NZ Health IT (NZHIT)

Overview of the software applications landscape across New Zealand's health system prepared for the NZ Health & Disability Sector Review Panel

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Introduction

The New Zealand Health IT Cluster Incorporated (NZHIT) has been commissioned to provide this overview for the NZ Health & Disability Sector Review Panel (Panel). The objective of this overview is to identify the extent of the software applications in use across New Zealand's health and disability sector (sector) and, where applicable, provide relevant commentary on the sector's digital capability including key issues and opportunities. This is especially in terms of the development of an interoperable environment across the sector and how this might be achieved.

To prepare this overview, NZHIT undertook a range of targeted interviews within a relatively short timeframe (to meet the Panel's requirements). The focus being on NZHIT's membership especially those that are providing software solutions across the wider public health sector including the secondary, primary, community and NGO sectors. This overview also briefly looks at the emerging health software market growth to provide a snapshot of how this is developing, constraints and opportunities this creates for the sector.

Our Findings (where are we today)

In summary, the key findings from the interviews and feedback are as follows -

Committed industry partners (software providers/vendors)

- New Zealand is fortunate to have a core base of software providers (NZ and international) committed to the health and disability sector in this country and a growing number of new emergent operators that are adding to the digital health landscape. The predominant approach across all software providers is that they want to work collaboratively and in partnership with the public sector.

Interoperability is possible

- This collaborative approach, and New Zealand's relatively small size (in global terms), can be made to work in the country's favour when it comes to creating an interoperable environment in the digital health sector.
- By its very nature, interoperability is directly connected to a number of other factors that require alignment. It is often said that "technology is no longer the constraint" and the focus needs to be on those areas of the sector that provide opportunities for progress, such as:
  - **Aligned digital health strategies** that provide leadership across the whole health sector on the direction of travel for the next 10+ years.
  - **An action and investment plan** associated with these strategies that provides a focus on the major areas of achievement, timelines for completion and the funding required to support successful implementation and ongoing evolution.

- **Funding and procurement methodologies** that are better aligned with the purchase and implementation of modern digital technologies.
- **Capacity and capability** of the people working in the digital health sector is a very important and rapidly evolving area of opportunity for New Zealand. Currently, expertise is spread thinly across the country, across both public and private settings, and no digital health workforce plan exists to attract and retain the 'best and brightest' in this country's health sector.
- **Development of national standards** (based on international standards) that support interoperability and pathways to bring the sector, public and private, to a consistent approach for achieving the standards. This includes procuring to the standards, which supports the commitment required to be "up to standard" whilst disincentivising the use of non-standard solutions.
- **Alignment of applications** across the sector including bringing versions up to date and rationalisation where applicable (closing down systems no longer fit for purpose).

Our future digital health environment (where do we need to be)

- Internationally, there is increased recognition of the important role that digital technologies play in enabling the delivery of healthcare services as well as supporting the required business and operating models, all of which are rapidly evolving.
- New Zealand's digital health future must encompass the following -
  - The levels of investment in digital solutions is aligned to the strategic direction and objectives for New Zealand's digital health sector.
  - The ubiquitous nature of digital technology enables a much greater engagement directly with consumers in relation to their own health. This means the use of apps and portals will be 'common practice', which means areas such as identity, consent and social licence, security, privacy and literacy become even more important.
  - An innovation ecosystem is aligned across the country that has a focus on "NZ Inc". This is so investment and successful new solutions (that are exportable) can be scaled in a way that benefits all New Zealander's health and social wellbeing as well as the country's economic development.
  - A strong and vibrant digital health sector that provides modern, fit-for-purpose solutions to the local sector whilst exporting to, and learning from, international markets is essential.

Our recommended next steps (how are we going to get there)

- Take advantage of the collaborative nature of the public and private sectors to develop co-designed solutions and create an environment where digital technologies can be used to their fullest to support the wider health sector.
- A number of these areas have already been mentioned above (and expanded further in this document) along with -
  - Reducing replication and fast-tracking foundational system areas such as standards, identity, interoperability and investment models required to support these to be achieved.

- Establish security standards for 'on premise' systems to encourage movement to a fully 'as a service' environment.
- Identify areas for skills investment – e.g. business case proposals where 'whole of life' benefits realisation models are applied and change management upskilling occurs.
- Create a vision for partnership between the NZ health and disability sector and the digital health solution providers.

In summary, the health and disability sector is an understandably complex environment. The use of digital solutions is recognised as a key enabler of healthcare service delivery and supporting digital adoption and transformation across the sector. However, it is rapidly moving from being "an enabler" to be an essential component of healthcare services.

During the past 3-4 years the environment has made some progress, as public and private sectors are finding ways to work together within policy and funding constraints. However, there is still significant room for improvement especially where New Zealand's relatively small size can be used to its advantage by creating a world leading digital health industry sector.

Whilst there is clearly not an absolute correlation with other sectors, parallels can be drawn with the likes of the banking and travel sectors where technology and digital innovation is now an embedded part of the "way things are done".

In a similar way, the transformation of the New Zealand health and disability sector must include digital technology as a core strategic and operational function that works hand-in-hand with changes to models of care and business systems.

Health has the opportunity to move through the maturity curve to recognise the benefits of modern 'digital business models' and establish a platform for the future 10+ years.

This requires a public-private partnership approach (not only in a monetary sense). The environment is absolutely ready for this as the industry sector wants to partner with the public sector to deliver the solutions that both consumers, patients and the providers of health and disability services require, now and into the future.

CONTEXT

NZHIT was formed in 2002 to represent the health IT industry players and, since then, has grown to be the peak industry body for the digital health sector. With 148 member organisations, NZHIT represents 95% of the digital providers operating in this country's health and disability sector along with a range of healthcare providers drawn from across New Zealand's health sector (including, BUPA, Ryman, Green Cross, Healthcare NZ, PHOs, Govt agencies and many others).

This enables NZHIT's members to work as a network of software providers, healthcare providers, policy-makers and funders to provide and develop digital solutions to enable the delivery of healthcare services both nationally and internationally.

To prepare this overview NZHIT undertook a range of targeted interviews within a relatively short timeframe (to meet the Panel's requirements). The focus being on NZHIT's membership especially those that are providing software solutions across the wider public health sector including the secondary, primary, community and NGO sectors. This overview also looks at the emerging health software market growth to provide a snapshot of how this is developing, constraints and opportunities this creates for the sector.

All members interviewed were highly supportive of this piece of work and took the opportunity to provide as much information as possible. It has to be noted that many had confidentiality constraints that prevented disclosure of more detailed information. Despite this, the information provided was as open as possible with most being available in the public domain although not necessarily aggregated in this manner before now.

Along with software applications information there was a consistent message on a number of areas where members experience challenges in the sector along with a positive view of the opportunities available to the sector. The most consistent message being that there is a genuine desire to work collaboratively, more inclusively (i.e. on co-design projects) and a belief that there is an opportunity to again make New Zealand a global leader in digital solutions that enable quality health outcomes.

DISCLAIMER

To the best of its ability, NZHIT has sought to source accurate information and feedback during the course of developing this report whilst recognising that the level of information related to applications on a national, regional and local basis has not been captured to this extent previously. Within the timeframe available NZHIT has carried out as much cross-checking as possible but does not claim that all information provided in this report is completely accurate as at the time of publishing. It is recommended that this be regarded as a starting point and further investment is made to expand and keep this record up to date.

There are approximately 150 active providers of numerous software solutions operating within NZ's health IT sector, which represents a spread of legacy systems through to new emerging technologies. The following chart is a cross-section of providers (not exhaustive, based on main area of focus):

Secondary, Primary/Pharmacy, Community, NGO, Aged Care, other	Infrastructure, Software Development, Consultancy, Manufacture	Emerging
SECONDARY: Orion Health, DXC, Sysmex, Advanced Management Systems, ARANZ Medical, Cerner, Change Healthcare, COMRAD, Core Schedule, Hills, ICNet, Incisive Medical Systems, InterSystems, MKM-Alcidion, Precision Medical, Rauland, SBS, Winscribe-Nuance, Telstra Health, Transcriptionz, Tranzsoft Group, Trendcare Systems, Vivid Solutions, Volpara Health Tech	**INFRASTRUCTURE:** Microsoft, Spark Health (Revera, CCL), Vodafone, Advantage Computer Systems, CNS, Platform Plus, SATO, SecureCom, SolNet Solutions, Tech Management Group, Umbrellar, Xcrania, Siemens, Sektor	**EMERGING:** ableX, Webtools Health, Celo, Ackama, Auximedic, BeSure, Eightwire, Fitbit Health Solutions, Florence Health, Jupl, Mycare, Noted Ltd, Ronin Group, Sense Medical, SHI Global, Stellar Healthcare, Swiftmed, Vault, VCNow, Aceso
PRIMARY: MedTech, MyPractice, Intrahealth, Indici-Valentia, Vensa Health, Best Practice Software, ConnectMed, DrInfo, Enigma Solutions, Healthlink, Healthpoint, HealthSoft/RxOne, Toniq, Medi-Map, Medical Objects, Melon Health, Patients First-Conporto, Sharecare, Whanau Tahi, ZOOM Pharmacy, MoleMap, Konnect Net	**SOFTWARE DEVELOPMENT:** Augen,	
COMMUNITY: Netsoft, Wild Bamboo, Geneva Health Tech, HealthTrx, iMOKO, Securely	**CONSULTANCY:** Beca, Medical IT Advisors, NOW Consulting, Deloitte, e-Borne Solutions	
AGED CARE: Health Metrics, Leecare Solutions, Momentum Healthware, Tunstall, VCare International	**MANUFACTURING:** Chiptech	
NGO/Other: Erudite, Fraame Healthcare, Stratos Tech Partners, SuccessFactors, The Tarn Group, Vicinity Solutions		

NZHIT members actively support and participate in a number of initiatives to assist with the advancement of New Zealand's health sector. During 2015, NZHIT and its members engaged in the consultation process relating to the review of the New Zealand health strategy. The resulting release of the New Zealand Health Strategy 2016 identifies five strategic themes that will enable all New Zealanders to – live well, stay well and get well.

