinct a range of topics which, really, are not so distinct. It became quite apparent whilst coding the transcripts that many themes are dependent on other themes and, in some cases, this dependency can actually operate in either direction. For example, a lack of focus on standards was felt to have resulted in a fragmented product landscape, but this in fact works in *both directions* since participants felt that the influence this has given vendors will now make it that much harder to implement standards. I will now briefly draw these linkages together, and attempt to show how they connect and in which direction the influence flows. To start with, given the complexity of these issues and their interdependence, this is best depicted graphically. The image below shows what I have learned from the research and how these themes and issues connect.

Figure 6.1.: Thematic connections



Please note that the figure above shows only the overlaps and connections between themes - it is not detailed enough to show the *strength* of relationships, and neither is the layout intended to denote anything particular. What we see is simply a broad overview of the following conclusions.

Standards predominantly overlap, in the first instance, with issues related to vendors - in the sense that a lack of enforceable standards has resulted in vendor dominance and vendor dependence, and also in the way that the status of the vendor market may make it difficult to move ahead with enforcing standards. There is furthermore a multi-faceted impact here on the theme of incentives. Vendors (or at least the most powerful incumbents) are not sufficiently motivated to move towards standards, because they already have a profitable market share which a move towards open standards may jeopardise. Furthermore, the sector may feel it will be relatively difficult to move towards standards, given this, and will diminish their enthusiasm to do so. It is here that we see an overlap with the leadership theme.

Participants noted repeatedly (as detailed in section 6.6) that they wished to see some bold policy-setting at the centre to break down this perceived deadlock. The overlap with vendors, seen above, is a product of how a perceived lack of action from the centre has led to a position where there are the types of vendor dependence discussed in section 6.3.2. Leadership is therefore quite central to how incentives are set and promulgated throughout the sector. Naturally, overlapping with both leadership and incentives is the issue of funding. Incentives can of course be merely financial - we discussed in section 6.4 how other jurisdictions have made direct fiscal incentives to encourage greater moves towards interoperability (Australian Medical Workforce Advisory Committee, 2005, The Office of the National Coordinator for Health Information Technology, 2013). It was the perception of several participants that the centre should be using these kinds of levers to incentivise the sector to move towards standards, or to increase market dynamism, or to encourage greater cross-sector sharing and collaboration.

The extent to which the sector *can* be incentivised is largely a product of how the New Zealand health system is configured and structured. I have already noted in section 6.8 the suggestions of a ‘them and us’ conceptualisation, particularly between funder and provider. The sector must think carefully about how that relationship can continue into the future to help us design an integrated health system which thinks explicitly about the whole patient journey, rather than simply the planning needs within its own administrative boundaries. Funding and leadership intersect with the System itself to prompt questions around - *who sets the agenda and the protocols to move us towards interoperability?* More importantly, perhaps, *how does the centre incentivise regional sector health leaders to incentivise the fragmented policy actors within their own jurisdiction?* Relationships and trust, of course, have underpinned a large part of our discussion but appear to me to derive mostly from how our system is configured, and how the benefits and costs of purchaser/provider splits play out amongst a wide range of people who absolutely have to work together.

The above representation is thus not comprehensive, and certainly not intended to accurately represent the entirety of interview responses. However, it helps point us towards the key issues which will be reviewed in chapter 7. Firstly, however, I will briefly return to the discussion in chapter 3 and link the conclusions I draw from this chapter back to the theoretical framework.

6.11. The matrix revisited

I discussed in section §3.4 my intention to assess the findings of the interview process against the Ambiguity-Conflict matrix (Matland, 1995). The reader will recall that this framework calls for a parallel focus across two dimensions, or axes, when analysing the effectiveness of a policy implementation.

Firstly, we turn to 'Policy conflict' which deals with the extent to which multiple agencies, who have a stake in a given policy, are aligned in their goals. In our area of interest, I have identified already that there are many groups of policy actors who have a stake in a goal of health information systems interoperability - from the DHB, to PHOs, to individual GPs, to community pharmacists, just to name those I have already touched upon. 'Conflict' (as opposed to congruence) is thought to occur when the goals of those groups are not aligned and when success depends on their interdependence. I have therefore concluded that there is certainly more conflict than congruence in the Auckland region, based on the interview responses I have discussed in this chapter. This lack of congruence appears to be present at different tiers of the health sector; we have noted that in some cases there is a mistrust from GPs themselves based on past experiences of breaches of trust around data usage (section 6.8). Furthermore, the funder-provider structure of the health system appears to have introduced a relationship in which policy actors feel the power balance is weighted unfairly. This is true of New Zealand as a whole, of course, but perhaps more noticeable in the Auckland region given the fact that the metropolitan area is composed of three DHBs, and four PHOs.

