# Quality Improvement at Counties Manukau Health: A case study evaluation

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Funder: Ko Awatea Counties Manukau Health




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## Contents

# List of figures

# List of tables

## Executive Summary

This report is an independent evaluation of a quality improvement initiative undertaken by Counties Manukau Health. The objectives of this report are to establish if improvement within the Counties Manukau healthcare system as a consequence of the initiative was evident, how any improvement was accomplished, and if any gaps remained. Three aspects of quality improvement were examined: Counties Manukau's System Level Measures, the establishment of comparisons and gold standards for these measures; and a case study of healthcare organisations recognised for their work on quality improvement. A modified case study method was used to examine these.

Counties Manukau Health's population and funding context is a significantly challenging one, requiring it to embark on an ambitious quality improvement response. It is clear from our findings that Counties Manukau Health has developed the cultural and quality improvement science approaches necessary to operate a quality improvement initiative largely in accordance with international best practice. It set ambitious targets and is the best performing of all its international comparators on three of its fifteen System Level Measures, is ahead of its peers on two of the fifteen, comparable on four, and is focusing improvement on five (one was unable to be compared). Overall the findings indicate that Counties Manukau Health:

- has largely put in place the organisational and operational structures needed to be successful;
- uses accepted techniques to address buy-in and change management;
- has clearly articulated the cultural importance of quality improvement, and has situated its work in an existing supportive staff culture;
- has invested in Ko Awatea as an educational organisation, in a quality improvement method that works towards sustainable change and in being a learning organisation;
- has recognised the need to link the emotional motivations of staff, patients and families to quality improvement;
- works with appropriate processes and technologies to support quality improvement.

In the future, Counties Manukau Health may like to:

- refine and extend the use of system level measures;
- extend the quality improvement initiative and the use of quality improvement methods, including system level measures, into the wider social sector;
- ensure the quality improvement initiative addresses its own sustainability;
- ensure learning and innovation remain priorities.

Healthcare measurement is difficult because there is no universal method of comparison. As such, this evaluation is unable to determine if the goal set by Counties Manukau Health's Chief Executive of being the best healthcare system in Australasia by December 2015 has been achieved. However, Counties Manukau Health has clearly put in place many of the strategies suggested by international best practice as being necessary to achieve such a goal. In this regard, we can confidently say that Counties Manukau Health is a leader, and one of the best at getting better.

## Section one: Study setting

This report documents the findings of an independent evaluation of a quality improvement initiative[1] undertaken by Counties Manukau Health (CM Health). Counties Manukau's goal is to become the best healthcare system in Australasia by December 2015[1] and is underpinned by a Triple Aim framework and delivered via six Executable Strategies. The framework and strategies recognise that to make meaningful progress towards the goal, if not achieve it, then quality improvement must be addressed. As noted in CM Health's 2015 District Annual Plan:

> *One key component of a high performing, modern healthcare system is a robust quality and safety programme.*[2]

This evaluation was commissioned by CM Health. It will inform its Chief Executive's report to his Board on the progress of the quality improvement (QI) initiative, as well as being shared with senior Counties Manukau managers. Aspects of this evaluation are also to be published academically. It is the clear intention of Counties Manukau Health to share widely what has been learnt by the evaluation, and this is to be commended.

For this report, the evaluation team from the University of Otago and CM Health has focused on CM Health's System Level Measures (SLMs) and comparing their performance on these with other national and international healthcare systems, as well as on the development of gold standards for these measures and case studies of best practice in quality improvement initiatives. As such, this report does not encompass all the QI initiatives CM Health undertakes.

Much can be learnt about quality improvement from CM Health's example, not least because its express intention is for quality improvement to operate across the whole of its local healthcare system.[2] Counties Manukau Health funds along the continuum of healthcare and provides a very wide range of services across inpatients, outpatients and public health. It does so for a very diverse population of half a million people with high levels of socio-economic and healthcare outcome disparity. It is also required by the New Zealand (NZ) Government to maintain a financial

[1] Quality improvement *initiative* is used in this report to indicate a programme of quality improvement activity in a healthcare system. It includes a number of more specific quality improvement *projects* implemented using quality improvement *strategies*.
[2] Dr Gloria Johnson, Chief Medical Officer, Counties-Manukau Health. Source: http://www.countiesmanukau.health.nz/blog/welcome-from-dr-gloria-johnson/. Last accessed 4/11/2015.

surplus. Consequently, the CM Health transformation goal is nested in a significantly challenging context from which other healthcare systems can draw valuable lessons. This evaluation will also make it clear that CM Health has been able to leverage from some important strengths in its staff and community.

The exchange of national and international experience has been crucial to both CM Health's quality improvement initiative and this evaluation of it. Counties Manukau Health's work is based on and continually informed by world leaders in quality improvement, both institutions and individuals, as it is well recognised that, at an organisational level, most innovation results from borrowing rather than invention.[3] Many of these leaders have provided their expertise to help in this evaluation.

The two-way sharing that animates CM Health's work also applies to its own staff, service delivery partners and patients, as well as many of the people of the district. The quality improvement journey CM Health has set itself is utterly reliant on working in such partnerships. One of the important findings to emerge in this evaluation is that quality improvement is not something done by management to the rest of the system; it involves people at all levels both doing and leading. Many of the initiatives discussed in this report originated with and owe their success (or otherwise) to passionate people throughout the Counties Manukau district. This should be kept in mind.

## Report objectives

The objectives of this evaluation were set in terms of reference agreed between CM Health and the University of Otago. The objectives are to determine:

- If improvement within the health system is evident;
- If discernible, how was it accomplished?
- Where gaps remain.

An improvement intervention in the context of this report is one where purposeful efforts seek to secure positive change in an identified service or system.[4]

These objectives are examined by considering CM Health's SLMs, their performance against these measures, comparing that performance with other healthcare systems and any spillover benefits or disadvantages associated with developing and implementing the measures. Also considered are the development of gold standards for these measures, and case studies of well-regarded quality improvement initiatives from other healthcare systems. These objectives are then analysed in the discussion section of this report and recommendations made.

## Report structure

This report is organised as follows:

- Section One: the study setting;
- Section Two: the methods;
- Section Three: the findings from each component of the evaluation;
- Section Four: Discussion and synthesis of the findings, including recommendations;
- Appendices: A significant amount of content rests in the appendices, in order to reduce the length of the main body of the report.

## Counties Manukau Health context

The following section is intended primarily for readers not familiar with the New Zealand healthcare system.

Counties Manukau Health is one of twenty District Health Boards (DHBs) in NZ. It was established in 2001. With the funding it receives, largely from central government, it is responsible for:

- Collaborating with other DHBs, service providers, the community and other stakeholders to plan the strategic direction for health and disability services in the northern region [of New Zealand] and promote the integration of health services;
- Funding the provision of most health and disability services provided in CM Health through service contracts with health and disability providers and non-governmental organisations;
- Providing hospital-based services for the population of CM Health and some access to specialist or highly complex services for people who are referred from other DHBs;
- Promoting, protecting and improving the health of the CM Health population through the provision of health promotion, health education and evidence-based public health initiatives.[5]

The overall structure of the New Zealand healthcare system is summarised in the figure below provided via personal communication by the Ministry of Health (15th October 2015). It is important to note that approximately 25% of healthcare expenditure is not funded from the public purse or administered by DHBs.

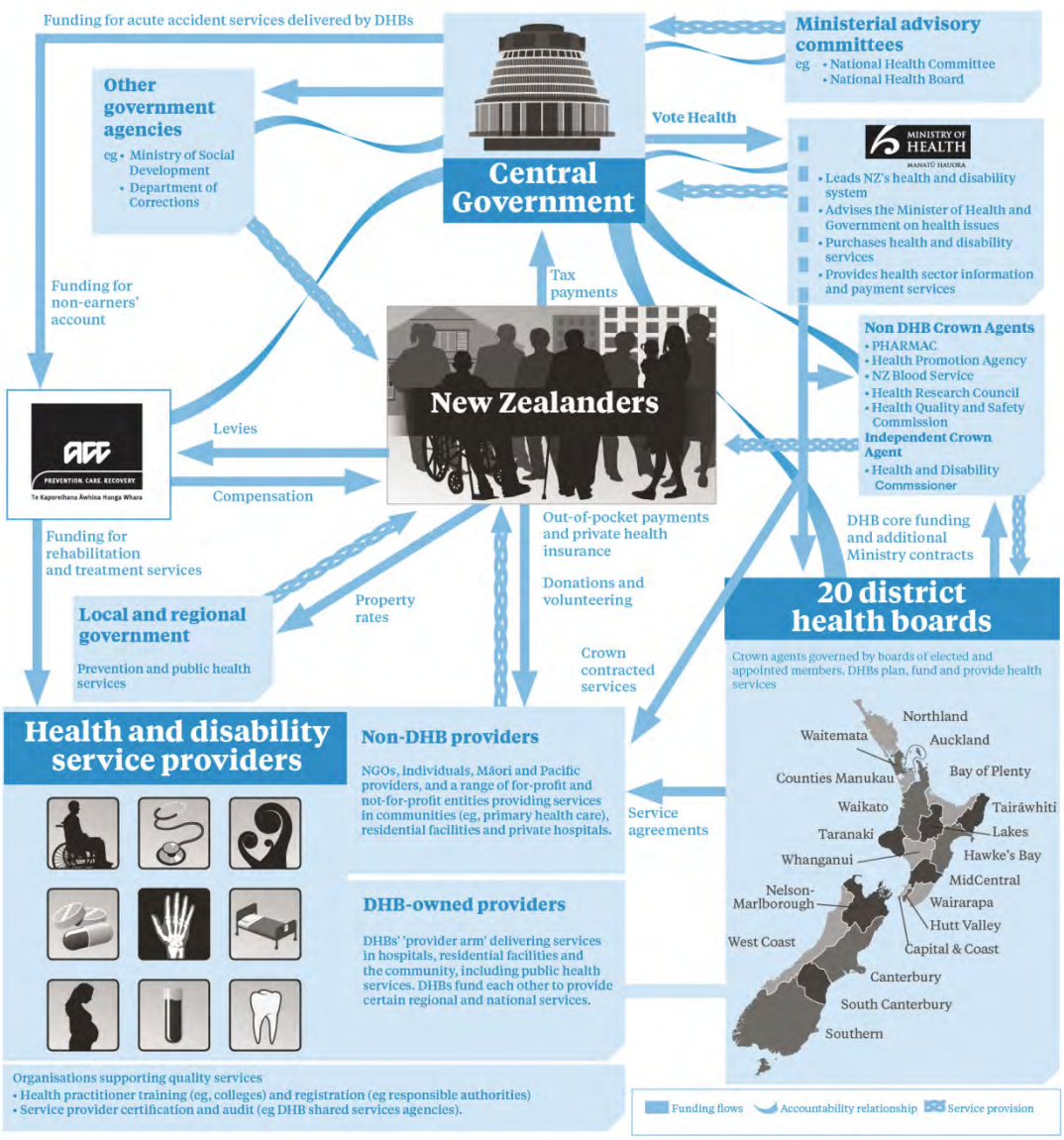



**Figure 1: New Zealand Health System Overview (Personal communication from MoH)**

Counties Manukau Health is governed by a Board of eleven members, seven of whom are elected by the community, and four, including the Chair, appointed by the Minister of Health. As well as the Board, there are three other key committees, the Hospital Advisory Committee (HAC), the Disability Support Advisory Committee (DSAC), and the Community and Public Health Advisory Committee (CPHAC).[6]

The principal executive decision-making body of CM Health is the Executive Leadership Team, which is responsible for designing and developing the strategic direction of the district's healthcare system, as well as ensuring its objectives and key performance requirements are met.[7] The Chief Executive, Geraint Martin, has been in the position since 2006, providing

significant continuity in senior leadership. He is acknowledged as having a strong quality improvement focus and promoting clinical leadership.[8]

Counties Manukau Health has long been recognised as having a strong quality improvement culture. This culture, however, was significantly enhanced by the establishment of Ko Awatea, CM Health's centre for health system innovation and improvement, in 2011. Since its establishment, Ko Awatea has been led by Professor Jonathon Gray. Its key purpose is to support sustainable high quality health services at CM Health and further afield in NZ and the Asia-Pacific region.