NZHIT recognises that with a new Ministry of Health Leadership team now in place, the development of the Living Standards Framework in conjunction with the soon to be released Wellness Budget, this health strategy may be refreshed and would welcome industry participation in that process.

During 2017, NZHIT and its members have actively engaged in the development of the New Zealand Digital Health Strategy as well as having member representation on the standards development working groups covering – Interoperability, Connected Health and Digital Identity.

Additionally, NZHIT currently has two specific special interest groups (SIGs) where members and stakeholders can provide strategic leadership to the sector. These SIGs are – Cybersecurity and Privacy Industry Group, and Virtual Health Industry Group. NZHIT's members are very aware of the need to align their solution offerings with the requirements of the health and disability sector.

In the New Zealand Health Technology Review: 2016 (attached page 15) the health IT companies translated their contribution to these themes as follows –

Closer to home
- **supplying technologies that support remote care delivery and communications**

Value and high performance
- **automation, efficient communications and admisitrative functions as well as reducing error**

One team
- **streamlining clinical communications and intergating multiple functions, and the input of clinical groups**

Smart systems
- **providing enhanced analytics, with devices that are connected diectly into health records and administrative systems**

People powered
- **enabling people in health goes hand-in-hand with digital technmologies, like teleheatlh systems and mobile health apps, that enable health services to engage with people wherever they are located**

Exact figures on the size of New Zealand's public health IT sector are difficult to exactly quantify given variability of reporting methods and how software is accounted for in various financial management systems. Following research conducted in 2018, which included official information requests to all District Health Boards (DHBs), it was reported that the DHBs spend in the vicinity of 2.3% of their annual budgets on technology (eHealthNews, May 2018).

This is based on the DHB's self-reported spend for the 2016-17 period, with a total of $280 million (of the total $12.2b provided to the provider arm from Vote Health for that period). The spend at each DHB varied from $1.8m to $46.6m. This is indicative only as identifying the exact level of spending is influenced by a number of variables including how each of the DHBs account for their spend (i.e. capex, opex or mix of both) and how they categorise 'technology' for accounting purposes.

Further, in 2016 NZHIT partnered with three other parties to produce the 'New Zealand Health Technology Review: 2016' (see full review attached). This involved a survey of members that identified NZ health IT companies contributed $321 million to New Zealand's economy during the 2015/16 period (page 24). Of this, approximately 59% ($189 million) was gained through exports of health IT software meaning $132 million was directly identified as domestic revenue (most of which will have been from the public health sector). It is important to note that during the survey period the largest volume of export revenue was contributed by Orion Health.

In terms of international trends of investment levels in health IT, it is generally accepted that the global industry average is 4.6% (Gartner) and that, on average, 74% of this goes into the 'run' category (keeping systems going), 17% on 'grow' and 9% on 'transform'. In NZ's case, based on the above estimates, it can be assumed that the bulk of technology spend is going towards the 'run' category and there is limited spend available for digital transformation and innovation.

Reference:

New Zealand Health Technology Review: 2016, New Zealand companies innovating to improve people's health (attached)

eHealthNews articles -

- https://www.hinz.org.nz/news/398790/New-Zealand-underinvesting-in-health-IT.htm
- https://www.hinz.org.nz/news/398789/Barriers-to-funding-health-IT-projects-need-to-be-overcome.htm

A major piece of the work undertaken by NZHIT to prepare this report has been to interview and obtain information from members about the location and use of their applications across the health sector. The following charts represent the self-reported information provided by NZHIT members relating to where their various systems are in use. Where possible, input has been sought from local DHBs and other agencies –

Consumer, Community, Allied, Pharmacy & Primary Care	Comment
Community Software Providers	Healthcare NZ, Geneva, Wise Group & multiple NGOs
- Netsoft Carecall	Home-based, Community, ACC
- Wild Bamboo Record Base	Major provider to Mental Health, Disability, Social Housing, Corrections, Domestic Violence
- Fraame File Version	NGO
- Aspirico – iPlanit	
- Health Metrics - eCase	Aged Care, Community, ACC
Community PMS and Specialists	
- MedTech	Primary Care
- MyPractice	Primary Care
- IntraHealth	Primary Care & focus on larger systems e.g. Corrections
- Best Practice, Houston	Primary Care, Ophthalmology
- Indici (Valentia Tech)	Primary Care, Emergency Services, Community
- Incisive	Private specialist market focus
- Gensolve	Physio market
Portals	
- Health365	Provided by MyPractice
- ManageMyHealth	Provided by MedTech
- ConnectMed Portal	Provided by ConnectMed
- Vensa	Vensa.com
- Indici	Provided by Indici (Valentia Tech)
Community Pharmacy	
- HealthSoft – RxOne	Community Pharmacies & Chemist Warehouse
- Toniq	Community Pharmacies & Countdown, Green Cross
- NZePS	14% of all GPs currently (& growing)
Aged Care Prescribing	
- Toniq 1Chart	
- Med-Map	
HealthPoint National Services Directory	6000 organisations, 430,000 access

Key:

Colour	Version	Colour	Version
Green	< 2 years old	**Amber**	>2 and < 4 years old
Red	> 4 years old	**Black**	Information not available
Diagonal line	Regional instance		

Referrals

	NDHB	ADHB	WDHB	CMDHB	WaiDHB	BOPDHB	LDHB	TarDHB	TaiDHB	MCDHB	WhDHB	HBDHB	WaiDHb	HVDHB	CCDHB	NMDHB	CDHB	WCDHB	SCDHB	SDHB
	Northern				Midland					Central						Southern				
- Orion eReferrals		Green	Green	Green												Red/Diagonal	Red/Diagonal	Red/Diagonal	Red/Diagonal	Red/Diagonal
- BPAC					Black	Black	Black	Black	Black											
- Healthlink																				
o Forms - Primary to Secondary	Orange	Orange	Orange	Orange								Orange	Orange	Red	Orange					
o Forms - Primary to Community	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Red	Orange	Orange	Orange	Orange	Orange	Orange
o Forms - Secondary to Community	Orange																			
o Forms - Primary to ACC	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Red	Orange	Orange	Orange	Orange	Orange	Orange
o Forms - Primary to MSD	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange	Orange
o Hospital eReferral Receiving, Triage and Workflow	Green									Orange	Orange	Orange	Red	Orange						

HealthLink Messaging Service

	NDHB	ADHB	WDHB	CMDHB	WaiDHB	BOPDHB	LDHB	TarDHB	TaiDHB	MCDHB	WhDHB	HBDHB	WaiDHb	HVDHB	CCDHB	NMDHB	CDHB	WCDHB	SCDHB	SDHB
- Lab Results to Primary (some via private labs)	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green
- Discharge Summaries to Primary	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Red/Diagonal	Red/Diagonal	Red/Diagonal	Red/Diagonal	Red/Diagonal
- Referrals from Primary	Green	Green	Green	Green								Green	Green	Green	Green					
- Clinical Documents to Primary	Green	Green	Green	Green	Green							Green			Green	Red/Diagonal	Red/Diagonal	Red/Diagonal	Red/Diagonal	Red/Diagonal
- Status Messages to Primary	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green

Emerging

	NDHB	ADHB	WDHB	CMDHB	WaiDHB	BOPDHB	LDHB	TarDHB	TaiDHB	MCDHB	WhDHB	HBDHB	WaiDHb	HVDHB	CCDHB	NMDHB	CDHB	WCDHB	SCDHB	SDHB
	Northern				Midland					Central						Southern				
- SmartPage Alcidion			Green							Green										
- Celo				Green													Green	Green	Green	
- ableX – Rehab													Green							
- Vensa – Txt2Remind	Main provider to Medical Centres (2.7M patients p.a.)																			
- Mycare																				
- Webtools																				
- Noted																				
- Zoom Pharmacy																				

Key:

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Nursing

	NDHB	ADHB	WDHB	CMDHB	WaiDHB	BOPDHB	LDHB	TarDHB	TaiDHB	MCDHB	WhDHB	HBDHB	WaiDHb	HVDHB	CCDHB	NMDHB	CDHB	WCDHB	SCDHB	SDHB
					Northern					**Midland**					**Central**					**Southern**
- PatientTrack - Alcidion			Green	Green												Green	Green	Green	Green	
Theatre																				
- Scope		Red		Red	Green												Diag	Diag	Diag	
- WebPAS, iPM	Black		Black	Black	Black	Black	Black	Black	Black	Black	Black	Black	Black	Black	Black					Black
- Cardiology - Dendrite		Black			Black										Black		Black			Black
Clinical Documentation																				
- Cortex										Green							Green			
- Orion Care Pathways																Red/Diag	Red/Diag	Red/Diag	Red/Diag	Red/Diag
Patient Flow																				
- PFM – Telstra Health					Green															
- Miya Precision PF										Green										
Bed Management																				
- Trendcare	Green	Green	Amber	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green	Green		Green	Green	Green
- Alcidion Miya Access										Green										
- CapPlan – Change Health			Amber	Amber	Black		Black							Green	Diag	Diag	Red			
HR, Staff, Rostering																				
- OneStaff – Change Health					Amber	Amber														Green
- AMS Rostering or Payroll		Amber	Amber	Amber	Green								Amber	Amber		Amber		Green		
- Trendcare – Rostering	Green							Green			Green									Black
- Kronos		Black	Black																	

Clinical Workstation

	NDHB	ADHB	WDHB	CMDHB	WaiDHB	BOPDHB	LDHB	TarDHB	TaiDHB	MCDHB	WhDHB	HBDHB	WaiDHb	HVDHB	CCDHB	NMDHB	CDHB	WCDHB	SCDHB	SDHB
					Northern					**Midland**					**Central**					**Southern**
- DXC iHealthviews					Black		Black		Black											
- Orion Concerto	Red/Diag	Red/Diag	Red/Diag	Red/Diag				Green		Green	Green		Green	Green	Green	Diag	Diag	Diag	Diag	Green/Diag
- Scanned Patient Record		Black													Black					