The second axis is 'Policy ambiguity'. This deals with how far the goal itself - or the means by which it is to be achieved - is clearly understood. It is true that almost without exception, interview participants agreed that an interoperability goal was an important one, which offered significant benefits that could be clearly identified and even agreed upon. Nevertheless, it is also true that there is confusion about the steps required to get us there. As indicated in the preceding discussion, there was repeated mention of a desire for the centre to take bolder, and more assertive, action - whether this was to proscribe that things must be done in a certain way, or even to incentivise other actors in the sector (particularly PMS vendors operating in the private sector). However, I have already drawn attention to Matland's view that, where a policy is implemented in a complex sector, conflict will tend to occur must less when the process and means of implementation are not specified. The NHITB have presumably borne this in mind when the decision was made to set a high level policy goal and encourage the sector to move towards it. My conclusion from the interviews is that whilst there may be some clarity about the policy *goal*, there is certainly ambiguity about the policy *means*. This distinction is made explicit in Matland's work, and tends to occur where multiple agencies are involved in a policy implementation process, or where the environment is sufficiently complex to make it difficult to know exactly how to approach implementation (Matland, 1995). Based on this, I conclude that the interoperability goal resides in the top right quadrant of the Ambiguity-Conflict matrix.

6.11.1. Symbolic implementation

Where implementation tends towards having high conflict and high ambiguity, the approach is referred to as 'Symbolic'. Matland states that, in these cases, it is 'coalitional strength' which determines the outcome - that is, the extent to which those who control local resources work together. If we consider that the substantive resource of an interoperability policy goal might be *data*, we must conclude that the coalitional strength is relatively weak. Ambiguity around policy means results in a situation where differing coalitions in fact appear, who are tied to a particular implementation approach which aligns with their interests.

Interestingly Matland, in discussing symbolic implementation, points out the importance of professional groups. I have discussed, in section 6.5, how some participants pointed out the relationship between being a custodian of data and how this might enhance professional standing. Matland's discussion indicates that such professional groups tend to form competing coalitions which further inhibit policy adoption and implementation.

Another interesting link is with the repeated calls from interview participants around having greater direction and action from the centre. Matland states that, in a symbolic implementation, coalitional strength is exerted primarily at the *micro* level. When the ambiguity level decreases, the goal and the means of the policy become much clearer, and this provides central policy actors to exert a much greater influence (Matland, 1995). How can we deal with this situation?

It is important to identify where the local coalitional strength lies, and to understand further the local context that affects their relative levels of strength and influence. Whilst the capability of central policy actors to directly intervene is diminished in this scenario, it is true that there is still a large role for them to play in provision of resources and setting appropriate incentives (Matland, 1995).

6.12. Conclusion

In this chapter I have attempted to draw together, and discuss, the key themes that have emerged from the research. Where possible I have endeavoured to link my discussion with the relevant literature. It became increasingly clear whilst drafting this chapter that there are indeed many overlaps *between* themes; some appear to exist almost as prerequisities of others.

Eight major themes, being the most distinct, have been identified and discussed in turn. In doing so, I have encompassed all of the most prevalent issues that were identified throughout section §5.4. Together, these themes encompass the breadth of debate around why our health information systems in the Auckland region are not more connected, based on the opinions and perspectives of the participant group. The relevance of these themes with respect to the interoperability question may be generalised to greater or lesser extents, and this is reflected in the alignment found throughout each section with relevant literature from New Zealand or overseas. The fundamental message appears to be that there is certainly no technological impediment to having all of the health-related information systems connected in some way; obstacles exist mostly in the domain of how the policy actors at different levels, and in different parts, of the health sector interact *with each other*. To some extent this can be aggravated or mitigated by other important factors, such as how the structure and incentives of the New Zealand health system - and specifically in the Auckland region - influence this behaviour, as well as the role and influence of the centre itself. There is a substantial amount of overlap and codependence amongst these themes, which I have attempted to depict in figure 6.1.

Finally, I have returned the discussion back to focus on how the results of the interview process can be placed against the theoretical framework introduced in chapter 3. I have concluded that there are high levels of both policy ambiguity and policy conflict in respect of the NHITBs interoperability goal. This leaves us in a position of that policy goal forming a ‘symbolic implementation’. Central to this is the coalitional strength of local policy actors and, although the centre naturally must play a diminished role in clearly setting out the policy *means*, there appears to still be much that can be done in providing resources (for example, funding - discussed in section 6.4), and setting incentives (for example, incentivising moves to formal standards, discussed in section 6.9).