## Key healthcare statistics for Counties Manukau Health

Four areas that provide important context to the CM Health experience are population characteristics, workforce characteristics, healthcare service provision and financial performance. These are set out below.

### Key population statistics for Counties Manukau district:[9]

- Approximately 520,000 people, growing at close to 1.5% per year;
- Four distinct localities with their own demographics and healthcare needs;
- A more diverse population than other New Zealand districts: 38% Pakeha[3] and Other, 23% Pacific, 16% Māori, 23% Asian;
- A relatively young population: 24% of the population aged 14 years and younger, and a relatively high birth rate;
- 57,520 people aged 65 and over in 2014;
- Younger groups have higher proportions of Māori, Pacific and Asian peoples than the population aged 65 years and over;
- Life expectancy (2010-2012 average) at birth is similar to that of the New Zealand average at 81 years. The gap between Māori and non-Māori/non-Pacific is in excess of 10 years while the gap between Pacific and non-Māori/non-Pacific is 6 to 8 years;
- At the time of the 2013 Census, 36% of the Counties Manukau population lived in areas classified as being the most socio-economically deprived in New Zealand (187,250 people, estimated from the 2015 population). 58% of Māori, 76% of Pacific peoples, and 45% of those aged 0-14 years in Counties Manukau were living in areas with a deprivation index of 9 or 10 (the two lowest deciles);

[3] New Zealanders of European descent.

- Avoidable mortality and hospitalisation rates are higher than the national rates, with Māori and Pacific residents having higher rates than those in Asian and NZ European/Other groups.

## Key workforce statistics for Counties Manukau Health:[10]

- As at 1 January 2014, CM Health employed a headcount of 6,829 people, who worked an equivalent of 5,752 FTEs;
- From 2009 to 2013, FTE workforce numbers increased by approximately 14%;
- Over a third of the workforce were on casual and part time contracts.
- Half of CM Health employees were between 30 and 49 years. A third of the staff are likely to retire in the next 20 years;
- Māori and Pacific are significantly under-represented in clinical staff groups.

**Table 1: Counties Manukau Health FTE by workforce**

| Workforce Group | 2013 |
|---|---|
| Administration and Management | 832 |
| Allied Health and Technical | 1097 |
| Medical | 826 |
| Non-Clinical Support | 407 |
| Nursing/Midwifery/Healthcare Assistant | 2590 |
| Grand Total | 5752 |

Table 2: Counties Manukau Health workforce representation by ethnicity

| Workforce Ethnicity | All Staff | Clinical | CM Health Population |
|---|---|---|---|
| Asian | 26% | 29% | 22% |
| Māori | 5% | 5% | 16% |
| Pakeha and Other | 59% | 59% | 38% |
| Pacific | 10% | 7% | 23% |

## Key healthcare service provision statistics for the Counties Manukau district

Both of the following tables are sourced from Counties Manukau Health[4].

Table 3: Inpatient facilities, beds and discharges (Fiscal year 2015)

| Facility | Beds | Discharges |
|---|---|---|
| Middlemore Hospital | 746 | 100363 |
| Manukau SuperClinic | 68 | 14417 |
| Botany Downs Maternity Unit | 15 | 3848 |
| Pukekohe Hospital | 10 | 2321 |
| Papakura Maternity Unit | 10 | 2642 |
| Franklin Memorial Hospital | 26 | 60 |
| Spinal Unit | 20 | 178 |
| | 895* | 123829 |

* Maximum capacity

[4] Counties Manukau Health, personal communication, 11/11/15.

Table 4: Outpatient Appointments (Fiscal year 2015)

| Outpatient Physician | Discharges |
|---|---|
| Doctors, Nurse Practitioners, Lead Maternity Carers | 224004 |
| Allied Health | 69640 |
| Nurses, excl District Nurses | 13527 |
| | 307171 |

- Approximately 330 GPs are primarily based in the Counties Manukau DHB region in 2014 (Medical Council estimates from data collected as part of its workforce survey[5]). There are 104 GP practices in the district;

  107 pharmacies are located in the Counties Manukau district. Statistics for pharmacists are not collected at the DHB level.[6]

## Key financial performance statistics for Counties Manukau Health

The most recent figures available are for the year to 30 June 2014.[11] They show:

- A surplus of $3.054 million ($3.012 million in FY 2013).
- Revenue for patient care of $1.417 billion ($1.405 billion in FY 2013). Total income was $1.440 billion;
    - Largely $1.300 billion from Ministry of Health contracts and a net $80 million from contracts with other DHBs.
- Expenditure of $1.436 billion ($1.402 billion in FY 2013);
    - Largely $526 million for personnel expenses, $422 million as payment to non-DHB providers, and $199 million to other DHBs.
- Net assets and total equity were $198 million:
    - Total assets were $697 million (largely property, plant and equipment) and total liabilities were $498 million (including $267 million of total borrowings).
    - Equity consists of Crown equity and revaluation reserves, minus an accumulated deficit.

[5] Medical Council of New Zealand, personal communication.
[6] Pharmacy Council of New Zealand, personal communication.

## Section two: The methods

A modified case study approach was used to determine if the quality improvement strategies employed by CM Health have been effective and resulted in improvement, as well as establishing to what extent CM Health can say it is the best healthcare system in Australasia.

The case study approach has a history of being used to assess the success or otherwise of complex healthcare improvement programmes, such as those undertaken by Jönköping County in Sweden.[12-15] Furthermore, the case study approach is noted as being particularly suited to naturalistic non-experimental studies such as this.[16] There are various definitions of a case study, but common to all is the requirement to explore an event or phenomenon in depth and in its natural context.[17] In this case, further key components of CM Health's extensive QI initiative were explored. The evaluation team, in consultation with CM Health, decided to focus on the following aspects of CM Health's QI strategies:

- The SLM framework and how CM Health compared on these measures with other national and international healthcare systems;
- The process of developing gold standards/Toyota specifications for the individual SLMs;
- A determination by case study interviews of common characteristics of healthcare systems with a strong focus on QI.

Due to short timeframes, the exploration of these did not take place in a sequential manner. Consideration of the different aspects in parallel did not preclude the use of information from one aspect to assist with the understanding of another. The methods related to the three aspects above are now described.

### The System Level Measures framework

The work of CM Health on the development of their SLMs framework has previously been described in two papers (see appendices). The focus of this section, therefore, is to describe the process of comparing CM Health's achievements in relation to their chosen SLMs and with those from other New Zealand and international healthcare systems.

The use of a core set of measures to monitor a healthcare system's performance was originally developed by the Institute for Healthcare Improvement (IHI).[18] Counties Manukau Health's SLMs framework comprises sixteen SLMs and they sit in three domains as illustrated in table 5.

Table 5: Counties Manukau Health System Level Measures

| Population health | Patient experience | | Cost and productivity |
|---|---|---|---|
| Life expectancy at birth | Patient experience of care | Rate of adverse events | Health care cost per capita |
| Health service utilisation | Hospital standardised mortality rate | Acute hospital readmissions | Workforce retention (annualised) |
| Childhood immunisation status | Long term conditions risk assessment | Long term conditions management | Access to elective surgery |
| Ambulatory sensitive hospitalisation | Hospital days during last six months of life | ED length of stay | Access to outpatient diagnostics |

Each of these measures relates to one of the following: structure, process, outcome, access, safety, costs, and patient experience. They provide leaders and other stakeholders with information that shows how the healthcare system is performing over time, they enable the organisation to assess how it is performing relative to its strategic improvement plan, thereby informing strategic quality improvement planning, and finally they permit comparisons with other similar organisations. Each measure is underpinned by a suite of contributory measures, or small dots, which reflect the performance of discrete aspects of the healthcare system. Drilling down into these small dots provides an understanding of where processes that impact on the higher order measures, or big dots, need to improve. These big dots form the overview of the healthcare system.

Each measure underwent extensive discussion as outlined in the paper *Developing and implementing a framework for System Level Measures: Lessons from New Zealand* (see appendices). This was to ensure measures aligned with CM Health's six Executable Strategies (see figure 2) and therefore their Triple Aim of improving population health, patient experience and cost and productivity. These measures enable CM Health to hold itself accountable and allow others to evaluate their performance on core dimensions of quality across all care settings.

***We will contribute to the national health goal for ...***

**All New Zealanders live longer, healthier and more independent lives**

***We support and align with the northern region vision to ...***

Improve health outcomes and reduce disparities by delivering, better, sooner more convenient services; and doing this in a way that meets future demand whilst living within our means

***By contributing to regional priorities ...***

| | | |
|---|---|---|
| Life and years | First, do no harm | The informed patient |

***To reach our vision for the people of Counties Manukau ...***

To work in partnership with our communities to improve the health status of all, with particular emphasis on Maaori and Pacific peoples and other communities with health disparities

***So that our community can ...***

**Live longer, healthier and more independent lives**

***We commit our skills and resources to reaching our goal of ...***

Delivering sustainability and excellence, by becoming the best healthcare system in Australasia by December 2015

***By delivering our triple aim strategic objectives for ....***

| | | |
|---|---|---|
| Improved health and equity for all populations | Improved quality, safety and experience of care | Better value for public health system resources |

***By organising and delivering our actions through six executable strategies ....***

Better Health Outcomes for All
First Do No Harm
System Integration
Ensuring Financial Sustainability
Enabling High Performing People
Delivering Patient and Whaanau Centred Care

***That work together with health service delivery by supporting our community throughout their life course with ....***

| | | | |
|---|---|---|---|
| **Prevention** Health Promotion & Education, Immunisation, Health Screening, Statutory and Regulatory | **Early Detection and Management** Primary Health Care (GP), Long Term Conditions, Oral Health Diagnostics, Pharmacy | **Treatment** Mental Health, Elective, Acute, Maternity, Additional Patient Safety | **Rehabilitation and Support** NASC, Assessment Treatment & Rehabilitation, Palliative Care, ARRC, Home Based Support |

***So that all people living in Counties Manukau ...***

| | | |
|---|---|---|
| ✓ Will be smokefree by 2025<br>✓ Children will have the best start in life<br>✓ Will have good levels of health literacy<br>✓ Will have minimal harm from poor housing | ✓ Will experience a better transitions of care<br>✓ Are active participants in their own health care<br>✓ Participate and collaborate in decision making | ✓ See better value from health care funding<br>✓ Will have better access to services based in the community<br>✓ See a health care workforce that looks more like their own community |

**Figure 2: Counties Manukau Health Intervention Logic Model**

The desire to compare healthcare delivery systems using measures of performance is increasingly common,[19] and rationales for the comparison vary.[20] In CM Health's case, it wishes to learn from other systems, as well as having a desire to share its learnings when it is identified as a top performer. There are, however, well-documented difficulties associated with the process of comparison, not least of which is the trade-off between flexibility and consistency.[19 21] While it is ideal to have consistency of definition regarding the measures and uniformity of numerators and denominators, if this approach is to be more broadly used there is a need to embrace a level of flexibility to enable, at the very least, a learning conversation to start.[19]

For this process of comparison, data were extracted from a variety of sources as illustrated in table 6.