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Clinical Data Repository

	NDHB	ADHB	WDHB	CMDHB	WaiDHB	BOPDHB	LDHB	TarDHB	TaiDHB	MCDHB	WhDHB	HBDHB	WaiDHb	HVDHB	CCDHB	NMDHB	CDHB	WCDHB	SCDHB	SDHB
	Northern				**Midland**					**Central**						**Southern**				
- Local – HealthViews					⚫															
- **Orion CDR**										🟢	🟢	🟢	🟢	🟢	🟢	🟢/	🟢/	🟢/	🟢/	🟢/
Radiology										🟢	🟢	🟢	🟢	🟢						
Radiology Signoff													🟢	🟢	🟢					
Pharmacy (Cmn'ty Meds)																🟢	🟢	🟢	🟢	🟢
- **Eclair CDR**																				
Laboratory (Community)	🟠/	🟠/	🟠/	🟠/	🟢/	🟢/		🟢/		🟢/		🟢/		🟢/		🟢/	🟢/	🟢/	🟢/	🟢/
Laboratory (Hospital)	🟠	🟠	🟠	🟠	🟢	🟢	🟢									🟢	🟢	🟢	🟢	🟢
Radiology (Hosp)	🟠	🟠	🟠	🟠	🟢	🟢	🟢									🟢	🟢	🟢	🟢	🟢
Pharmacy (Cmn'ty Meds)	🟠	🟠	🟠	🟠						🟢	🟢									
Clinical Docs	🟠	🟠	🟠	🟠	🟢															
Lab Orders (Community)	🟠	🟠	🟠	🟠	🟢	🟢	🟢	🟢	🟢	🟢	🟢		🟢	🟢	🟢	🟢				🟢
Lab Orders (Hospital)		🟠	🟠																	
Radiology Orders (Hosp)		🟠	🟠	🟠												🟢	🟢	🟢		
Electronic Signoff	🟠	🟠	🟠	🟠	🟢	🟢	🟢	🟢								🟢	🟢	🟢	🟢	🟢
Bloodbank orders		🟠																		

	NDHB	ADHB	WDHB	CMDHB	WaiDHB	BOPDHB	LDHB	TarDHB	TaiDHB	MCDHB	WhDHB	HBDHB	WaiDHb	HVDHB	CCDHB	NMDHB	CDHB	WCDHB	SCDHB	SDHB
PAS	**Northern**				**Midland**					**Central**						**Southern**				
- DXC - WebPas	🟢				🟢		🟢			🟢/	🟢/	🟢	🟢/	🟢	🟢					
- DXC - iPM		🔴	🟠	🟠	🟢		🟠		🟢									🟢		🔴
- Orion - HIS																🟢/	🟢/			
- Legacy		⚫																	⚫	

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Lab	NDHB	ADHB	WDHB	CMDHB	WaiDHB	BOPDHB	LDHB	TarDHB	TaiDHB	MCDHB	WhDHB	HBDHB	WaiDHb	HVDHB	CCDHB	NMDHB	CDHB	WCDHB	SCDHB	SDHB
	Northern				**Midland**					**Central**						**Southern**				
- Sysmex Delphic	/🟠	/	/🟠	🟠	🟠/	/🟠	/	/	/🟠	/🟠	/🟠					/🟠	/🟠	🟠	/	🟠
- Healthscope – Ultra	🟠	🟠	/🟠	🟠								/	/🟠	/🟠	/🟠	🟠	/🟠	🟠	/	🟠
- DXC - iLab					⚫															
RIS/PACS																				
- Comrad									🟢							/🟢	/🟢	/🟢	/🟢	
- AGFA		⚫	⚫	⚫																
- Philips	⚫				⚫	⚫			⚫											⚫
- GE							⚫													
- CareStream										🟢/	🟢	🟢	🟢	🟢	🟢					
Pharmacy																				
- ePrescribing – MedChart	🔴	🟠	🟠					🟠		🟠							🟠		/🟠	/🟠
- Pharmacy – ePharmacy	🟢/	/	/	🟢	/🟠	/	/🟠	/	/🟠	/	🟢	🟢	🟢	🟢		🟢			/	/
- Pharmacy – Windose																🔴	🔴	🔴	🔴	🔴
- Pharmacy – Other			⚫																	
- Orion Meds Reconciliation	⚫	⚫	⚫	⚫				⚫									⚫			

National Projects	NDHB	ADHB	WDHB	CMDHB	WaiDHB	BOPDHB	LDHB	TarDHB	TaiDHB	MCDHB	WhDHB	HBDHB	WaiDHb	HVDHB	CCDHB	NMDHB	CDHB	WCDHB	SCDHB	SDHB
	Northern				**Midland**					**Central**						**Southern**				
- Maternity - Clevermed				🟢				🟢	🟢						🟢					
- Infections - ICNet		🟢/	🟢/			/🟢											🟢/	🟢/		
- Dental - Titanium	🔴	🟢	🔴		🟢	🔴	🟠		🔴	🟢	🔴	🟢		🔴	🔴	🔴	🟢		🔴	🟢
- Immunisation - Orion	🔴	🔴	🔴	🔴	🔴/	🔴	🔴	🔴	🔴/	🔴/	🔴	🔴	🔴/	🔴	🔴/	🔴/	🔴	🔴	🔴/	🔴
- AgedCare - InterRAI	🟢/	🟢	🟢/	🟢	🟢/	🟢	🟢	🟢	🟢/	🟢/	🟢	🟢	🟢/	🟢	🟢/	🟢/	🟢	🟢	🟢/	🟢
- Bloodbank - Mak	⚫/	⚫	⚫/	⚫	⚫/	⚫	⚫	⚫	⚫/	⚫/	⚫	⚫	⚫/	⚫	⚫/	⚫/	⚫	⚫	⚫/	⚫
- Plunket	⚫/	⚫	⚫/	⚫	⚫/	⚫	⚫	⚫	⚫/	⚫/	⚫	⚫	⚫/	⚫	⚫/	⚫/	⚫	⚫	⚫/	⚫
- NCHiP							🟢													
- Breast Screening – Orion	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴	🔴
- Bowel Screening – WDHB > Del			⚫	⚫						⚫	⚫									⚫
- Cervical Screening	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫
- Financials – Oracle					⚫	⚫											⚫	⚫		
- NHI	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫	⚫

Key:

Colour	Version	Colour	Version
Green	< 2 years old	**Amber**	>2 and < 4 years old
Red	> 4 years old	**Black**	Information not available
Diagonal line	Regional instance		

General Overview

From the information provided by NZHIT members and the resulting applications 'heat maps' there are some related inferences that can be made in respect to the current state of digital systems being used across New Zealand's public health sector.

Whilst not definitive, these inferences provide important background to the experienced-based views of the industry sector and are important in terms of how both public and private groups can work together towards the desired future state, especially where interoperability (and related foundations systems of privacy, security and identity) can be achieved.

There are a wide range of applications and versions across the country with further work do be done to provide a more in-depth view of how many users per application and the use cases involved (this will require a working group that contains public and private sectors).

There are multiple applications deployed (and in many cases multiple instances of a single application) in place along with a range of versions. Data storage is an area that also needs further review and strategy development as there are a considerable spread of on-premise, cloud (public & private) and hybrid data storage ecosystems in place; each with their own privacy and security risk profiles.

The range of different versions being used across the country, indicates that there is a risk associated with an IT asset base that has been fully "sweated" beyond its capabilities whilst necessary regular version upgrades and most current technologies are proving difficult for DHBs to implement.

Consumer Market

A key finding from the National Electronic Health Record Programme Business Case identified that consumers expect to engage with and control their health information in the same way they do with other digital services.

As part of a national consultation process, consumers and their carers expressed their need to be empowered to more actively manage their own health and wellness seamlessly and transparently across multiple digital channels. When asked, nearly all consumers and their carers wanted a digital experience to manage their health and wellness; however, approximately only 5% had a digital experience currently. Where consumers reported having a "digital experience" this was primarily achieved through a General Practitioner's (GPs) primary care portal (GP portal).

Over the past 3-4 years the GP portal market has grown on the back of considerable focus, resource and investment from the Ministry of Health. The leading patient management systems (PMS)

suppliers have their own bespoke portal whilst there has also been the development of generic portals that can be used on multiple PMS solutions.

Whilst not yet fully endemic this is an example of early progress towards interoperability in this particular segment of the sector. It should be noted that the main focus of the GP portal development has historically been towards benefiting the GP, where the portals in use are tethered to the particular PMS solution that the GP practice uses.

It is seen in other markets and health sectors internationally that benefits and functionality that that directly benefit the patient (consumer/customer) is where value is derived and drives the uptake and rapid innovation that creates an integrated "my health and wellness experience", irrespective of the care setting.

> **Hence, using digital technology to "put health and wellness in the customer's hands" is an area where New Zealand must develop a strategic and tactical approach to empower New Zealander's to have full equity and access to the healthcare services they need in a more proactive manner.**

ALLIED HEALTH & NGO

Allied Health is a developing and growing market although has been historically slow in the uptake and use of digital technology. This is also the case in the much larger and complex Non-Government Organisation (NGOs) sector where there is a highly fragmented and unsophisticated approach to the use of IT for business operations and service delivery. There is still a predominant use of paper-based recording methods and care planning processes that are later transcribed into an electronic system "back at the office".

A fundamental driver of this is that it is a market that operates on "high volumes-low margins", which means that IT tends to be put towards the bottom of the priority list when it comes to investment and implementation. This is despite the obvious advantages that IT can provide but there is a constant struggle between delivering to daily contractual requirements versus investment for the future.

Predominantly, the funding models in place do not enable investment in digital technology to improve patient outcomes, and the data captured regarding service provision is still reasonably compartmentalised away from other core public health provider's systems (not integrated or interoperable).

Major service providers and digital developers/users in this sector are The Wise Group, Healthcare NZ, Access Homehealth, Geneva Health and Netsoft. Their scale enables them to build and utilise technology to enable effective service delivery and operate their businesses as efficiently as possible. In the case of The Wise Group, their IT business unit (Wild Bamboo) is the largest provider of digital solutions to the NZ NGO market.