7. Conclusions

In this paper I have described the research process by which I have attempted to uncover some of the reasons why health information systems interoperability is so difficult, and seems such a distant prospect, specifically in the Auckland region primary health care sector. What the research has discovered is that the structure of the health system - as it applies to Auckland, but plausibly generalisable to New Zealand - contrives to inhibit the kinds of alignment, collaboration and system-wide thinking that policy goals such as interoperability to a large extent rely on. This is shown in the way respondents talked about how they interact with other parts of the health system, and in the sense of strategic conflict that became obvious. This is, in the view of participants, aggravated by what they see as a lack of assertive policy-making at the centre to enable the sector to move past these obstacles. The key message essentially could be reduced to reiterating that technology is not the problem; the barriers are political.

7.1. The research process

My interest in this topic was based on my own experience of working within the health sector, and encountering many instances where data was siloed within different organisations and, sometimes, within different parts of the same organisation. I was aware that, particularly when sharing data between 'custodians' (for example, between primary care and a DHB) there were quite serious and appropriate concerns around privacy and security. I was also aware that even accessing data on systems *within my own organisation* was often just as difficult - whether it was because the vendor had restricted access (presumably for commercial reasons), or because there were other more political reasons to do with data ownership. I was therefore very interested in the NHITBs plans for integrated health data (National Health IT Board, 2010), and the extent to which the sector was really ready to actually move towards *interoperability* - or even just to begin to share more data.

The research was conducted by purposive sampling of twelve participants from different parts of the sector; semi-structured interviews would be conducted to obtain a rich source of qualitative data, which could then be transcribed and coded. I endeavoured to be as broad as possible in my selection of participants, however I was not resourced to conduct more than twelve and this is clearly not a number that can be considered as wholly representative. Participants did represent a reasonable cross-section of policy actors, speaking from differing perspectives. However, I came to regret my failure to include anyone who could represent the private-sector PMS vendors who were spoken of negatively by many participants. The weight of negative sentiment arising from the interviews does feel skewed because of this, and any further research that encompassed the vendor perspective more fully would be particularly valuable.

The transcript and coding process revealed a clear concentration of responses around certain keywords, and these have been summarised in section §5.4 and discussed in chapter 6.

7.2. Findings from the research

The research process found that there were a multitude of factors which combine to make any move towards integration and interoperability extremely complex. Although this research focused on primary care in the Auckland region, many of the issues raised have been addressed in different jurisdictions and related to different parts of the general health sector (Aarts et al., 2004, Greenhalgh et al., 2004, Knight et al., 2008). This therefore provides some comfort that these findings not only fit appropriately within a broader body of literature, but may be generalised elsewhere.

The key issue is around *system complexity*. In achieving the interoperability policy goal, the multitude of stakeholder groups, holding and exerting differing levels of *coalitional strength* (Matland, 1995), are critical. The policy ambiguity expressed by informants indicates that the centre has relatively little direct influence in implementing this policy, and this was also reflected by participants who felt that somebody must take more assertive action. The coalitions in healthcare appear to be broadly formed along the boundaries and intersections of either professional groupings (for example, GPs or pharmacists), or parts of the sector whose immediate strategic and operational goals do not seem to be aligned (for example, DHBs and PHOs). These divides are aggravated by a funding system which was thought to not be appropriately incentivising more collaboration and integration. Furthermore, these divides are neatly partitioned around data custodianship - DHBs are custodians of hospital data; GPs and PHOs are custodians of primary care patient data. It is theoretically within the power of each to choose if, and how far, they wish to share information and integrate data.

The other major component of the research findings was the feeling - primarily from those within the primary care sector - that PMS vendors are themselves aggravating these divisions. Many were frustrated about the cost of PMSs, and noted the very high threshold which must be met before one might be incentivised to switch products. This created a sense of ‘vendor dependence’.

All of this combines to result in my conclusion that the definition of Matland's 'symbolic implementation' are met. That is, we face a situation where the relative coalitional strengths of different groups are critical and the centre has a role to play predominantly in encouraging much greater collaboration, by *allocating resources* and *setting appropriate incentives* to encourage greater alignment. Interview participants repeatedly mentioned that no 'burning platform' had been articulated; neither had any direct incentives been made available to the sector. It seems as if much more targeted work could be done in this area, perhaps in relation to incentivising standards - which were a focus of section 6.9, and has been a reasonably successful strategy thus far in the US and Australia.

7.3. Areas for further research

Given some of the constraints associated with time and resources to undertake this research, it is natural that there will be many areas that could have been explored further. Similarly, new issues and themes emerged that I had not expected and would also be interesting to research in more depth. I present in this section some of the more substantive areas for further research that I have identified along the way.