Table 6: Sources of comparison data

| Measure | Comparison data source |
|---|---|
| Health services utilisation | A Delphi process |
| Acute hospital readmissions | Health Round Table[22] and the New Zealand Health Quality and Safety Commission[23] |
| Hospital days during the last six months of life | Institute for Healthcare Improvement[24] and Health Round Table |
| Hospital standardised mortality rate | Institute for Healthcare Improvement and Health Round Table |
| Ambulatory sensitive hospitalisations | Atlas of Healthcare Variation[25] |
| Childhood immunisation status | New Zealand national health target data[26] |
| Adverse events | Institute for Healthcare Improvement |
| Long term conditions risk assessments | New Zealand national health target data |
| Patient experience of care | A Delphi process and the New Zealand Health Quality and Safety Commission |
| Access to outpatient diagnostics | A Delphi process |
| Waitlist for elective surgery | New Zealand national health target data |
| Emergency department length of stay | Health Round Table |
| Workforce retention (annualised) | Health Round Table and a Delphi process |
| Healthcare costs per capita | WHO Global Health Expenditure Atlas [27] |

In cases where the healthcare system used for a comparison achieved better on the measure than CM Health, an appropriate person from that system was interviewed to determine what approaches were used.

## Developing Gold Standards for the System Level Measures

How does a healthcare system recognise it is providing reliable, cost effective, high quality healthcare? An initial step requires establishing breakthrough performance goals or gold standards – a level of performance that exceeds previously believed "limits".[18 28] Although CM Health had a dashboard of SLMs in place, it did not have an aligned set of gold standards with which to measure progress. Counties Manukau Health, therefore, wanted to develop such a set.

It was decided to use a Delphi formal consensus process to establish gold standard benchmarks for CM Health's SLMs. Delphi studies generate consensus by collecting data from a panel of experts, who do not meet. Such studies are recognised as being effective in establishing consensus in complex areas.[29] The modified Delphi methodology used with CM Health differed slightly as it gained expert opinion by using a self-administered questionnaire (Round 1), followed by a face-to-face meeting of experts (Round 2)[30]. At the outset, a face-to-face meeting was not anticipated. However, due to the challenge of getting feedback even from those who had accepted the invitation to complete a questionnaire, it was decided to use the face-to-face format at the APAC Forum in Auckland in September 2015.

*Phase 1 Delphi study: self-administered questionnaire*

We invited, by e-mail, twenty four participants to take part in an on-line consensus panel to determine the gold standards for fifteen SLMs (one SLM was not included as it is context specific to NZ). Initially it was considered that using an on-line process would provide an economical way of exploring consensus on the topic. Participants were invited if they had recognised expertise in healthcare systems, the use of measurements within healthcare systems, or worked in a healthcare system reasonably similar to New Zealand's. The aim was to have a panel with considerable depth around the topic, not diversity. Those who agreed to participate were sent an e-booklet (see appendices) and asked to answer the following three questions in relation to each measure:

1. To document the best performance that you are aware of;

2. To specify a new standard of performance, and

3. To document what they considered would be an acceptable improvement trajectory.

In relation to 2 and 3, they were also asked to document their rationale for their responses. A minimum of three e-mail follow-ups to each participant took place. This phase was then followed by a second phase involving a face-to-face meeting with participants.

*Phase 2: face-to-face consensus panel.*

A face-to-face two-hour facilitated meeting took place during the APAC Forum in Auckland. Participants in this phase had not necessarily taken part in phase one. They were invited to participate based on the same criteria as those in phase one and were also drawn from a pool of approximately 1,500 attendees at the APAC Forum. Eighteen participants were invited to participate. Those who agreed were sent reading providing the purpose of the meeting, as well as information on each SLM, comparison data from different healthcare systems, and the results from phase 1. The structured meeting used an independent facilitator, and discussion and decisions were recorded by a graphic artist (the graphic recordings can be seen in the appendices). Participants were divided across four tables. As the aim was for participants to rate fifteen SLMs and time was limited, it was decided that they would consider and discuss the first five measures at each table before voting on a paper form. These forms were collected and the data entered into a spreadsheet while participants rated the next five measures. When the second batch of ratings was entered, the facilitator fed back the following on each measure from the first batch to the whole group: the mean, median, mode, standard deviation and interquartile range (the group were able to view the spreadsheet for each measure on a large screen). This was followed by a facilitator-mediated discussion which allowed participants to deliberate the ratings. The facilitator then proposed, based on the ratings and the key discussion points, a gold standard for the measure being discussed, and this was voted on. The process was repeated for the third batch of five measures. After the face-to-face meeting, each participant was sent a booklet containing the results and a copy of the graphic recordings.

## Case studies

Counties Manukau Health has sought both as part of its ongoing work and as part of this study to learn from other high performing healthcare systems about their journeys to improve the quality of their systems and the methods they used.

For this study, it was decided to investigate CM Health's quality improvement strategies against the experiences of a sample of these other high performing healthcare systems. Interviews were arranged with a purposive sample[31] of practitioners of quality improvement, including: chief executive officers; directors of quality improvement; academics and employees of quality organisations. Individuals from the following organisations were interviewed:

- Jonkoping County Council (Sweden)
- Salford NHS Foundation Trust (UK)
- Alfred Health (Melbourne, Australia)
- Cincinnati Children's Hospital Medical Center (USA)
- Curtin University (Perth, Australia)
- Agency for Clinical Innovation (New South Wales, Australia)

Purposive sampling is a technique used to identify and select participants who are information rich regarding the phenomena of interest[31]. In this case, the phenomena were quality improvement, quality improvement methods and working for a high performing healthcare system; therefore the criteria for the selection of participants was established a priori.[31] It was unknown at the outset how many interviews would be required to reach data saturation, but it was estimated that it would be reached at between 12-15 interviews.[31]

The evaluation team developed a semi-structured interview guide designed to be used flexibly by the interviewer (SB), thereby allowing the interviewees to tell their story in their own words. By maintaining this level of flexibility the interviewer was able to adjust the interview guide as the interviews progressed and other areas of interest emerged, or to suit the focus of the interviewee's work.[32] Some of the interviews took place face-to-face as the participant was attending the APAC Forum in Auckland, others were telephone

interviews. All interviews were digitally recorded and transcribed verbatim by a transcribing agency [33].

The text data from the interviews were analysed inductively. Various inductive approaches exist, but the common method of generic analytical inductive analysis, often termed a thematic analysis, was used.[34] All transcripts were coded by one of the evaluation team (SB), with four of the interviews being independently coded by another member of the team (FD-N) to check coding strategies and review interpretation of the data.[35]

# Section three: Findings

This section describes the findings from each of the sections outlined above: the comparison of SLMs, the development of gold standards for the SLMs, and the case studies.

## Comparison of System Level Measures

Below are a series of charts that compare CM Health across the SLMs with other healthcare systems. The abbreviations used are outlined and information regarding population groups is also provided below.

**Key**

IHI Institute for Healthcare Improvement (A global organisation)

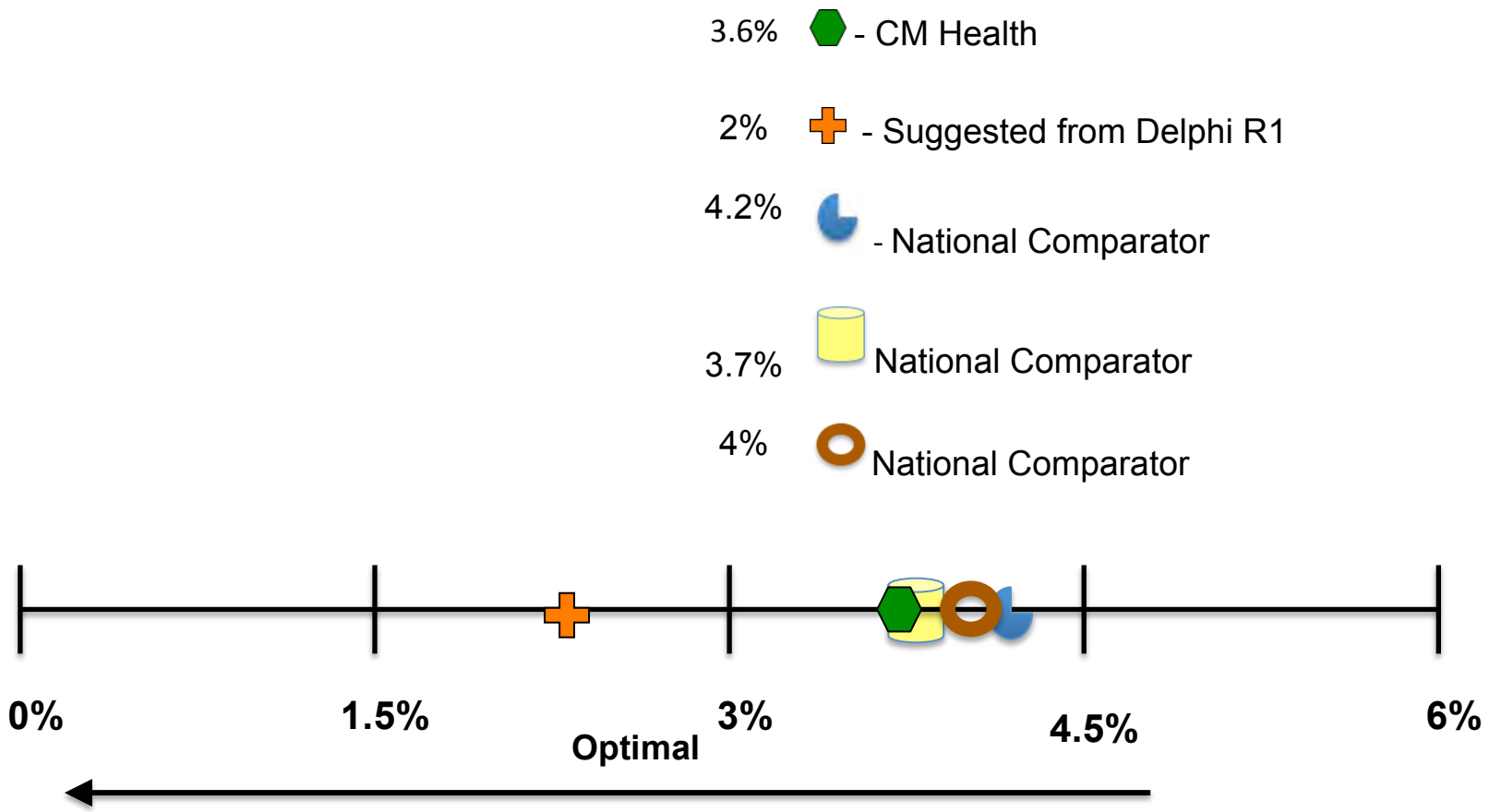
HRT Health Round Table (An Australasian organisation)

HQSC Health Quality and Safety Commission (A New Zealand organisation)

CM Health Counties Manukau Health (A New Zealand District Health Board)

**SLM 1: Health Services Utilisation**

Data definition: Percentage not enrolled in a primary health organisation within a month of discharge from secondary inpatient care.