Through their efforts, Wild Bamboo is playing an important role in building the digital capacity in this market although the challenges for NGO providers still revolve around the ability to invest in the technology itself, along with the required human resources to utilise it to their fullest.

Similarly, the opportunities this creates are being recognised by digital innovators (such as Noted and Netsoft, for example) who have developed cloud-based, simple to use, subscriber fee models that mobilises the allied and NGO health workforce and simplifies the capture of consumer records along with moving towards a more interoperable state.

Along these lines, both the allied health and NGO sectors have huge scope for improvement, which is especially important given the amount of people employed in these sectors who provide essential services to New Zealanders most often delivered in the home and community settings.

They can be viewed as a "direct to customer" provider and utilised as an important component of the empowerment of the health consumer of the future.

COMMUNITY PHARMACY

The community pharmacy market in New Zealand has two main providers of digital software – Toniq has the majority of the market with RxOne servicing the remainder. Toniq have a strong relationship with the Green Cross Group (which dominates the New Zealand pharmacy market) with an estimated 60% of revenue and script share. In the aged care sector (resthome and hospital) MediMap has approximately 65% of the market share with respect to medicines management.

Significant changes are occurring in the community pharmacy marketplace with the Chemist Warehouse (from Australia) entering the New Zealand market, which is challenging the established Green Cross Group and independent community pharmacies. RxOne has a strategic relationship with the Chemist Warehouse. Toniq has a similar relationship with Countdown who entered the pharmacy market in 2013.

There is a new entrant in the community pharmacy market with ZOOM Pharmacy launching a "disruptor" service that interacts electronically with the GP and patient to efficiently deliver prescriptions to the patient (to their home, place of work or other patient designated location).

Other innovative entrants are expected to enter the community pharmacy market along these lines as the 'virtual marketplace' driven by the consumer/customer is developed further.

Both Toniq and RxOne community pharmacy digital systems are currently "on premise" but the evolution towards contemporary web service architectures and cloud storage has begun. Similar to GP PMS systems, discussion must take place about the data privacy security of these systems.

Pharmacies are complex workplaces and systems need to interface and integrate with -

- Payments (incl AliPay etc)
- Dispensing robots
- Medimap

- Ecommerce
- Courier
- Xero/MYOB
- NZePS

Note - specialist compounding services are concentrated in Auckland with CompoundLabs dominating the market and delivering product throughout New Zealand.

The NZ Patient Management System (PMS) market is approximately $15 million in terms of revenue size to the digital providers (excluding messaging systems such as HealthLink and KonnectNet). As such, the primary care sector is a relatively small market in dollar terms (in comparison to the wider health sector). It is currently going through a period of change caused by new digital providers entering the market combined with some primary health organisations (PHOs) investing in their own "IT shops" to directly service their GP's digital requirements.

With approximately 1,000 general practices operating in New Zealand, the cost of digital systems at a practice level is still a material expense line for individual practices (despite the overall market size being small in health sector terms). The value of the PMS extends beyond the general practice door, capturing key community data needed to complement the wider sector.

The PMS market has one larger provider (MedTech) that has the majority share (approx. 80%) with most of its GP customers using the MedTech32 application. There is a move towards shifting their GPs onto their cloud-based platform (Evolution). There are five other main providers to the PMS market being – MyPractice, Intrahealth, Valentia Tech/Indici and Best Practice Software.

The primary care market is highly connected, based on the solutions that Healthlink has provided over the last 20 years. A typical New Zealand GP communicates electronically with 84 trading partners per month (compared with an average of 12 in Australia). This points to a more complex nature of the New Zealand environment and where opportunities could exist for consolidation, especially the previously mentioned small size of the overall PMS market.

The following graph provides a picture of the messaging traffic across the primary care sector per digital provider (sourced from Healthlink) -

Estimated PMS Market Share Dec 2018

■ MedTech ■ Gensolve ■ Incisive ■ Intrahealth ■ My Practice ■ Solution Plus ■ Houston ■ MedCen
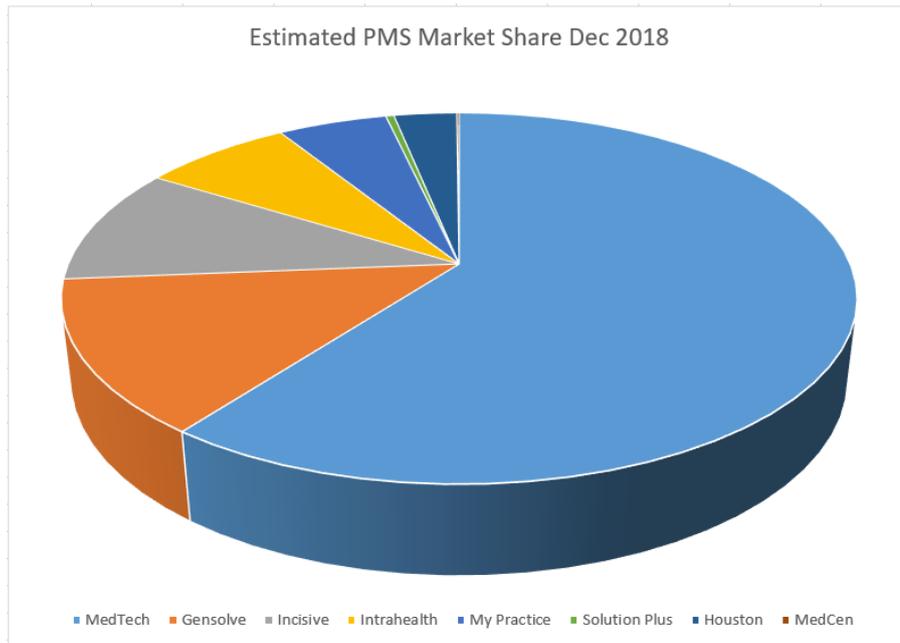
Moving away from "on-premise" installations

As with community pharmacies there is a move away from "on premise" configurations to cloud-based "as a service" solutions. Currently, it is estimated that PMS users are hosted in the following ways -

▪ 1/3 hosted by software company (i.e. the PMS software provider)
▪ 1/3 hosted and managed by local business solutions partner (a cloud hosting provider)
▪ 1/3 "on premise" (the GP's own piece of hardware)

The obvious benefits of being hosted off-premise are increasingly being recognised especially in the areas of support, integration, efficiency, ongoing upgrades, security and risk management.

There has been an historic reluctance to more away from on-premise systems (mostly determined by cost and reluctance to change). However, the changes in the PMS market are driving greater uptake especially where a GP's system needs to be upgraded due to its age or where a GP is switching to a different or upgraded PMS solution.

There has also been an historic practice of providing multiple "instances" of an application (MedTech report having approximately 600 instances across their GP customer base, which has reduced from 900+ over the past few years). The requirement to provide separate instances has provided the benefit of a more individualised experience for a GP but has also created a more complex IT environment, especially when it comes to systems changes, upgrades and enhancements.

As systems move to cloud-based environments this will make the provision of security and privacy requirements more easily provided. There does need to be encouragement and investment in

making this happen more quickly as there are numerous risks in this sector when it comes to holding sensitive patient related data and ensuring this data is suitably safe and secure.

Further supporting the need to move away from on-premise systems is the information provided in the table below. This highlights the operating systems in use that are supplying data to HealthLink. It shows that there are still older systems in use that have a very high security risk and, in some cases, may no longer be supported by the software manufacturer (such as, XP, Vista and Windows 2003).

Hence, a cloud hosted, and fully auditable system will significantly reduce the risks of cyber-attacks and the exposure of sensitive patient records, whilst creating a far more efficient environment with which to keep up-to-date, operate and innovate from.

Operating System	Number
Windows 2019 Data Centre	1
XP	10
Windows 8	25
Windows 2011	35
Windows 2003	65
MAC	76
Vista	107
Windows 2016	109
Windows 10	160
Windows 7	415
Windows 2008	415
Windows 2012	609

NZ Operating system by Healthlink Messaging

- Windows 2019 Data Centre
- XP
- Windows 8
- Windows 2011
- Windows 2003
- MAC
- Vista
- Windows 2016
- Windows 10
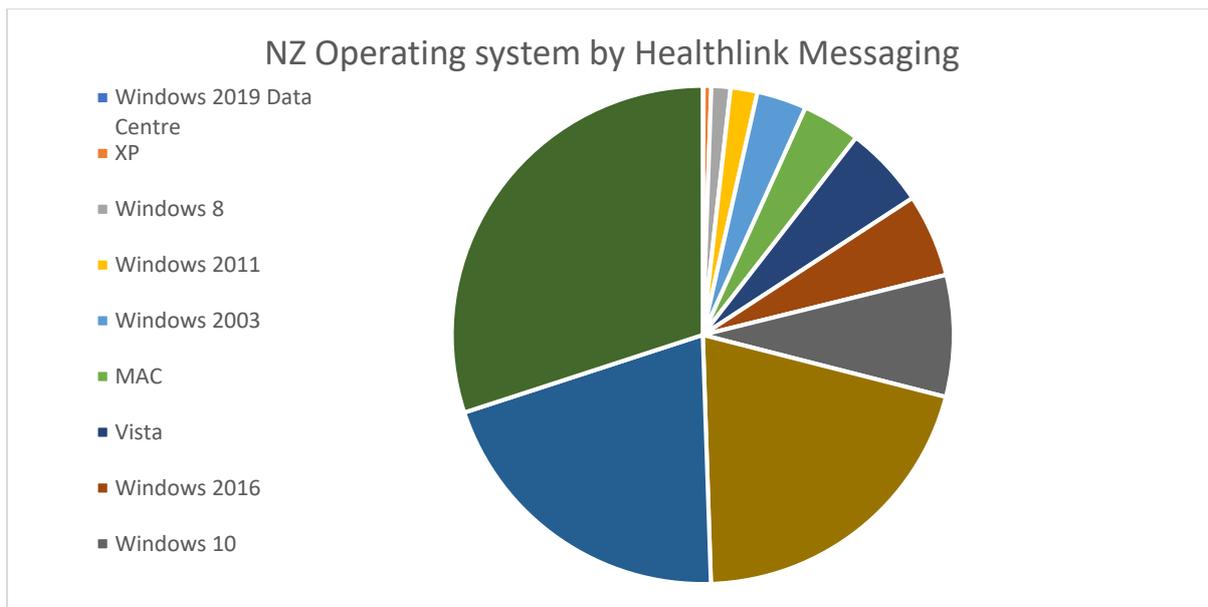
There is a market shift occurring from GP practices purchasing software themselves to the Primary Health Organisations (PHOs) engaging with a 'preferred system' and, in some cases, providing the IT infrastructure services themselves (versus contracting this out to private sector operators). The PHO then recommends that its GP members purchase the chosen preferred system on a preferential basis.