1. I have noted in the previous section that I was regrettably not able to capture the perspective of PMS vendors. One of the strongest themes emerging from the research was the frustrations and issues associated with procurement, management and improvement of primary care PMS systems. Further study which aims to capture a range of relevant perspectives in a complex and fragmented sector should certainly more fully capture the vendor perspective.

2. Another voice missing from the research is that of the patient. The NHITB take care to capture the views and opinions of patient representatives, and this was not a feature of the research process I have undertaken. Many of the comments from participants reflected a very patient-centric perspective and, indeed, much of the innovation in healthcare information technology is around meeting the needs of patients, and shifting patterns of demand. It would be valuable and instructive to ascertain, as part of a broader piece of research, the substantive views of patients as it relates to these issues and to locate them within a framework encompassing a wide range of policy actors.

3. The perspective of the Northern Region shared services provider HealthAlliance was regrettably not reflected in this research. It is feasible to anticipate that a move towards regionalisation in the provision of services such as IT infrastructure and application support would encourage greater awareness of issues to do with interoperability. HealthAlliance

would have been able to comment on efficacy of contract management, vendor management and the more technical realities of connecting information systems which would be a valuable addition to the findings I have presented.

4. A rather obvious avenue for further research is to test how generalisable these findings are across similar parts of the health sector in different parts of New Zealand, or even further beyond. Since a large theme was around how the structure of the system itself - at least, as it has emerged in the Auckland region, with its specific combination of DHBs and PHOs and other stakeholders - contributes to interoperability barriers, it would be very interesting to understand how this plays out in other regions. I have noted in section 6.8 that informants, for example, identified the Canterbury region as a place where its specific combination of policy actors (combined with a natural disaster which provided a ‘burning platform’) resulted in quite rapid progress around integration of services and innovative change. This is not specifically health information interoperability, to be sure, but the principle is that political, structural and many other barriers that are equally applicable directly to my research question were overcome.

5. This research uncovered some concern about how far the structure of the health system in New Zealand encourages integration and interoperability - either at a general operational level, or specifically with regard to health information. The extent and depth of the apparent divide between core parts of the health sector - primary, secondary and community - suggest that further research could provide more substantive recommendations around how effectively the system is encouraging integration.

6. Related to this last point, the ‘fee for service’ model generally seen in primary care was referred to by participants as a brake on the willingness of individual GPs to embrace interoperability. Further research on the non-clinical sequelae of the funding model would be useful.

7. Further research around information standards as they related to encouraging interoperability would be valuable. I have reviewed some literature which focuses on the application of this in Australia and the US, but it would be interesting to examine how far such approaches might be useful in New Zealand.

8. The conclusions I have presented indicate that the political complexity in the Auckland region health care sector constitutes a barrier to interoperability. I have also noted an example from the Canterbury region which portrays a very different outcome. Whilst it would perhaps be foolish to infer from this an inverse correlation between the number of DHBs or PHOs, and the success of a policy implementation, it would be interesting to

review progress in other parts of New Zealand and overlay with this with a focus on the number and relative influence of different stakeholder groups.

9. Several informants noted that patient demand will be a strong factor in any kind of change in the health sector. It would be valuable to understand, in the New Zealand context, exactly how this kind of reliance on market forces actually operates. Are patients sufficiently informed and engaged to exercise choices in the health care market place? More importantly, and in a very practical sense, what range of options are really available to patients?

7.4. Conclusion

I have endeavoured to tease out some of the finer detail around the barriers to interoperability within the parameters of this research. At the beginning, I noted that interoperability does not necessarily have to mean something technical or specific. We are talking essentially about why there are any barriers to sharing *anything* within the health sector. Most participants could agree that sharing of data - even, interoperability itself - has considerable potential benefits for the patient and the system. However, there are perceptions of power imbalance within the sector, at least in the Auckland region, that trump this.

These perceptions are to some extent systemic (the kind of dynamic one might expect in a principal-agent relationship), and to some extent more personal (individual memories of breaches of trust). Sitting behind all of this is the simple fact that our funding system does not yet incentivise any of the interoperability goals put forward by the NHITB. Furthermore, primary care stakeholders appear to be fed up with shoddy treatment from the software vendors on which they rely. For their own part, these participants are looking for someone to take some decisive action and it is not their perception that this is forthcoming from the MOH, or the NHITB.

I have concluded in section §6.11 that this picture represents Matland's 'symbolic implementation', where everything hinges on the relative coalitional strengths of different groups. The centre is somewhat marginalised in this representation and can only effectively allocate resources or provide incentives to manage those relative strengths. Given news from the Ministry of Health in 2016 that yet another senior IT position has been created, reporting to the Director-General and apparently overlapping considerably with the role of the NHITB Director, it is perhaps difficult to see firm and coordinated action coming forth from the centre. Indeed, the NHITB National Plan has not been updated since July 2014.