**SLM 2: Acute Hospital Readmissions**

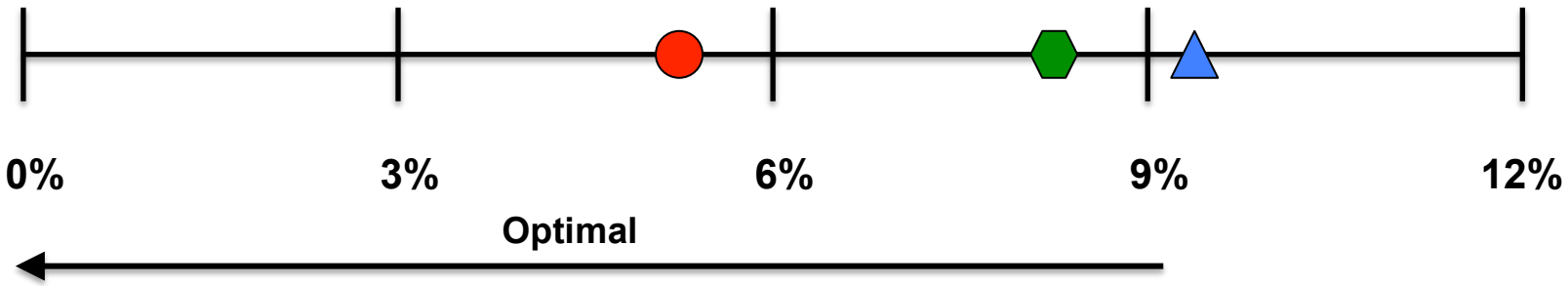
Data definition: Percentage readmitted within 28 days of index discharge to same specialty as indexed discharge speciality.

Note that the HQSC and HRT definitions vary either in the number of days to readmission (30 v 28 days) or the location of readmission (readmission anywhere v readmission to same speciality).

8.3% - CMH

5.5% - HRT best

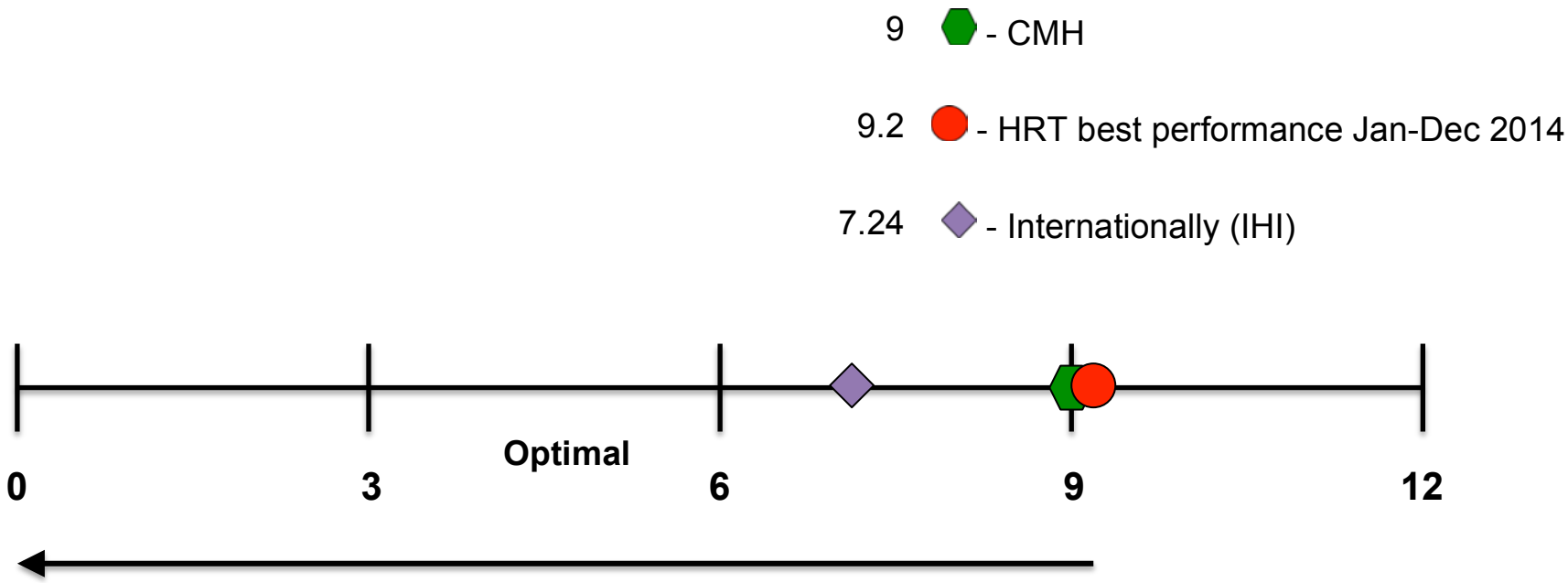
9.2% - NZ average (HQSC report)



**SLM 3:**

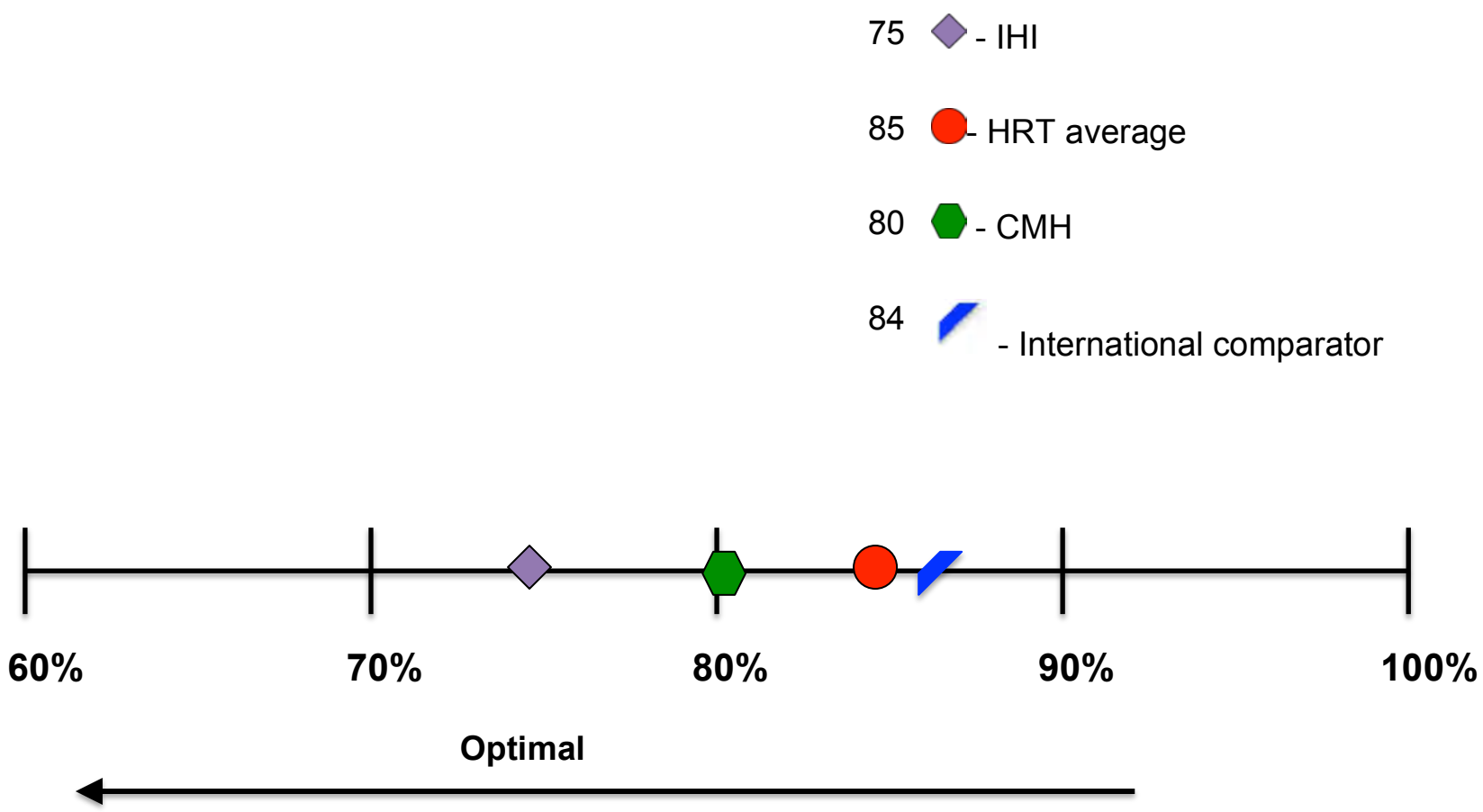
**Hospital Days During The Last Six Months Of Life**

Data definition: Total hospital days in the last six months for patients who have had a death recorded



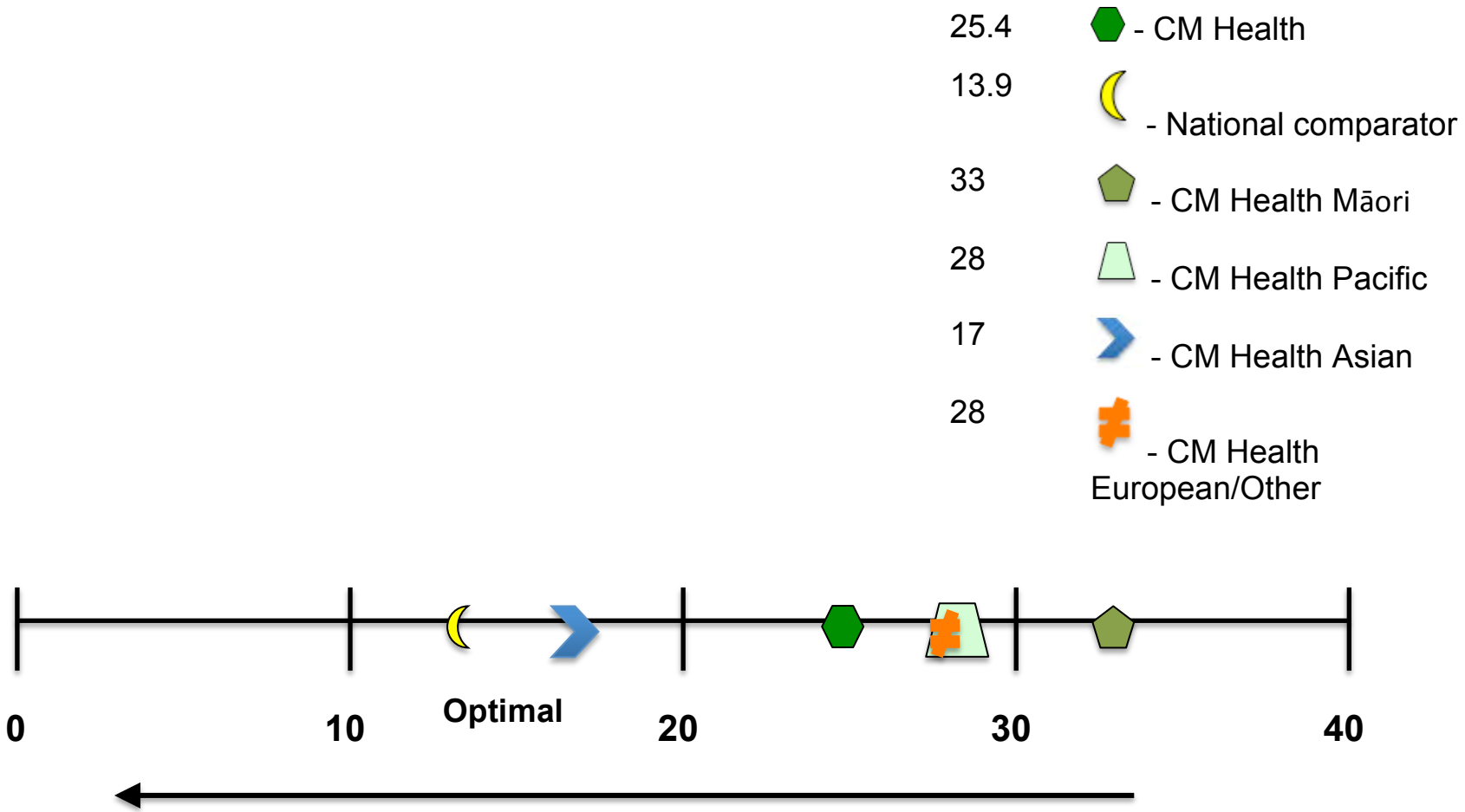
**SLM 4: Hospital Standardised Mortality Rate**