Examples are as follows -

- Pegasus – Intrahealth (Profile/Sirius)
- Pinnacle – Valentia (Indici)
- Compass – Valentia (Indici)
- ProCare – Valentia (Indici)

Whilst having the endorsement of a PHO in this way provides obvious advantages there are still reasonably high market entry costs associated for any potential new entrant to the PMS market. One new entrant has provided an estimate of $500,000 required to interface and connect/gain access to a range of other systems such as ACC, National Enrolment Service (NES), National Health Identifier (NHI), Health Practitioner Index (HPI), Concerto/Clinical Portal, Éclair, NZ Formulary and so on.

These also factor into the cost structures of the incumbent PMS providers who have to maintain their system's connectivity profiles across these numerous settings.

With APIs emerging for national assets (NHI, HPI, etc) there should be a reduction in these cost factors over time. NZHIT supports the Ministry of Health working with the sector to prioritise the availability and adoption of these as soon as possible.

The wide range of applications, versions and instances aligns with the nature of the public health's secondary care sector where there are national, regional and local systems in place. The survey undertaken by NZHIT showed a significant number of systems and services across the sector that adds to the relative complexity when it comes to addressing key areas such as interoperability.

There is an opportunity to reduce this complexity and minimise fragmentation especially through the previously mentioned development of aligned digital health strategies, operational plans and associated funding models.

There has been significant headway made over recent years to drive regional projects such as in the South Island with SIPiCs, HealthOne and Health Connect South; the Midland Clinical Portal and NCHiP system (Midland region), CMH/WDHB shared clinical portal (Northern region) and soon to be implemented Northern and Central Region's RIS/PACS systems.

Some points to note

- Variability of systems across DHBs, regions & nationally i.e. 5 x PACS across the country (regions not consistent except Central)

- Variable versions nation-wide, sometimes >4yrs old i.e. Concerto in Northern Region (15 versions behind current)

- Multiple instances across regions i.e. Midland region has 5 instances of PAS (1 per DHB) vs Central & SI having regional implementations

- Not shown is the fragmented nature of HR related systems – an opportunity to develop workforce related efficiencies and effectiveness

NATIONAL AND REGIONAL SYSTEMS

Members expressed frustration at New Zealand's ability to procure, implement and then run national and regional programmes. One of New Zealand's advantages is that at a population of 5 million, we have the opportunity to implement "small" systems nationally and ensure they are all interoperable and meet required standards.

This gives software providers the opportunity to "win or lose". If they win, great. If they lose then they move onto the next opportunity. It prevents costly effort for every provider trying to 'win' every DHB, and only ever realising a small market. Ultimately, when the scale of the solution and revenue available is too small, then investment in R&D becomes difficult on an ongoing basis, especially where perpetual licences have been granted and there are limited SaaS revenue models available currently.

Software providers are often reluctant to promote their system regionally or nationally because they know the procurement process will be resource intensive, expensive and will often be a

drawn-out process with a high chance of the project not being procured or cancelled once commenced.

Related to these comments are -

- The implementation of regional or national projects has a chequered success i.e. the maternity solution has been implemented in only 4 x DHBs over 5 years.
- Infections solution in only 5 x DHB in 8 years.
- A national dental solution tender was put to the market, which was not awarded and has instead gone back to regional.
- The National Oracle System has a well-documented history of slow and expensive implementation.
- National Child Health Information Platform (NCHIP) has taken 5 years to get to business case in the Northern region and still not adopted in Central Region or South Island (so not yet National)

Medications Management -

- MedChart – installed in 7 x DHB (but not necessarily across an entire DHB)
- MedRec – different instances installed across the country; no upgrade paths being explored for MedMan with full meds APIs
- ePharmacy being rolled out slowly
- NZePS (Electronic Prescribing Service) 14% of GPs in 5 + years. All Pharmacies have now been connected.

It is believed there are a number of factors causing this situation including -

- The need for a collaborative, co-design approach from the outset,
- Funding for the procurements processes are in place but not for implementation of an actual system meaning the process is stymied or cancelled when funding doesn't eventuate.
- Increased sharing of successful implementations and lessons learned to reduce the repetition of work across the sector.

It seems that where there is a national organisation such as Plunket, Defence, Corrections, NZ Blood Service, there is a better chance of a successful IT implementation and consistent delivery across the country.

Where projects span multiple DHBs, members relayed problems often occurring resulting in significant delays to project commencement and project completion. This can be in a number of areas:

- **Purchasing and contracts** – with a devolved model of funding each DHB is required to:
  - Develop a business case and obtain approval
  - Identify funding before going to tender or, if funding is not available, notify the market or go to short EOI process
  - Enter into a direct contract with the vendor

- o   Prioritise amongst other IT projects
- **Infrastructure** – Often each DHB will need to host and maintain a separate instance of the application creating costly inefficiencies.
- **Standardisation** – With 20 x DHBs there is a huge opportunity for a project to get "lost" during the specification and implementation phase. Software providers commented on frustrations in being asked to provide customisation to accommodate clinical practice differences within each DHB, and between each DHB. Defining standard naming conventions for the services provided across the country that spans typical tertiary, secondary, rural hospitals, etc would accelerate speed to value and be more cost effective.
- **Product Selection**: Often this becomes a hugely complicated process with 4 or 5 separate DHBs and in some cases up to 20 DHBs having input into an RFP. The result is that no single system can satisfy the requirements for all. This sometimes results in the selection process being cancelled at great expense to all involved (public and private sectors).
- **Business Case**: The sector needs to develop expertise in writing business cases based on the Better Business Case model, enabling fast tracking and standardisation of business cases. Efforts should be made to standardise at a national or at the regional level.

The Future

New Zealand has an opportunity to improve the process of running national projects. There is a need to explore the various national projects that are currently ongoing and learn from the successes and failures. In doing so, a core competency can be developed in this area that focuses on:

- Being able to identify when a project should be national (or regional)

- Being able to identify a lead DHB to define the requirements and implement on behalf of a few, or all, DHBs (not limited to those that sit within a particular region e.g. Waitemata DHB could provide support to smaller DHBs within their region (Northland) or those outside their region (Lakes), broadening the skills and talent reach and streamlining product selection process.

- Develop skills for managing a single software provider. With good processes in place any threat of monopoly ("vendor lock-in') can be managed. The benefits of a well-managed national system are significant and all solutions, as long as they are being procured to be open, will provide opportunities for other software providers to participate and additional value to be created.

- Investigate 'top slicing' funding to remove the need for individual business cases. Fund key priorities centrally to accelerate the pace of change and create momentum for digital enablers.

- Standardise and streamline clinical processes before implementation of the solution. Set up a "National Clinical Design Authority" to align processes for core and common services. Publish and mandate adoption.

▪ Invest in change management. Too often during negotiations, change management is removed to lower the cost of the implementation, which is seen as optional or managed by the DHB with no input from the software provider and almost always commenced too late to be fully effective.

▪ Instead, change management needs to be a 'non-negotiable' component of every IT implementation and viewed as a key enabler to the whole project being successful, especially so that it can move to the business as usual stage and provide the required effectiveness and efficiencies.

▪ Encourage "as a Service" solutions hosted centrally with a standard configuration (with options where necessary)

▪ Create an environment that encourages NZHIT members to:

  ▪ Look at developing innovative solutions in partnership with the public sector.

  ▪ Look for novel public-private partnership collaborative models where there is shared risk and reward based on solid benefits realisation outcomes to measure success.

  ▪ Look for solutions from around the world that could be brought into NZ to support local solutions and implemented regionally or nationally.
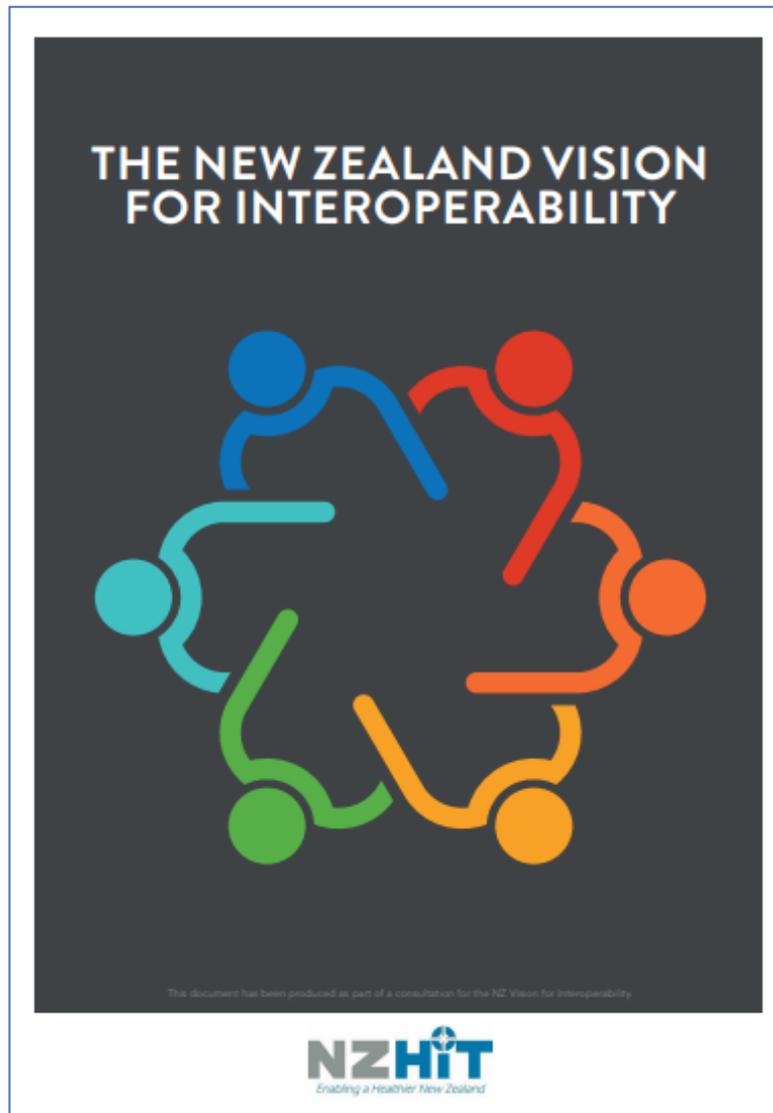
It is NZHIT's position that the vision, charter and principles contained in the New Zealand Vision for Interoperability remain highly relevant and must be used as the platform to fast track progress, un-lock the potential that already exists in digital systems presently in use and create a "call to action" for all those who have the commitment to engage in this process.