Given the strength of feeling from participants about the advantages that interoperability could offer, it is indeed a shame that the prospect seems so distant. In the meantime, all the constituent parts of the health sector will undoubtedly continue to work tirelessly to provide quality care to patients. But a small country like New Zealand, once the envy of the developed world in its adoption of electronic health records in primary care, will quickly find itself lagging behind as even the vastly cumbersome US health system makes some kind of very tangible progress thanks to a clear and targeted incentive system.

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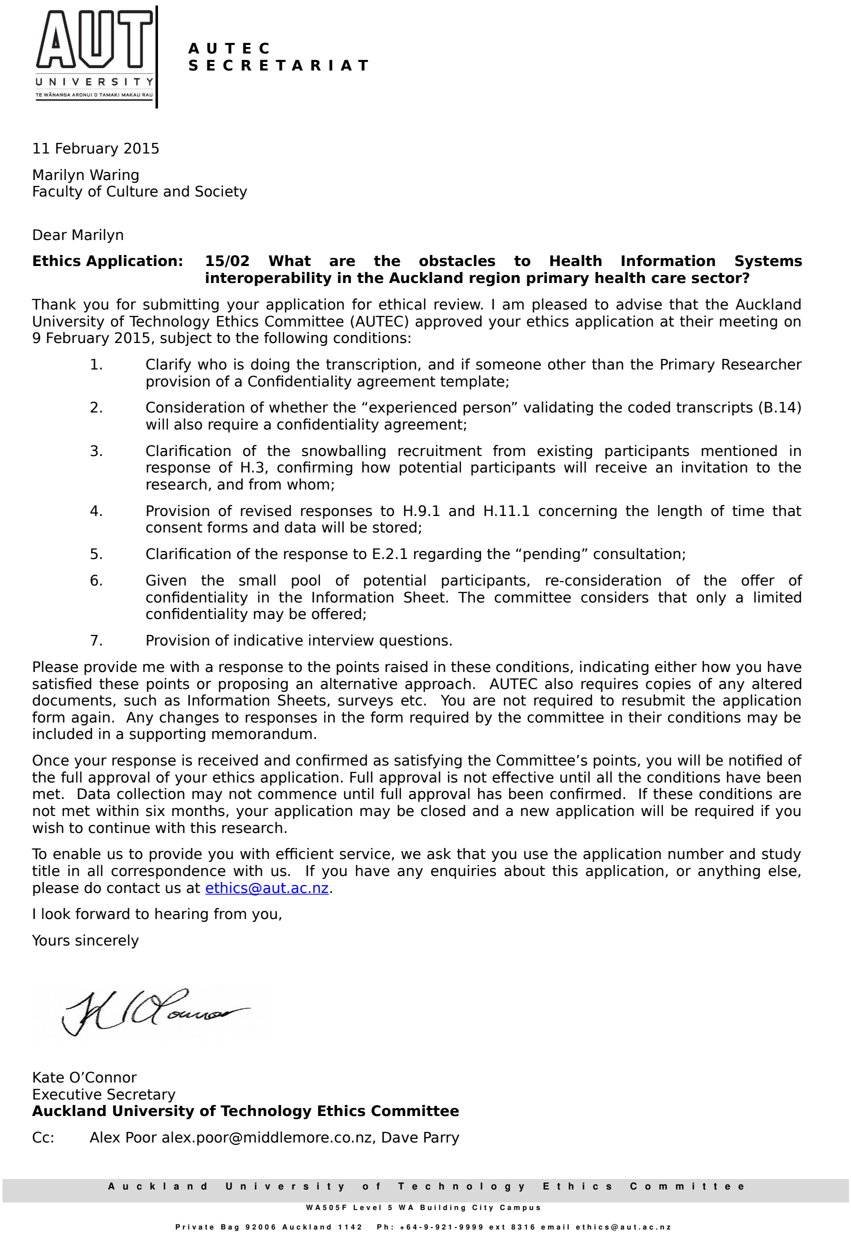
A. Ethical approval



AUTEC
SECRETARIAT

11 February 2015

Marilyn Waring
Faculty of Culture and Society

Dear Marilyn

Ethics Application: 15/02 What are the obstacles to Health Information Systems interoperability in the Auckland region primary health care sector?