Data definition: 100 * Observed Deaths / Expected Deaths - Data source: Health Roundtable (based on Risk-Adjusted Canadian model)



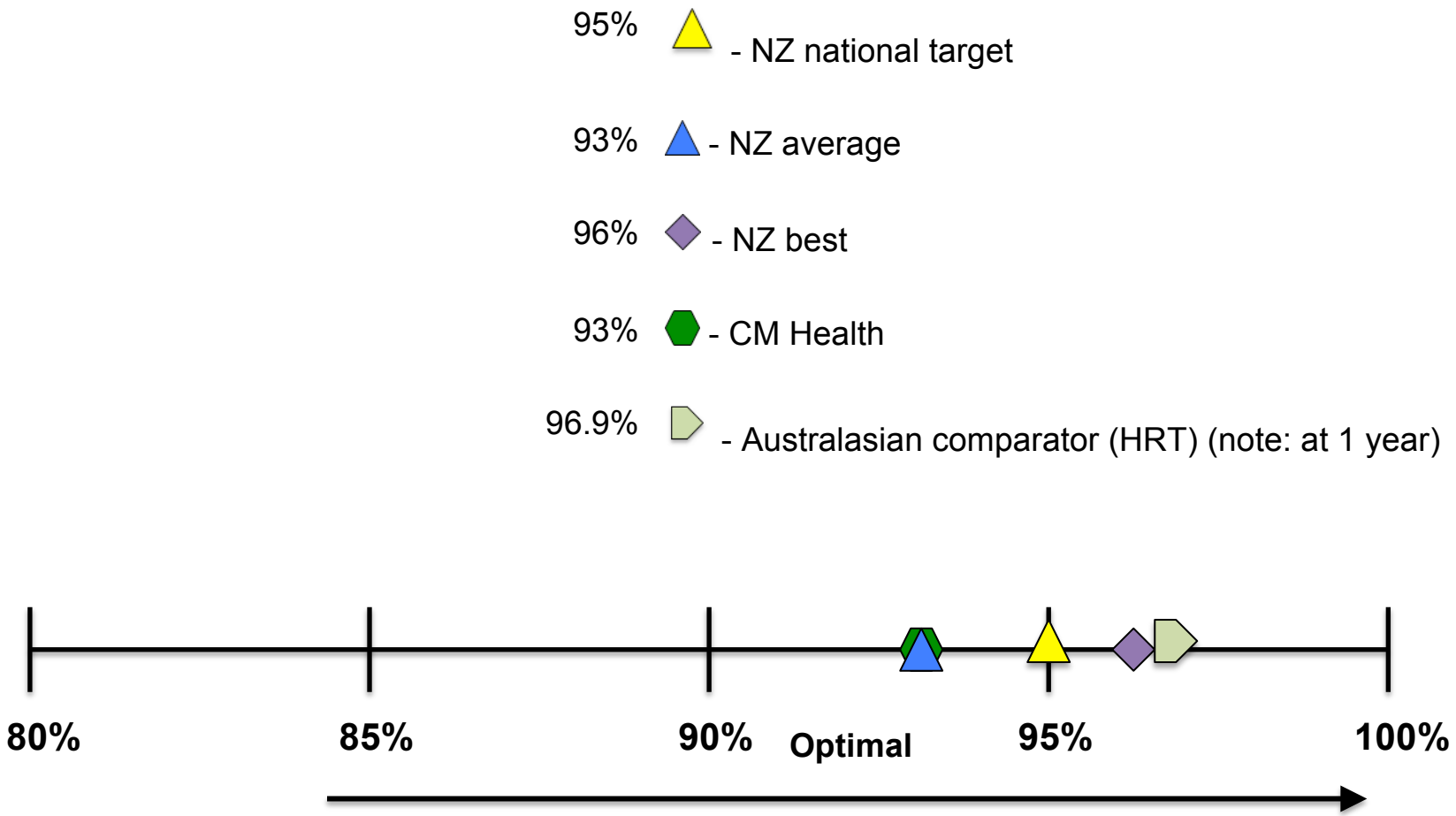
**SLM 5: Ambulatory Sensitive Hospitalisations**

Data definition: Admission rate per 1,000 for those admitted with an ASH condition and domiciled in CM Health District Health Board



**SLM 6: Childhood Immunisation Status**

Data definition: Percentage of children fully immunised at 8 months of age.



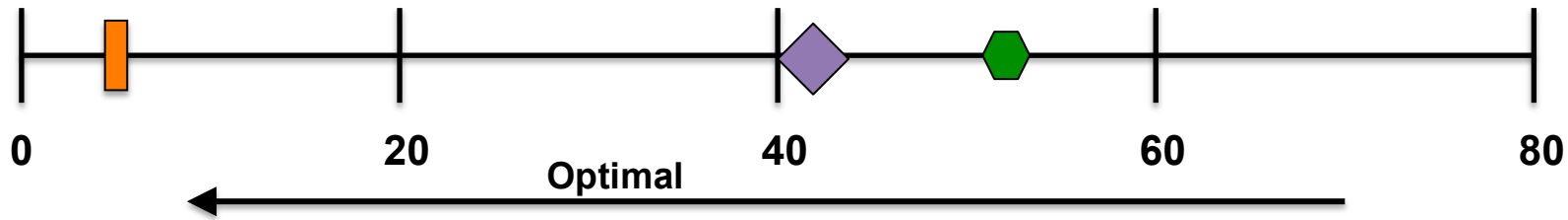
**SLM 7: Adverse Events**

Data definition: The number of Adverse Events per 1,000 Bed Days (based on Global Trigger Tool).

40 - IHI best

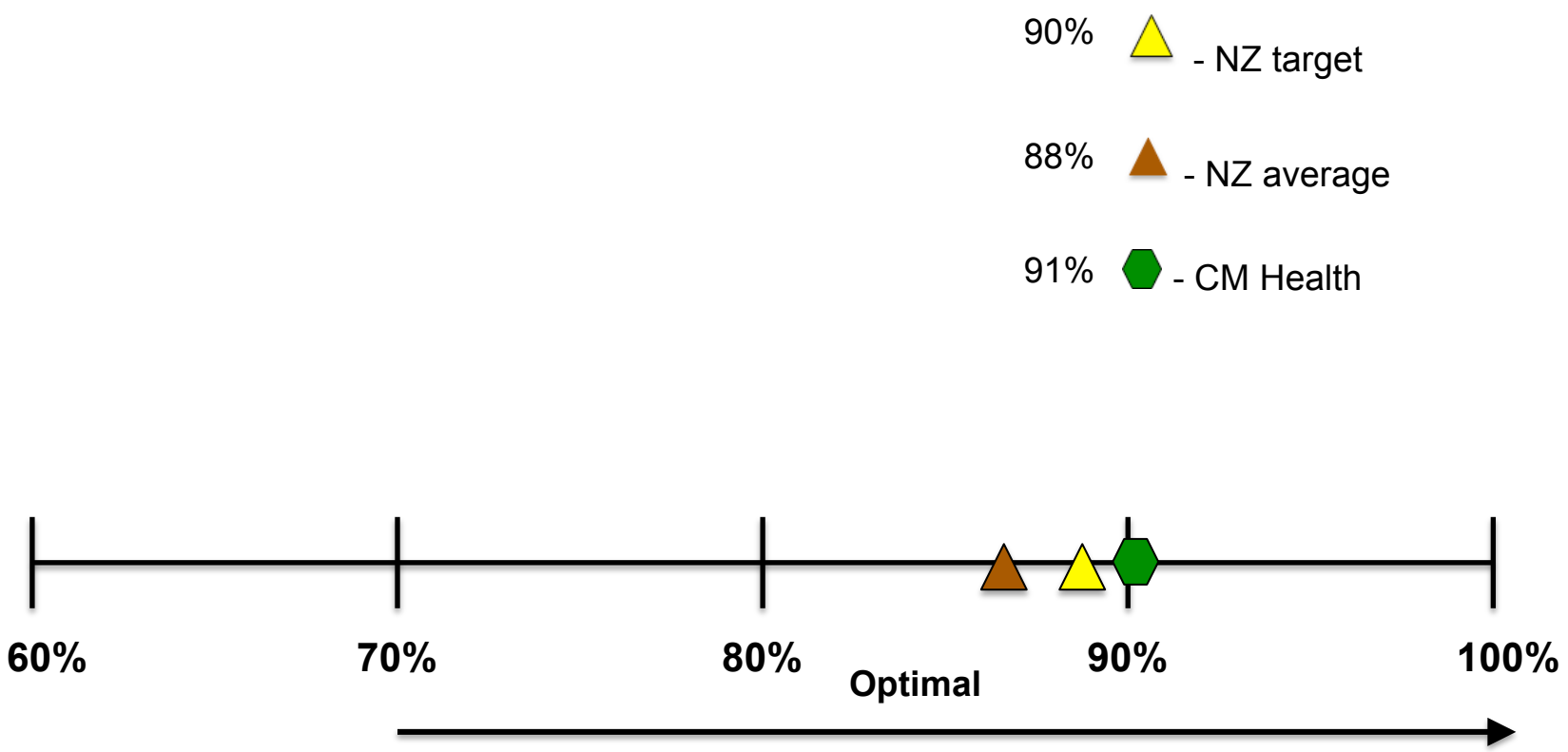
50.5 - CM Health

5 - IHI Toyota Specification (an ambitious goal thatwould represent breakthrough performance—performance that exceeds previous believed "limits".