This means that there must only be one vision and charter covering the whole of New Zealand's health and disability sector with funding, policy, standards and operational alignment adopted as a matter of requirement, not choice.

In 2016, NZHIT members and key stakeholders produced the "New Zealand Vision for Interoperability" (see appendix). This also assisted in a combined piece of work with the MOH to produce the "Commitment to New Zealand Health Interoperability" (see appendix). In 2017, NZHIT supported the MOH with the implementation of an interoperability technical working group (TWG) and has had members involved as representatives to contribute to the development of a standard for interoperability.

The interoperability TWG is still in operation and NZHIT continues to support this group. This is an example of where public and private sectors can come together and create positive results. However, the view of running these groups "on the smell of an oily rag" must change.

The importance of interoperability to New Zealand's health and disability sector requires these types of joint collaborative work to be given the highest level of priority and funding.

As set out in the NZ Vision for Interoperability it contains a 'Vision' and a 'Charter' (pages 4 & 5) that are designed to provide direction to all participants in the health and disability sector to work collaboratively to build a fully interoperable digital environment that is a key enabler of quality healthcare services delivered as effectively and efficiently as possible.

At the time of producing this document it was acknowledged that it is a first step focussed on establishing a leadership position and was a "call to action" that must be heeded if interoperability in New Zealand's health and disability system is to be achieved. Most importantly, the future needs of "health customers" (consumers, patients, clients) must be central to this process so that interoperability supports the models of care that are essential for the delivery of quality health and disability services.

Unfortunately, despite the obvious importance of interoperability, progress since 2016 has been slow and reflects the multiple factors that need to be addressed in order to be successful. In fact, it is now over 8-10 years since the previous interoperability framework was tabled. In this time healthcare demands, challenges and costs have increased markedly whilst interoperability has still not been achieved.

In the spirit with which it was developed, NZHIT does not hold proprietary rights over the New Zealand Vision for Interoperability and wants to see it used for its intended purpose. Hence, the context of NZHIT's position is drawn from the vision document and remain as relevant today as they were when developed in 2016.

INTEROPERABILITY IS ESSENTIAL

The vision document (page 2) makes it clear that interoperability must happen and 3 years later we still see this as an imperative for the sector. From a health funding and policy-setting point of view, improved interoperability increases efficiencies and enables more effective services. It underpins the ability to design new health services based on the future needs of the population.

Delivering efficient, sustainable, high quality, multi-disciplinary care in a range of settings from home to hospital makes interoperability one of the important foundation stones for the health and disability sector.

LEADERSHIP WILL MAKE THE DIFFERENCE

Largely, interoperability is not a technical problem to solve. It is more about everyone's willingness to accept it as the way forward, to support it and to make it happen. In the words of one DHB CIO involved in the document's engagement process –
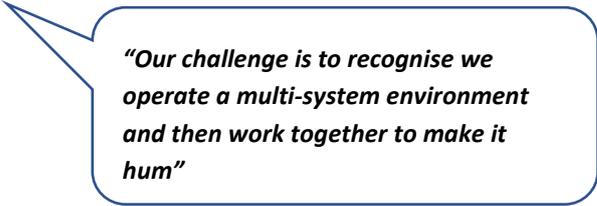
> *"Our challenge is to recognise we operate a multi-system environment and then work together to make it hum"*

Standards and compliance are important and obviously critical when it comes to areas such as privacy and confidentiality of data and information. However, these are seen as enablers rather than the only way that interoperability can be achieved. It is often asked - if these were the sole drivers of interoperability, then surely, we would already have this in place?

As a part of NZHIT's position we support a move away from historical transactional, compliance ('master-servant') interactions to collaborative, long-term solutions that are based on relationships, partnerships and joint innovation processes. It is pleasing that there are pockets of this style of approach now occurring and these can be used as exemplars to spread this type of leadership approach across the country (for example, Canterbury DHB & Waitemata DHB).

BUILDING BLOCKS FOR ACHIEVING INTEROPERABILITY

There are some key principles that are seen as building blocks (page 7) towards achieving an interoperable environment –

- **Re-use of an existing interface** that includes;
    - no restrictions on use
    - no additional charges
    - un-envisaged use and improvements benefit all
- **A "trust" environment –** meeting a minimum standard where trust is multi-dimensional comprising; identity, authorisation, security, performance, use, consent, data quality, visibility, provenance, etc.
- **Easy access to national information assets –** the National Health Index (NHI), for instance, needs to be readily accessible to enable interoperability to work particularly for consumer identification.

- **Governance and good practice for interoperability projects – this is multi-dimensional and includes;**
    - a need for interoperability that can be specified in terms of use cases and processes
    - customer(s) that can enter into a contract with approved industry partners to create and maintain an interface
    - governance – standard 'good practice' for projects will apply
    - A budget and/or commercial model that accounts for the full life cycle of an interface
    - Alignment with the interoperability vision and its core principles, including being re-usable by others
- **Technology, process and commercial quality** – building and maintaining an interface between one or more systems requires high levels of skills.

"CERTIFYING" FOR INTEROPERABILITY

NZHIT's members are supportive of a certification process that creates an environment where there is a capability to provide stewardship and curation of published interfaces, support for interoperability efforts and provides a model to support achievement of the interoperability vision.

This could be through a certification (or similar) process that ensures the following functions are in place –

- Sets a minimum standard
- Accredits industry partners (and maintains a database of approved/certified industry partners)
- Reviews and accredits interfaces for re-use by others
- Curates published interfaces (facilitates their re-use)
- Operates a technical sub-committee (or similar)
- Facilitates access to business model and process expertise to help ensure best practice
- Works with MOH to streamline and operate processes to make national information assets available to industry partners
- Operate an agreed construct where interfaces can be tested, new interoperability scenarios can be tested, re-usable services can be maintained and accessed.

It is important to note that any certification process requires an infrastructure, expertise, resourcing, funding and leadership that is not generally met through a conventional internal standards setting methodology, especially where a 'whole of sector' approach is required.

Certification also requires a process for auditing that the standard has been met and continues to be met. Certification to a standard also has to factor international standards into its process so achievement to the New Zealand requirement is translatable to same or similar standards in use globally.

A benefit of certification is that it creates a "one time" national assurance environment whereby any party in New Zealand that is procuring and funding for interoperability doesn't have to run their own individual due diligence processes (which is currently the case). This reduces transactional

costs for both the buyer and seller each time an interface is being procured and speeds up the process to get this into place.

The challenge with any type of certification process is to achieve buy-in across all key stakeholders especially where a level playground approach is essential to gain engagement. The sector needs to look at national and international examples in order to develop a construct that enables it to achieve the required outcome.

For example, Standards New Zealand has a well established and proven model for the setting, maintaining and auditing of standards across a wide range of sector and industry groups. It has expertise in bringing key sector players together to collaboratively develop and agree on minimum standard sets based on a partnering approach rather than a traditional 'master-servant' environment.

FUNDING FOR INTEROPERABILITY

There are three factors involved under this heading -

1. A requirement for funders to "purchase to the minimum standard"

Industry partners wanting to participate in New Zealand's health and disability sector will have to make the necessary investments to achieve certification (or similar) to the standards along with maintaining their systems to the standards and being "audit ready". It can be seen in other parts of the health and disability sector that this creates a "wheat from the chaff" situation whereby those having a commitment to participate in the delivery of healthcare services are prepared to invest accordingly.

Conversely, those who are not prepared to make this investment can choose to opt-out or not enter the market altogether.

Hence, this commitment and investment has to be recognised through procurement processes where the funder is required to purchase from only those who meet the nationally established minimum standards for interoperability. This also requires that procurement documents (e.g. RFP, ROI, etc) and contracts contain uniform and consistent clauses that clearly stipulate the standards that the respondents have to demonstrate are in place.

2. Investing to create an interoperable sector environment

Achieving an interoperable environment requires levels of investment that reflect its importance to the New Zealand health and disability sector. A key factor in the slow progress to date has been that this importance has not been supported by sufficient funding support and the tensions that exist between the desire to have a "complete digital solution in place" versus individual pragmatic decisions based on needing to get a solution in place at the lowest possible price point.

This generally means a reduction in functionality especially where interoperability interfaces are removed from a contract and upgrade agreements.

The heat maps presented earlier in this report are indicators of this. There will need to be investment to bring a number of IT systems up-to-date or disestablished and replaced altogether so interoperability between systems can be implemented.

An opportunity exists to review and trial best practice or successful implementations from other countries where the flow of data has been funded and mandated, and where standards and interoperability are being adopted as a key enabler to solve sector problems. An example of this could be where Australian GP and Pharmacy software vendors are being compensated 15 cents per transaction for all scripts (in return for this data being made available nationally) and provided upfront 'interoperability' funding to enable systems to send data to the MyHealthRecord (MyHR).