Thank you for submitting your application for ethical review. I am pleased to advise that the Auckland University of Technology Ethics Committee (AUTEC) approved your ethics application at their meeting on 9 February 2015, subject to the following conditions:

1. Clarify who is doing the transcription, and if someone other than the Primary Researcher provision of a Confidentiality agreement template;
2. Consideration of whether the "experienced person" validating the coded transcripts (B.14) will also require a confidentiality agreement;
3. Clarification of the snowballing recruitment from existing participants mentioned in response of H.3, confirming how potential participants will receive an invitation to the research, and from whom;
4. Provision of revised responses to H.9.1 and H.11.1 concerning the length of time that consent forms and data will be stored;
5. Clarification of the response to E.2.1 regarding the "pending" consultation;
6. Given the small pool of potential participants, re-consideration of the offer of confidentiality in the Information Sheet. The committee considers that only a limited confidentiality may be offered;
7. Provision of indicative interview questions.

Please provide me with a response to the points raised in these conditions, indicating either how you have satisfied these points or proposing an alternative approach. AUTEC also requires copies of any altered documents, such as Information Sheets, surveys etc. You are not required to resubmit the application form again. Any changes to responses in the form required by the committee in their conditions may be included in a supporting memorandum.

Once your response is received and confirmed as satisfying the Committee's points, you will be notified of the full approval of your ethics application. Full approval is not effective until all the conditions have been met. Data collection may not commence until full approval has been confirmed. If these conditions are not met within six months, your application may be closed and a new application will be required if you wish to continue with this research.

To enable us to provide you with efficient service, we ask that you use the application number and study title in all correspondence with us. If you have any enquiries about this application, or anything else, please do contact us at ethics@aut.ac.nz.

I look forward to hearing from you,

Yours sincerely

K O'Connor

Kate O'Connor
Executive Secretary
Auckland University of Technology Ethics Committee

Cc: Alex Poor alex.poor@middlemore.co.nz, Dave Parry

Auckland University of Technology Ethics Committee
WA505F Level 5 WA Building City Campus
Private Bag 92006 Auckland 1142 Ph: +64-9-921-9999 ext 8316 email ethics@aut.ac.nz

B. Consent form

11 April 2016

page 1 of 1

Consent Form

Project title: **What are the obstacles to Health Information Systems interoperability in the Auckland region primary health care sector?**

Project Supervisor: **Prof. Marilyn Waring**

Researcher: **Alex Poor**

- ○ I have read and understood the information provided about this research project in the Information Sheet dated 10 April 2015.
- ○ I have had an opportunity to ask questions and to have them answered.
- ○ I understand that notes will be taken during the interviews and that they will also be audio-taped and transcribed.
- ○ I understand that I may withdraw myself or any information that I have provided for this project at any time prior to completion of data collection, without being disadvantaged in any way.
- ○ If I withdraw, I understand that all relevant information including tapes and transcripts, or parts thereof, will be destroyed.
- ○ I agree to take part in this research.
- ○ I wish to receive a copy of the report from the research (please tick one): Yes○ No○

Participant's signature: ....…………………………………………………………

Participant's name: ....……………………………………………………

Participant's Contact Details (if appropriate):

Email : …………………………………………………………..

………………………………………………………………………………………..

………………………………………………………………………………………..

………………………………………………………………………………………..

Date:

Approved by the Auckland University of Technology Ethics Committee on 19 March 2015

AUTEC Reference number 15/02

Note: The Participant should retain a copy of this form.

This version was last edited on 8 November 2013

C. Information sheet

Participant Information Sheet

Date Information Sheet Produced:

10 April 2015

Project Title

What are the obstacles to Health Information Systems interoperability in the Auckland region primary health care sector?

An Invitation

My name is Alex Poor and I am currently addressing the above research question in fulfilment of a Master of Philosophy in Public Policy. I would like to invite you to take part in this research by way of a semi-structured interview, which would take around 45 minutes at a place and time convenient to you. You have been purposefully selected as a potential participant on the basis of your role in the healthcare or health IT sector.

Participation is of course voluntary and, should you agree to participate, you may withdraw your consent at any time.

What is the purpose of this research?

This research will identify the barriers to implementation of a fully interoperable information system spanning the domains of hospital and primary care. By ‘interoperable’, I mean that siloed information sources should be able to connect and speak with one another freely and easily.