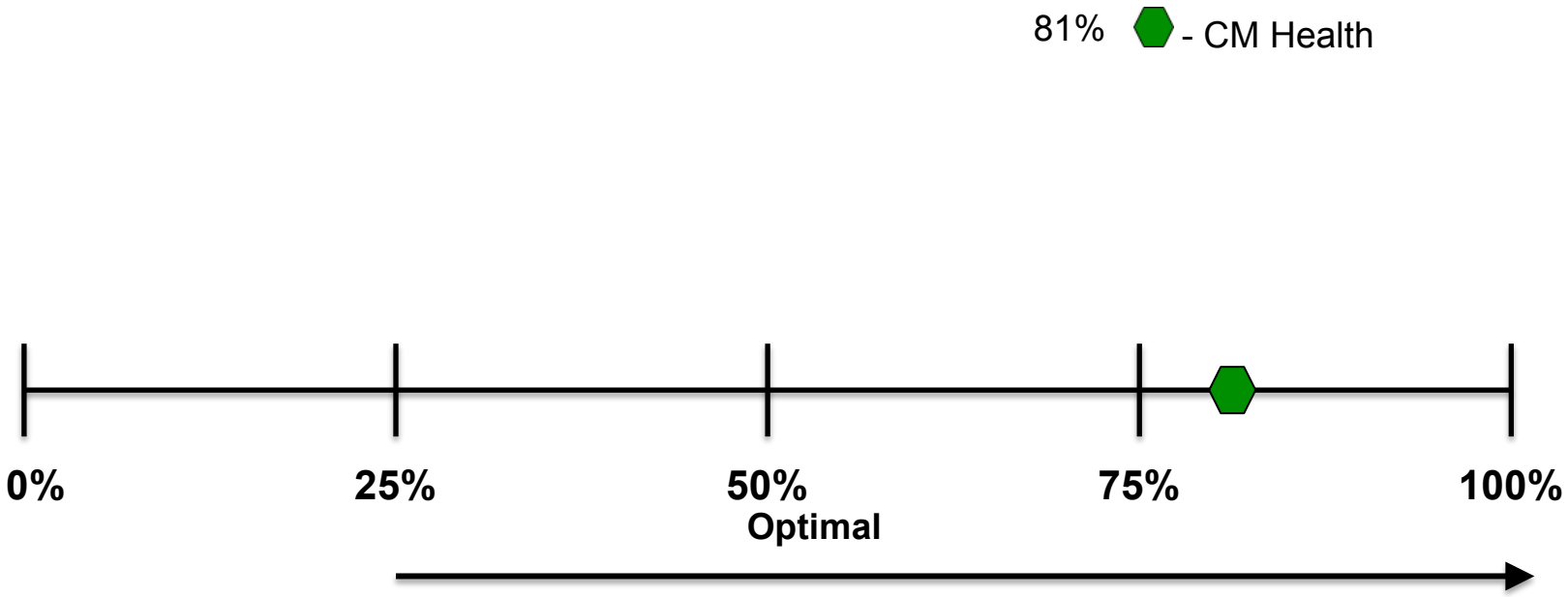
**SLM 8: Long Term Conditions Risk Assessments**

Data definition: Percentage of the eligible population (N=8074) will have had their cardiovascular risk assessed in the last five years.



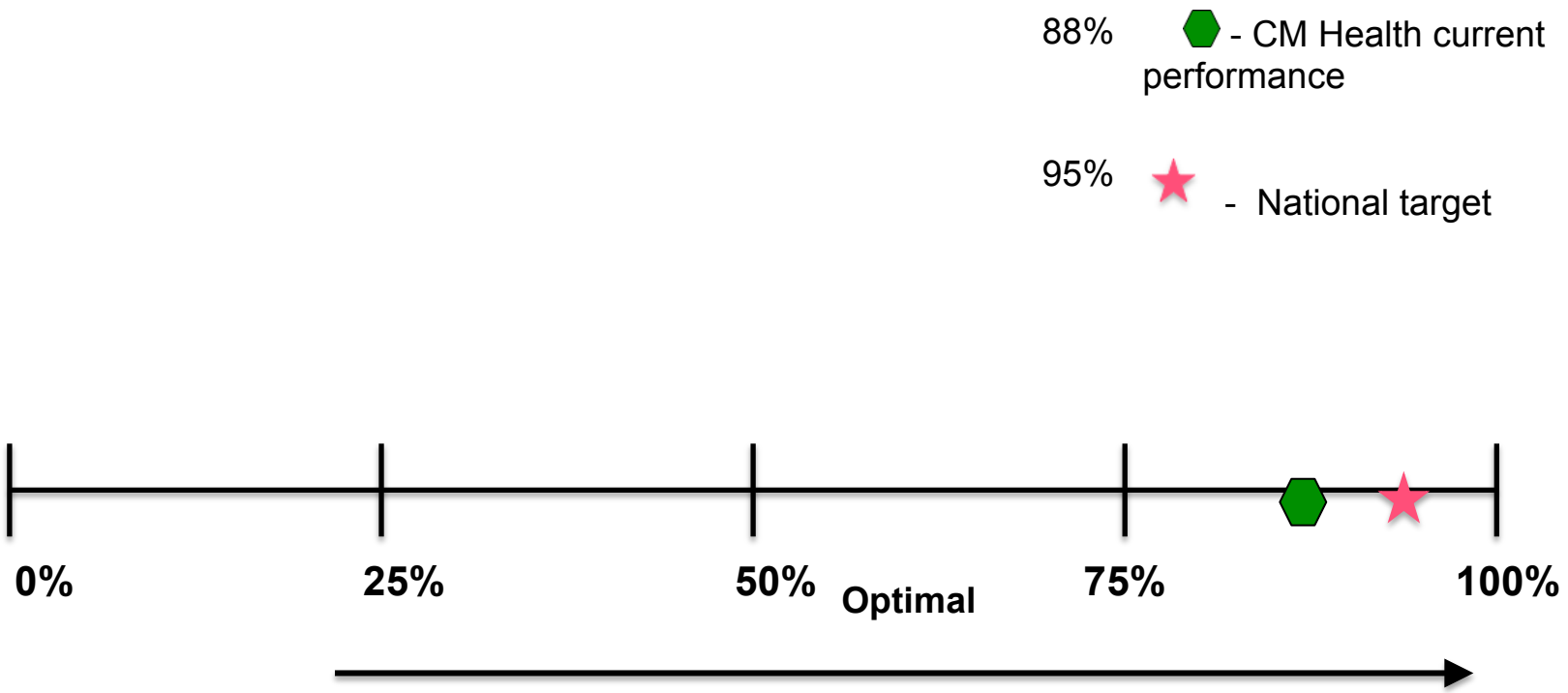
**SLM 9: Patient Experience of Care**

Data definition: Overall care and treatment ratings; percentage of patients who rated their experience of care as very good or excellent.



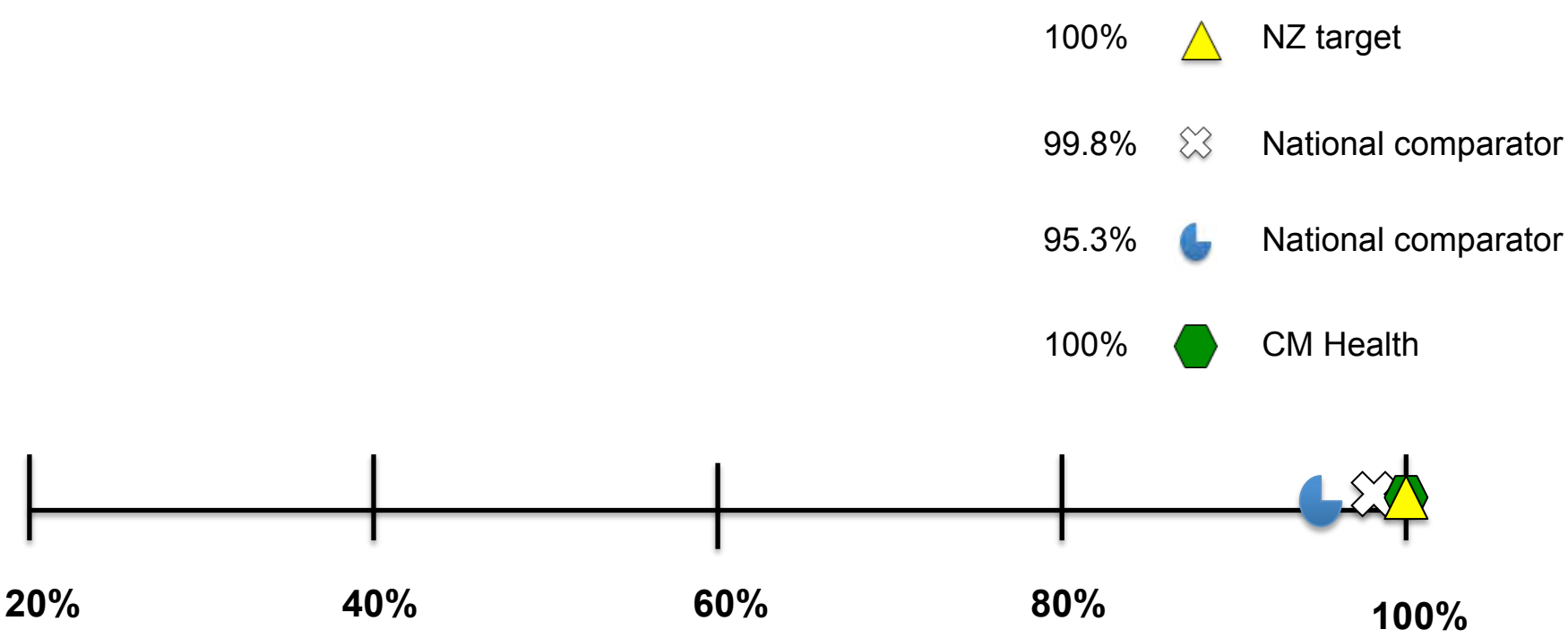
**SLM 10: Access To Outpatient Diagnostics**

Data definition: Percentage of all outpatient referrals for radiology completed within 6 weeks.