3. Commercial models that provide stability and sustainability over the long-run

Regardless of who develops an interface there has to be commercial rigour in place to ensure that it remains stable and is sustainable throughout its life cycle, and that of the business entity (or entities) that develops, operates and maintains it.

The New Zealand Vision for Interoperability outlines this in its Vision statement as follows (page 4, point f) –

"I play my part in providing an interoperable environment by making sure there are robust, well planned and considered commercial arrangements in place where everyone's investments are made based on long-term sustainability and return on investment (in the public and private sense)."

The Interoperability Charter adds to this as follows (page 5, point 4) –

"A commercial model for the use of the interface will be agreed and parties will only enter into a contract that addresses the full life cycle of an interface. This includes design and development, implementation, change management, operations, maintenance and ongoing support based on the agreed scope, and scale of use and performance expectations for the interface."

The true power of an interoperable environment can only be realised where the commercial factors inherent in building and providing interfaces to connect various systems is understood and recognised.

This is important because interoperability demands that digital systems are connected in a way so data and information can be accessed by clinicians, patients, service users, carers and family/whanau "anywhere, anytime and anyhow" whilst ensuring relevant standards, identity, privacy and security requirements are met.

In summary, investment needs to be made to build the construct outlined earlier in this section and to support the development of a standards environment that enables a certification (or similar) process.

There will be obvious returns on this investment including –

- Greater efficiencies through individual purchasing and contracting processes being standardised to a "one-stop shop" approach i.e. each DHB does not have to run its own accreditation-type processes.
- This also provides a quicker implementation process where standardisation and best practice can be utilised across the whole sector.
- Different digital solutions become interoperable as a matter of course. Individual procurers may select solutions that suit their particular needs in the knowledge that other local, regional and national (potentially international) solutions will interface across the whole sector.
- Improved clinical and operational efficiencies and effectiveness. These go to the core of why interoperability is essential – health consumers, and their clinicians/care providers, need access to their data and information no matter where it resides.
- The health and disability sector needs to derive operational benefits that interoperability can deliver through areas such as (but not limited to) reduced/eliminated re-work, improved clinical decision-making, placing health information in the hands of the consumer.

The key to a successful health IT sector in a "socialised health environment" (such as in New Zealand's case) is the ability to share data across the sector between the diverse array of medical (and non-medical) providers in New Zealand.

No single system can provide a "total solution" to New Zealand, so we need to develop a model where "best of breed" applications can share patient data to enable a streamlined and efficient service to the population of New Zealand, where all data appropriate to those providing health and disability services is available quickly and presented appropriately.

It is very positive that there is a sector-wide commitment to standards and interoperability. Industry providers are willing to work collaboratively with the MOH and others to develop new standards and methods of interoperability.

From this survey it can be seen that infrastructure and investment has to be made to create a consistent, up-to-date digital environment for interoperability to be made possible; the 'standards body' has to become more prominent and resourced to deliver whilst it continues to engage with the sector.

And, most importantly, leadership and commitment to creating an interoperable environment has to be demonstrated across all levels.

OTHER FACTORS THAT WILL ASSIST INTEROPERABILITY

FOUNDATIONAL SYSTEMS – IDENTITY, PRIVACY, SECURITY, WORKFORCE

Whilst interoperability is an important component of what are seen as the sector's digital foundation systems (core components that must operate effectively in their own right whilst supporting all others at the same time) there remains substantial work to be done in the following areas -

- **Identity**
  Digital identity is fundamentally important to New Zealand's health system and health outcomes.
  Modern approaches to digital identity position it as being….
  1) a key enabler of digital transformation across any industry including health,
  2) central to enabling health system users to more effectively participate in the health services they receive, and
  3) as the so-called "control plane for security".

  As with security, current approaches to identity across the health sector are fragmented and based on outdated concepts and technologies. A correspondingly well-resourced effort to develop a modern approach to identity across the health system is warranted.

  In this regard, it is important to note the work of the Department of Internal Affair (DIA) Identity Transition Team. Once complete, this work will have fundamentally altered the approach NZ Government takes to identity.

  Whilst it is essential that the health system's approach to identity is not divergent from this it should not be used as a reason to pause when it comes to the health sector. In fact, the health and disability sector is in a good position to be able to provide a lead role as there are some fundamental building blocks already in place for "quick wins" to occur that can still feed back into the DIA and cross-government work.
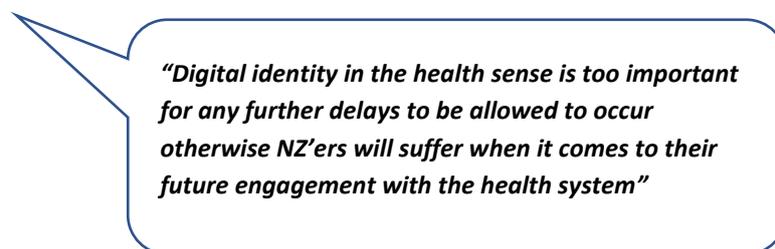
  > *"Digital identity in the health sense is too important for any further delays to be allowed to occur otherwise NZ'ers will suffer when it comes to their future engagement with the health system"*

- **Privacy**
  Privacy, consent and social licence are areas that need further attention, particularly as there is going to be increased digital implementation in allied health and NGO sectors. Currently, policy in this area is not keeping up with the pace of technology change and creates a barrier for progress.

- **Security**
  The nature of contemporary security risks is rapidly evolving, with profound implications for the NZ health system. The system's social licence to operate very much depends upon its ability to protect New Zealanders' health information and assure the ongoing operational ability of health systems in the face of a rising volume of ever more sophisticated security threats.

  There is a well-grounded concern that the current approach to security across the health system is fragmented, variable in its implementation, and outdated.

Significant effort should be expended to develop a "modern", universally adopted, approach to security that;

1) better anticipates and mitigates emerging security risks,

2) better assures robust privacy outcomes whilst,

3) enabling confident digital transformation of the health system.

- **Workforce enablement**

In conjunction with the above, workforce identity is also an area that must be prioritised. There are advantages for digital solutions to have access to a single HPI but there are currently no national APIs available to make this accessible for digital and health providers to do so.

The benefit of a single-sign on across the country must be a goal for the sector and it requires a concerted effort to mobilise all parties to make this happen.

Additionally, consideration must be given to how we handle non-registered care providers and the access they will require as we connect allied health and community teams with other more traditional care providers.

There is a great deal of untapped potential from carers and non-registered health workers and, to leverage their spread and depth, they will also need to come under the remit of an HPI.

The shape of the New Zealand health workforce is changing as technology plays an increasing role in automation and enabling a more mobile and virtual service delivery model. Freeing up time to care for our existing workforce whilst managing increasing demands on services is a key consideration.

This is where technology as an enabler needs to be seen as an investment in future sustainability, not as a cost to the system.

Whilst this report has predominantly focussed on the use of clinical software systems there is a need to address the fragmented nature of the digital systems used across the public health setting when it comes to human resourcing factors, including rostering, award alignment, and payroll.

Focussing on adding "head count" alone will not allow New Zealand to meet the ongoing pressures on the delivery of health services. It has been seen in other sectors (i.e. airline travel) that digital solutions can be used to provide greatly improved efficiencies that can be transferred into enhanced service delivery effectiveness "for the customer" whilst managing demand on the system.

This doesn't mean a reduction in the health workforce, but a far more effective delivery model is created that makes the best use of the people already in the sector whilst enabling greater planning and identification of where the pressure spots are going to be in the future.

This obviously enables improved decision-making, resource management and a more satisfied workforce.

> *"Given the large size of the health workforce, and the amount spent on this from Vote Health, there is an opportunity to create greater efficiencies through the use of joined up human resource systems"*

PROCUREMENT UNLOCKING INTEROPERABILITY'S POTENTIAL

NZHIT believes that there is an excellent opportunity for New Zealand to implement procurement processes that will unlock the potential of interoperability. In doing so, this will flow across the whole area of procurement, contracting and implementation of digital health solutions to support increased efficiencies and outcomes for the health and disability sector.

From both a funder and provider perspective the current procurement processes are challenging when it comes to the provision of digital solutions. There are obvious probity and funding considerations to be considered although the evolution of software development in recent times provides an opportunity to review and align the way software is purchased and implemented.

One of the most recurring themes (from both funders and providers) is the high transactional costs and resources required to carry out a procurement process. Sometimes, these costs and the resources involved can be as much as the solution that is being procured, whilst the time it takes from "RFP to implementation" can reduce the expected advantages that the solution was going to provide.

As a result, the following activities are on the increase and indicate the demand for digital solutions is high whilst the ability for the sector to meet this demand is being limited. These activities include;

- **Shadow IT** – the purchase and use of solutions that are not part of the care provider's (i.e. DHB) core and common IT systems.
- **Spend outside the IT department** – related to shadow IT, there is growth in the level of purchasing by other departments within a care provider (DHB) whereby senior clinicians, research clinicians and others are purchasing IT to meet a localised, specific demand.
- **Consumption-model procurement** – a current example being the Zoom videoconferencing solution that makes it simple for users to access and use on any device whilst paying for it on a

"consumption basis" i.e. you pay for what you use. This is different to the traditional procurement and funding models and is receiving a high level of support (as evidenced by uptake within a relatively short period of time).

It is important to note that these activities are not necessarily wrong and are highlighted here to demonstrate that the sector will find ways around a challenging situation in order to solve an immediate (and generally localised) problem.