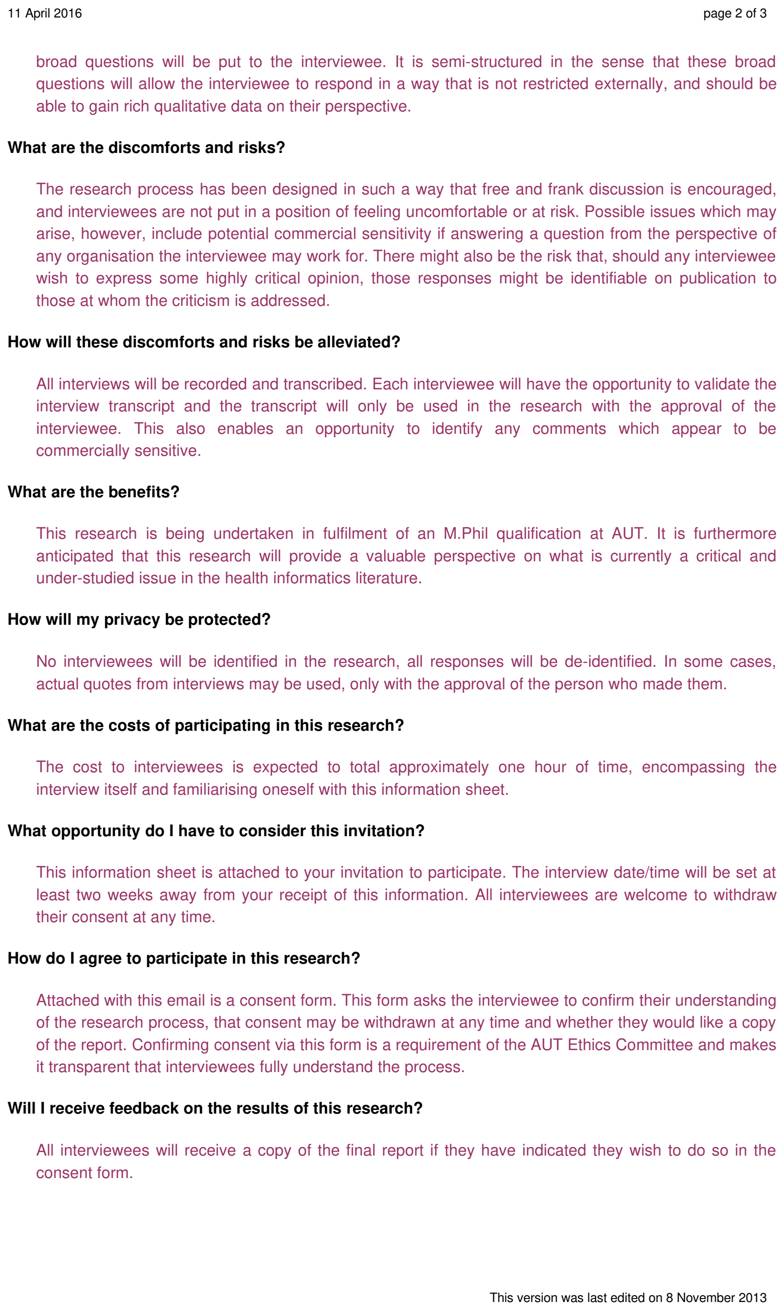
The research will form completion of an M.Phil Public Policy qualification, and it is also anticipated that I would publish my findings in an academic journal.

How was I identified and why am I being invited to participate in this research?

You have been selected purposefully as someone who can comment specifically on the issues surrounding data gathering, aggregation, reporting and analysis in the healthcare sector. I have selected a range of participants from different parts of the sector – from those setting policy direction at national level, to individual healthcare practitioners. The study aims to encompass issues from a range of different perspectives. In many cases participants are known to the researcher; in others, participants have been recommended by other experts and contact has been made via those third parties.

What will happen in this research?

The research will take the form of interviewing a total of twelve participants via semi-structured interviews. These are expected to last around 45 minutes. In each interview, a standard set of three



broad questions will be put to the interviewee. It is semi-structured in the sense that these broad questions will allow the interviewee to respond in a way that is not restricted externally, and should be able to gain rich qualitative data on their perspective.

What are the discomforts and risks?

The research process has been designed in such a way that free and frank discussion is encouraged, and interviewees are not put in a position of feeling uncomfortable or at risk. Possible issues which may arise, however, include potential commercial sensitivity if answering a question from the perspective of any organisation the interviewee may work for. There might also be the risk that, should any interviewee wish to express some highly critical opinion, those responses might be identifiable on publication to those at whom the criticism is addressed.

How will these discomforts and risks be alleviated?

All interviews will be recorded and transcribed. Each interviewee will have the opportunity to validate the interview transcript and the transcript will only be used in the research with the approval of the interviewee. This also enables an opportunity to identify any comments which appear to be commercially sensitive.

What are the benefits?

This research is being undertaken in fulfilment of an M.Phil qualification at AUT. It is furthermore anticipated that this research will provide a valuable perspective on what is currently a critical and under-studied issue in the health informatics literature.

How will my privacy be protected?

No interviewees will be identified in the research, all responses will be de-identified. In some cases, actual quotes from interviews may be used, only with the approval of the person who made them.

What are the costs of participating in this research?