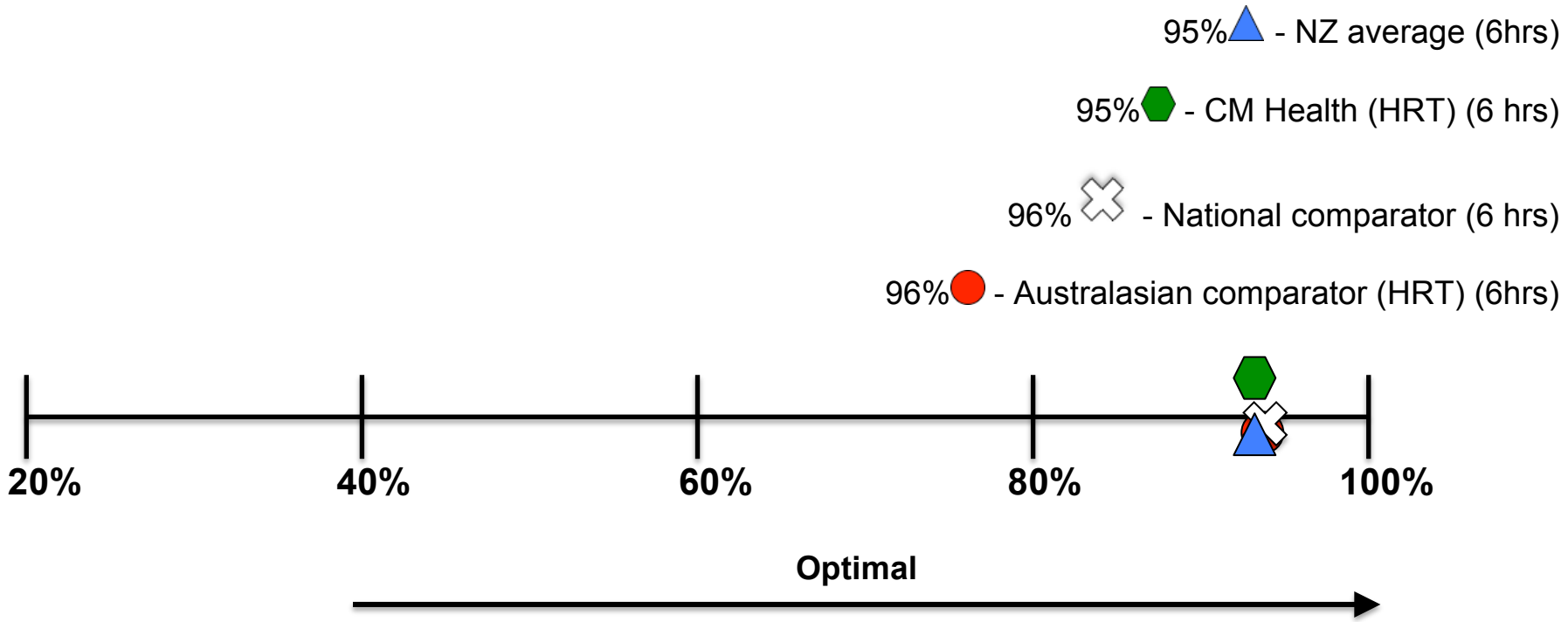
**SLM 11: Waitlist for elective surgery:**

Data definition: percentage who have been prioritised using nationally recognised tools and treated within 4 months.



**SLM 12: Emergency Department Length Of Stay**

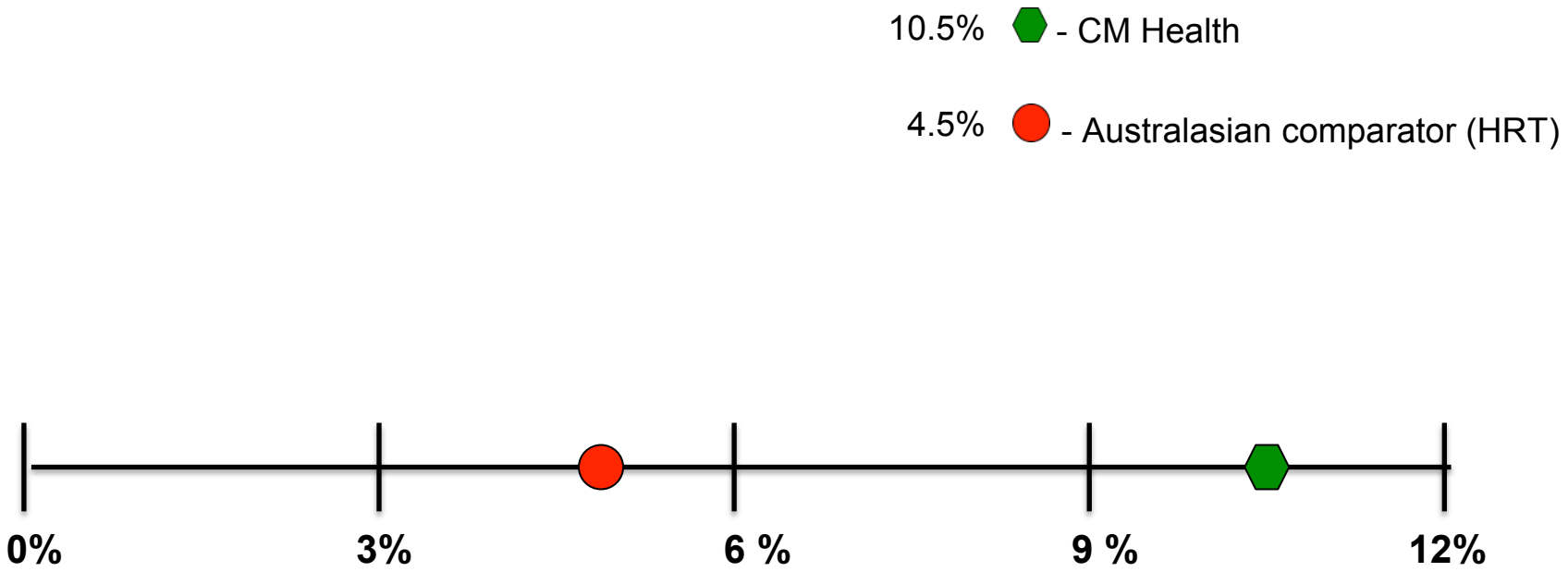
Data definition: The percentage of patients admitted, discharged, or transferred from the CMDHB emergency department (ED) within six hours.



**Note**: The CM Health figure for SLM 12 used in the Delphi formal consensus process was sourced from data that subsequently proved to have been compiled incorrectly. The corrected figure is presented here.

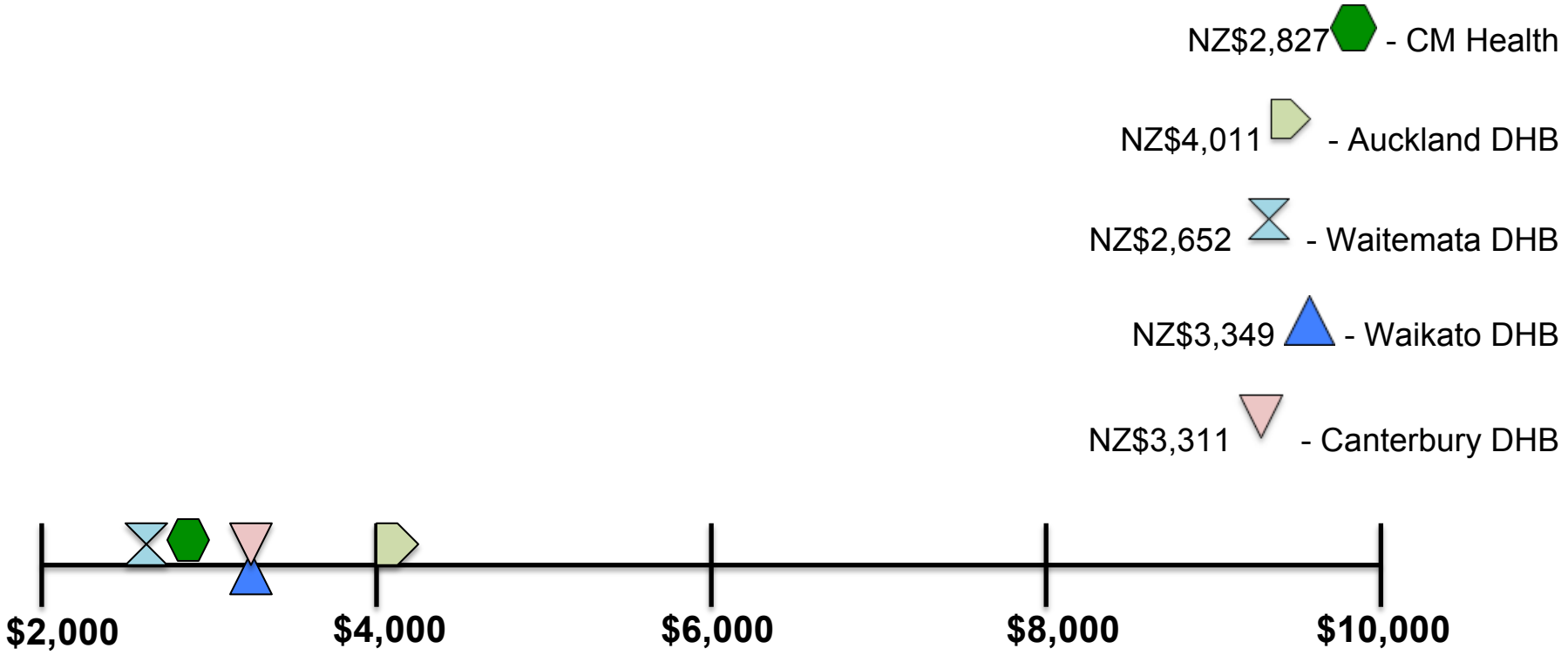
## SLM 13: Workforce Retention (Annualised)