Hence, there are opportunities to update procurement processes to support both the funder and provider sides of the sector, including –

- **Change the funding model** - shift IT procurement to align with hosted and outsourced solutions (i.e. from capex to opex funding methods) ensuring 'whole of life' costs are being taken into consideration when new SaaS solutions are being compared to on-premise systems that often require sizable in-house IT teams.
- **Aligned Investment** – build on a combination of 'best of international and national solutions', focussed on a NZ Inc approach that makes efficient & effective use of limited funding and resources. For example, if a solution is successful in another DHB, have a methodology for another organisation to quickly and efficiently purchase and implement the solution.
- **Define the scope before going to market** – an RFP/ROI type process that has its scope closely defined to the problem to be solved so the responses can be aligned to affordability and solutions can pragmatically be implemented.
- **Business cases and funding in place before going to market** – related to the above point, the funder has to prepare the groundwork in order to provide a procurement environment that encourages appropriate levels of support from the solution providers. All parties need to have confidence in each other that the outcome of a fair process will result in a business transaction taking place as this encourages engagement and investment in the procurement stages.
- **Utilise a panel approach where appropriate** – establish a panel of potential providers (based on functional merit for the problem at hand) and create an environment where the problem can be "worked on" together and a provider chosen who demonstrates the ability to solve the problem in the best way possible.
- **Faster time to implementation** – the nature of software development is that it needs to be implemented as quickly as possible to gain it's immediate benefits whilst building a version update process into the contractual agreement. Hence, move from a slower, waterfall approach that is "looking for the perfect solution" to a more agile, iterative pragmatic process that recognises the life cycle of the solution and enables it to grow and change as required.
- **Standardised contracting models** – draw on previous work already been done in the sector to develop and use a standard digital/software contract template that eliminates the need for individual funders to create their own contractual requirements and clauses each time a solution is purchased. Notwithstanding that specific deliverables may be different (and will be defined separately in the contract) although these too can be standardised to a certain extent, especially where the same software is being implemented to solve the same problem.
- **Intellectual property agreements** – included with the above point, the value and ownership of intellectual property (IP) provides an opportunity to recognise the risks, investment and

rewards involved for all parties, especially where a private entity has the opportunity to develop export markets that will provide NZ Inc level benefits.

- **Supporting successful solutions** – where a digital solution has provided clear outcomes, agreements need to reflect the ability for the software provider to develop use cases that support entry into other health markets (export opportunities) and local healthcare providers. This has the double effect of 1) translating successes across the New Zealand system and, 2) supporting NZ Inc growth whereby all citizens benefit.

INTEROPERABILITY AND MOVING TO "AS A SERVICE"

Significant progress has been made to move to the "as a service" model over the last few years. NZHIT members see this as a very positive move and support its increased adoption.

Interoperability obviously plays a significant role in this model whilst, at the same time, being enhanced by the model itself (in other words, the combination provides an exponentially larger benefit).

The advantages provided are:

- Increased security and more reliable systems implemented and operated across the country.
- Assists with interoperability – "in the cloud" systems can be more readily connected.
- Reduces the investment required to operate and maintain on-premise systems.
- Improved version control and upgrades resulting in more healthcare organisations running on the latest release of the software and the costs associated with version control being reduced (when compared to on-premise, localised systems).
- Improved business efficiencies for software providers through the reduction of multiple platforms (that often require specialist expertise for each one), which can be passed through into increased efficiencies for the care provider (i.e. creates a more competitive environment).
- Supports a "whole of life" approach that increases sustainability for all parties. For example, an agile model based on SaaS enables an immediate problem to be solved with ongoing updates keeping pace with the care provider and health consumer's needs.

There has been progress in this regard in the primary healthcare sector where the benefits of SaaS are now being better understood. Obviously, the changes occurring in that sector are driving GPs and PHOs to look for more efficient and effective ways for software to support their clinical and business needs, and there are similar benefits to be derived by the software provider.

The secondary care landscape is challenged by the prevalence of existing systems and tightly constrained budgets that has engendered a "make do" approach, which is understandable under the circumstances.

As highlighted by the current level of investment in IT solution in New Zealand (compared to the global average) this has resulted in a period of time where the systems (assets) in place have been "sweated" to their limits.

In this environment it is very challenging to move to a cloud-based approach as there is investment required to do so whilst continuing to operate the current systems until they're able to be fully switched over.

However, there is no avoiding the imperative nature of this situation as moving to a SaaS environment must happen so the benefits that digital solutions are able to provide can be fully materialised.

INNOVATING FOR INTEROPERABILITY

Digital technologies are an enabler of health service delivery and support changes to models of care and business models (not the other way around). The development of innovative digital health solutions over the past 2-3 years has seen a positive move to having "interoperability" built in as a matter of course.

> Support for ongoing innovation in the digital health space is an imperative and must recognise the ability for the "inventors" of new, enhanced solutions to develop scale and sustainability that recognises the investments required. The New Zealand health and disability sector has an immense opportunity to support the NZ Inc approach to be a leader in technological advancements that ultimately benefit our citizens.

When it comes to software solutions in general, and interoperability in particular, there has to be collaborative alignment across 3 main areas within the sector –
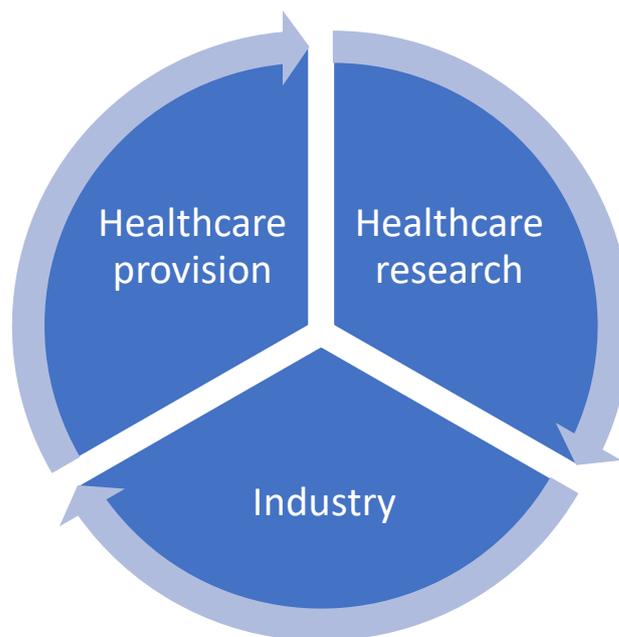
There is progress occurring within some localised parts of the sector (i.e. Waitemata's i3, Canterbury's ARA Innovations lab, Precision Driven Health Research Partnership). There are opportunities for increased regional and national alignment to support an innovation platform(s) to encourage the development of new solutions or enhancements to existing solutions that benefits New Zealand's health and disability sector.

Whilst it is challenging to be a private entrepreneurial innovator in NZ's health IT space, there are a growing number finding a niche segment then building on that for small incremental growth. Ongoing sustainability is a challenge (many have 'mortgaged their house or borrowed from family' to pursue their passion) and many of the points raised in the above procurement section are relevant when it comes to supporting innovation in the sector.

A benefit of new entrant (or existing market) innovators is that they are quick to adapt to sector and health consumer needs, often drawing on solutions from other markets (i.e. cloud hosted as standard, SNOMED and FHIR as standards of choice), they're nimble, agile, keen to collaborate and have an eye on international markets (albeit some are currently finding it easier to go off-shore first i.e. ARANZ Medical, Volpara, SHI Global).

It is essential to encourage scalability in order to create sustainability, share best practice more deliberately and standardise at a national level those solutions that provide uniform benefit regardless of location. Where an innovation is proven to make a difference then enable it to roll-out more widely and encourage international reach, so NZ Inc reaps benefits.

The innovative IT solutions of the 1980's and 90's are the staple legacy systems of today and there is a near 20-year gap between them and the current innovators entering the sector. A lot has changed in the market during that time and the approach to innovation development also needs to change accordingly.

There is an opportunity to create an innovation landscape that…..

- Empowers clinical and non-clinical DHB staff to put forward ideas and work with private digital providers to develop these to implementation
- Encourages New Zealand's entrepreneurial "digital inventors" to invest in developing health applications
- Enables digital health companies to add new functionality to existing solutions
- Provides a trusted environment where failure is acceptable and a learning environment exists to take advantage of any failures in the innovation process
- Draws on overseas best practice for ideas whilst learning from local successes such as the likes of Waitemata DHB's i3 and the Canterbury DHB's innovation hub
- Aligns the transformation of the delivery of health care services with technology as a key enabling partner in the process
- Create a platform for New Zealand's digital health companies to succeed internationally (thereby bringing benefits back into New Zealand)

MEMBERS THAT DIRECTLY PARTICIPATED IN THIS OVERVIEW

For the purposes of this overview interviews were conducted with the following organisations:

Partner	Person
Orion Health	Niru Rajakumar, Client Success Director
DXC	Florian Stroehle, Account GM New Zealand, Healthcare and Life Sciences
Spark Health	Will Reedy, Director Digital Health
Medtech / ManageMyHealth	Sanjeewa Samaraweera, Head of Solutions Ross Tanner, Director
Indici (Valentia Technologies)	Javad Ahmad, President - Technical Services
Sysmex	Colin McKenzie, National Sales Manager Arjit Bhana, CEO NZ
Noted	Scott Pearson, Founder & CEO
Clevermed	John Tolchard,
Healthlink	Eric van der Sluis, National Manager New Zealand John Carter, Product Manager
MyPractice / Health 365	Ashwin Patel, Medical Director
AbleX Healthcare	Elliott Kernohan, CEO
Advanced Management Systems	Virginia Mitchell, Account Director
IntraHealth	Craig Longstaff, VP– Business Development
NVision	Matt Hector-Taylor, Director
WellSouth	Kyle Ford, CIO
Sense Medical	Alistair Rumball-Smith, Co-Founder & Director
ClanWilliam/Toniq	Geoff Sayer, Managing Director
Titanium	Paul Weatherly, Managing Director
Wise Group	Julie Nelson, Joint CEO
NZ Health Group	Don Robertson, CTO
Vensa	Ahmad Jubbawey, Founder & Managing Director
Geneva	Vidhya Makam, Chief Digital and Technology Officer
HealthSoft/RxOne	Ross Peat, Executive Director
Trendcare	Cherrie Lowe, CEO
Healthpoint	Kate Rhind, Managing Director
NZHIT Board Members	List them all

THE NEW ZEALAND VISION FOR INTEROPERABILITY, 2016

THE COMMITMENT TO NEW ZEALAND HEALTH INTEROPERABILITY, 2016

THE NEW ZEALAND HEALTH TECHNOLOGY REVIEW: 2016 – NEW ZEALAND COMPANIES INNOVATING TO IMPROVE PEOPLE'S HEALTH