The cost to interviewees is expected to total approximately one hour of time, encompassing the interview itself and familiarising oneself with this information sheet.

What opportunity do I have to consider this invitation?

This information sheet is attached to your invitation to participate. The interview date/time will be set at least two weeks away from your receipt of this information. All interviewees are welcome to withdraw their consent at any time.

How do I agree to participate in this research?

Attached with this email is a consent form. This form asks the interviewee to confirm their understanding of the research process, that consent may be withdrawn at any time and whether they would like a copy of the report. Confirming consent via this form is a requirement of the AUT Ethics Committee and makes it transparent that interviewees fully understand the process.

Will I receive feedback on the results of this research?

All interviewees will receive a copy of the final report if they have indicated they wish to do so in the consent form.

What do I do if I have concerns about this research?

Any concerns regarding the nature of this project should be notified in the first instance to the Project Supervisor, Prof. Marilyn Waring, tel: 09 921 9999 ext 8306, email: marilyn.waring@aut.ac.nz

Concerns regarding the conduct of the research should be notified to the Executive Secretary of AUTEC, Kate O'Connor, *ethics@aut.ac.nz*, 09 921 9999 ext 6038.

Whom do I contact for further information about this research?

Researcher Contact Details:

The researcher may be contacted via email at alexjpoor@gmail.com, or via telephone on 022 355 1316.

Project Supervisor Contact Details:

The Project Supervisor, Prof. Marilyn Waring, may be contacted via email at Marilyn.waring@aut.ac.nz or via telephone on 09 921 9999 ext 8306.

Approved by the Auckland University of Technology Ethics Committee on *19 March 2015*, AUTEC Reference number *15/02*.

D. Analytical memos

This section reproduces a list of analytical memos that were created by the researcher as part of the interview process. The utility of memos in qualitative research is discussed in section 5.3.2. They are reproduced here exactly as written in the original texts, together with some explanatory text where appropriate.

- This statement reveals a technical/non-technical divide. How do we balance that focus within the research and subsequent analysis/discussion? How do we distill some of the core messages from the more technical participants?
- What research is there around the policy levers, *other than simply funding*, that can be employed to motivate the private sector?
- This is not my experience - how do I weight this as a researcher?
- How informed and engaged are patients - is there research on this? What do we know about patients using market forces of demand/supply to encourage change in health?
- This comment seems to imply that primary care should be nationalised along the lines of the NHS - what about research undertaken (eg. RAND) which identifies co-payment as suggesting/encouraging *value* of healthcare to patients?
- This is probably an issue more prevalent in Auckland because of the multiple PHO landscape - Canterbury is an interesting example but there is only one PHO there. Is success/efficacy inversely correlated with the number of PHOs?!
- Look in more detail about the mandating of standards-compliant software, eg. NPfIT in UK
- I have experienced this tendency towards top-down one-way flow of information myself in previous roles
- How responsive is the sector - especially primary care - to vocal demands of patients?
- Bring in writing around meaningful use in the US

- Investigate information on electronic claiming system introduced in pharmacy
- There are good examples of systems overcoming privacy fears in NZ. Is this an Auckland specific issue? Ref to other participants comments around this being a noticeable difference in Auckland
- This participant focuses criticism on an agency which they are immediately dependent on - how true is this of people working at different levels or in different sectors?
- There is still a focus in the language here of talking in ‘them and us’ terms
- But can’t we be incentivised to think differently? For example, via structural change
- Are critics of decentralised model justifiably pointing to data integrity/accuracy issues within primary care?
- IT advances in NZ Primary care (NHI and spread of PMS) suggest it is in a dynamic and innovative sector
- Look into IPIF developments and how these are messaged by NHITB
- Success stories all seem to exclude the ceding of sovereignty in primary care data!
- This view may be specific to this PHO and not representative of others

E. Acronyms and abbreviations

API Application Programming Interface

DHB District Health Board

EHR Electronic Health Record

GP General Practitioner

HBL Health Benefits Limited

HFA Health Funding Authority

HIPC Health Information Privacy Code

HIT Health Information Technology

HITECH Health Information Technology for Economic and Clinical Health

ICD-10 International Statistical Classification of Diseases and Related Health Problems

ICT Information and Communications Technology

MOH Ministry of Health

NGO Non-Government Organisation

NHI National Health Identifier

NHITB National Health IT Board

NHS National Health Service

NIR National Immunisation Register

NPfIT National Programme for Information Technology

NPM New Public Management

NZHIS New Zealand Health Information Service

OAG Office of the Auditor-General

PHO Primary Health Organisation

PMS Practice Management System/Patient Management System

SNOMED Systematized Nomenclature of Medicine