Data definition: Staff turnover per annum



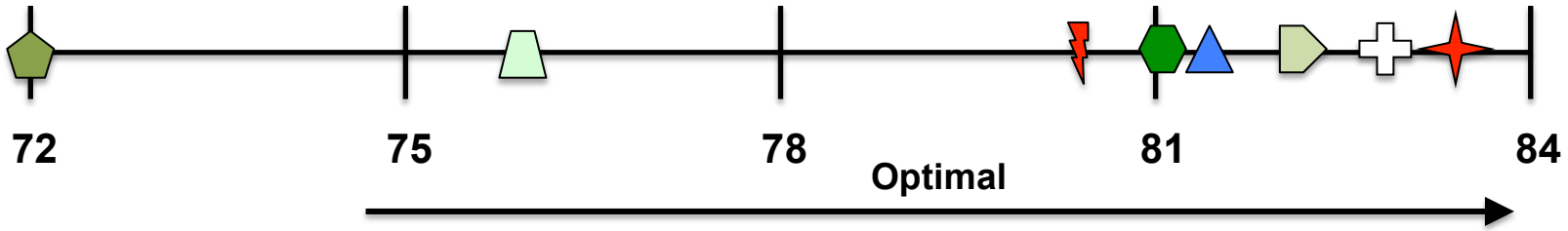
## SLM 14: Healthcare Costs per Capita

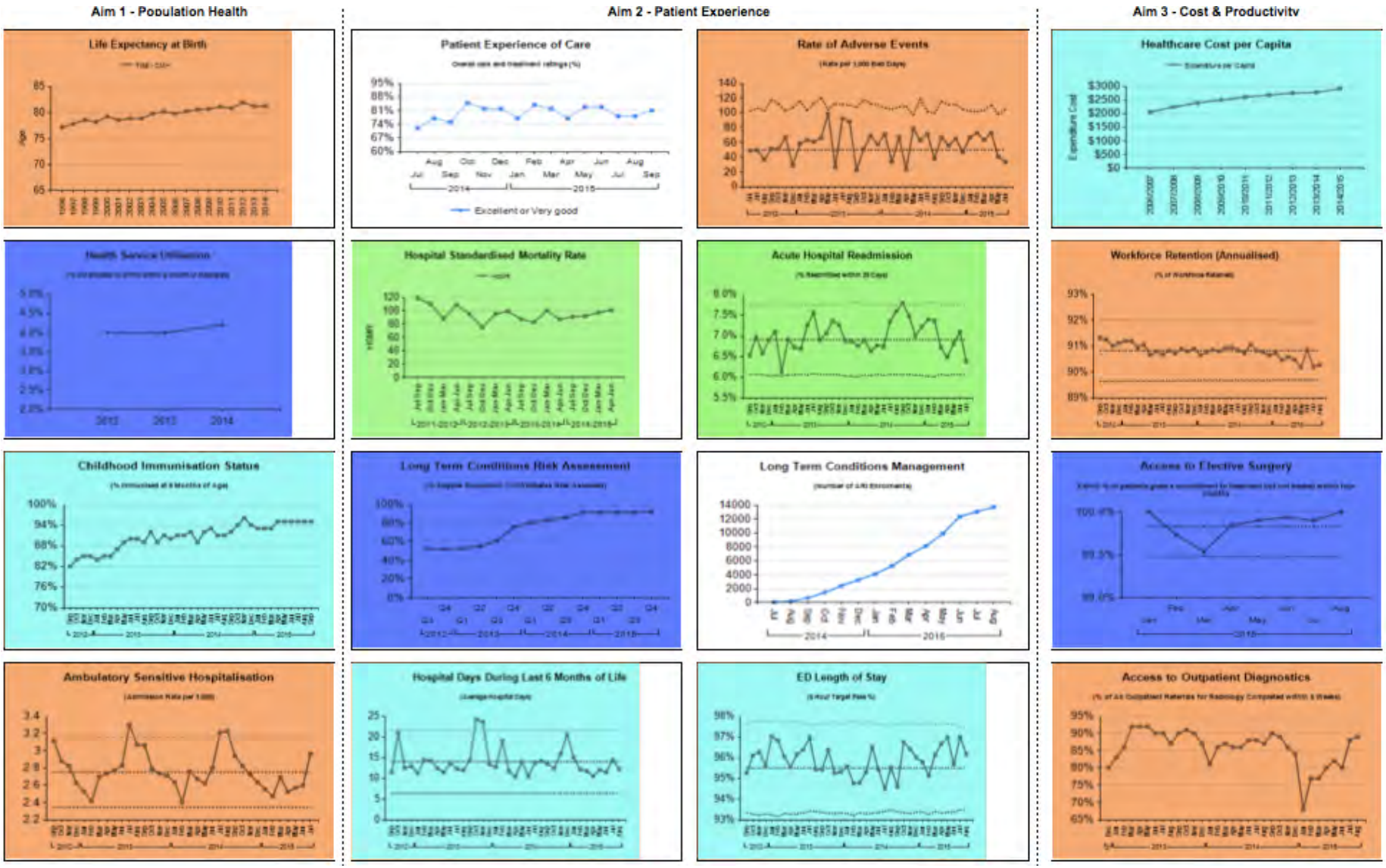
**Note**: The figure for SLM 14 used in the Delphi process and subsequent analysis has been replaced here by NZ DHB health expenditure only. The Delphi table is attached in the Appendices. DHB data are Total Expenditure and population data from respective DHB 2014/15 Annual Reports, and census population data published by CDHB at www.cdhb.health.nz/About-CDHB/corporate-publications/PublishingImages/Pages/canterbury-census-information/Canterbury%20DHB%20Census%20Summary.pdf.



**SLM 15: Life Expectancy at Birth:** estimated life span of an infant if they experience the current mortality rates of their population over the rest of their life. **Note** CM Health have recently updated their life expectancy data and this shows an improvement across all ethnicities, however, disparities in life expectancy remain despite greater gains for Māori and Pacific populations

| | | | |
|---|---|---|---|
| 82.9yrs | - Switzerland | 80.5 yrs | - OECD average |
| 83.4 yrs | - Japan | 81 yrs | - CM Health 2011 |
| 82.2 yrs | - Australia | 76 yrs | - CM Health (Pacific) |
| 81.4 yrs | - NZ | 72 yrs | - CM Health (Māori) |






**Key**

Best at | Ahead of | Comparable | Is focusing improvement | Unable to compare

**Figure 3: SLM performance over time**

Counties Manukau Health's SLM performance over time and against its Triple Aim can be assessed from Figure 3 above. For example, the figure shows that for Aim 1 – Population Health, CHM is Comparable on two SLMs and Ahead of on two SLMs.

Performance for all the SLMs and the rationale for this performance is set out below in Table 7.

**Table 7: SLM performance and rationale**

| Perfomance | Measure | Rationale |
|---|---|---|
| Best | Health services utilisation | Better than all peers |
| Best | Waitlist for elective surgery | Better than all peers |
| Best | Long term conditions risk assessments | Better than all peers |
| Ahead of | Hospital standardised mortality rate | Better than peers but not IHI |
| Ahead of | Acute hospital readmissions | Better than NZ peer but not Australasian |
| Comparable | Emergency department length of stay | Same as NZ average |
| Comparable | Childhood immunisation status | Same as NZ average |
| Comparable | Healthcare costs per capita | Comparable to NZ peers |
| Comparable | Hospital days during the last six months of life | Comparable to best Australasian peer |
| Is focusing improvement | Access to outpatient diagnostics | Not meeting national target |
| Is focusing improvement | Adverse events | Least optimal of peers |
| Is focusing improvement | Ambulatory sensitive hospitalisations | Less optimal than peer |

| | | |
|---|---|---|
| Is focusing improvement | Workforce retention (annualised) | Higher turnover than peer |
| Is focusing improvement | Life expectancy at birth | Less optimal than peers, especially for Māori & Pacific |
| Unable to compare | Patient experience of care | |
| Not included (context specific to NZ) | Long term conditions management | |

A key aspect of this evaluation was to explore strategies used by those healthcare systems that were doing better than CM Health on any SLM. Key people from health systems identified as doing better in relation to the following SLMs were interviewed:

1. ED length of stay
2. Workforce retention
3. Ambulatory sensitive hospitalisations
4. Patient experience of care

In addition, an interview took place with a CM Health senior clinician regarding their achievements in relation to long term risk assessments. This assisted with determining if there were any common themes between CM Health and other high achieving healthcare systems in relation to high performance. The key themes to emerge across all SLMs irrespective of healthcare system were: engagement and conversations; education and establishing a culture. Establishing relevancy for the stakeholders was viewed as an enabler, with a whole of systems approach considered vital. These themes are captured in table 7.

Table 8: Themes and illustrative quotes from SLM interviews

| Theme | Supporting quote |
|---|---|
| Engagement | "*The focus on engagement, the emphasis on engagement has been really fundamental".*<br><br>*"You get a strong sense of ownership by being part of the creating".* |
| Education | *"The provision of courses to actually build the skills and acknowledging that people need some time out from the system to come up with solutions".*<br><br>*"The new cohort of general practitioners and practice nurses are now getting taught about them (cardiovascular risk assessments) in their undergraduate training".* |
| Establishing a culture | *"By the time cardiovascular risk assessments (CVRAs) became a national target they were already embedded into everyday practice in CM Health".*<br><br>*"It takes people out of the normal health sector, to enable them to create a different language and a different way of looking at problems and then when they return into health there is a degree of consistency. That has been really important for helping change the culture".* |
| Relevancy | "*We are now in a position to develop a NZ Framingham equation and this will help increase the relevancy of CVRAs to the primary care workforce".* |
| Whole of system | *"The danger where we started off with was trying to deal with* |

| | |
|---|---|
| approach | *ED in isolation form the community, in isolation form the rest of the hospital…"* |

In regards to the patient experience of care, all District Health Boards in NZ now use the Health Quality and Safety Commission's patient experience of care survey. This is administered two weeks following discharge to anyone who has had at least an overnight stay in hospital. Those currently excluded from the survey are children, those with mental health admissions and those in aged residential care. The data are predominantly numerical, with some spaces left for free text comments. Patterns of experience are examined in four domains: communication (6 questions); coordination of care (2 questions); partnership in care and treatment (2 questions); and the meeting of physical and emotional needs (5 questions). The interviewee agreed that while aggregating data is useful in identifying patterns, treating soft data in the same way as hard metrics has potential to result in complacency. For example, if 80% of those surveyed consider the care they received as good or very good, does this mean that the views of the remaining 20% are not considered relevant? Potentially some of these outliers may have documented a key insight which could help prevent a potential incident. The need to look at feedback that lies outside of the majority is therefore a key message in relation to this measure.

## Delphi Results

### Numbers and location round one

In total, eleven participants took part in round one, with participants coming from England and Wales, the Netherlands, USA, Sweden, Australia and New Zealand. In the second round, fourteen participants took part in a face-to-face meeting, with another four who were unable to attend providing e-mail feedback prior to the meeting. Those who participated in the second round came from England, USA, Singapore, Australia and New Zealand. Only one participant took part in both phases. The feedback from those participating by e-mail in the second round was received prior to the face-to-face meeting and accommodated in the final determination of the gold standard. The agreed gold standards for each SLM are presented below in a series of figures and a table.

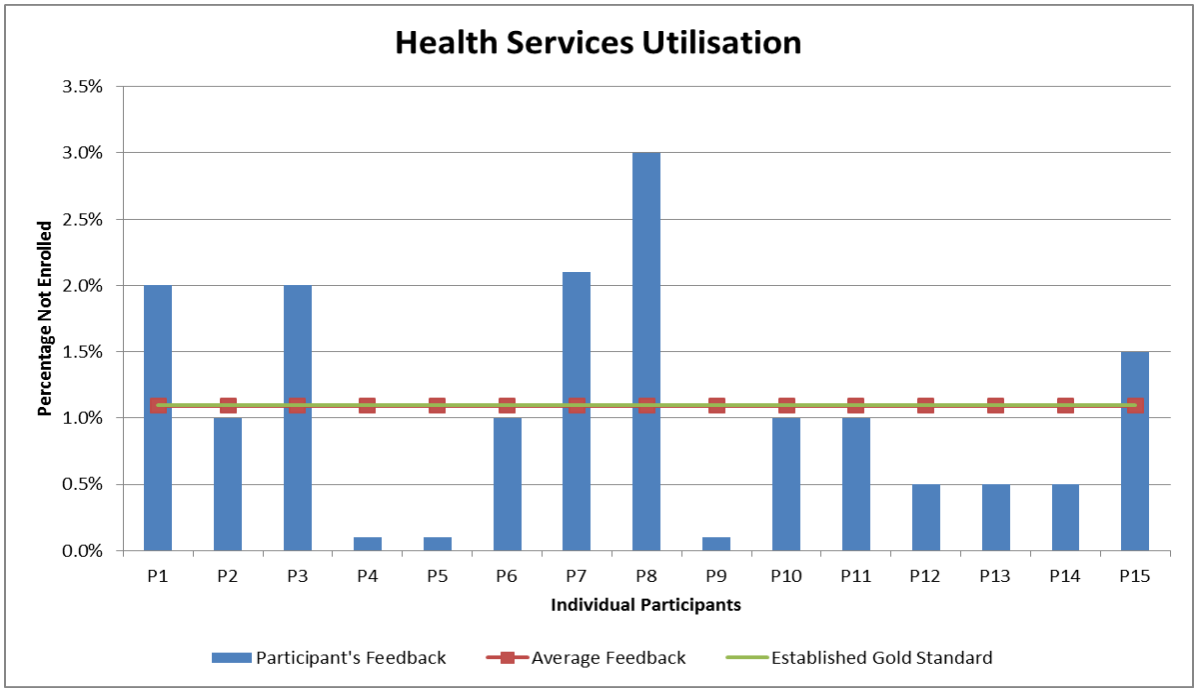



Figure 4: Health Service Utilisation

Data definition: Percentage not enrolled in a primary health organisation within a month of discharge from secondary inpatient care.

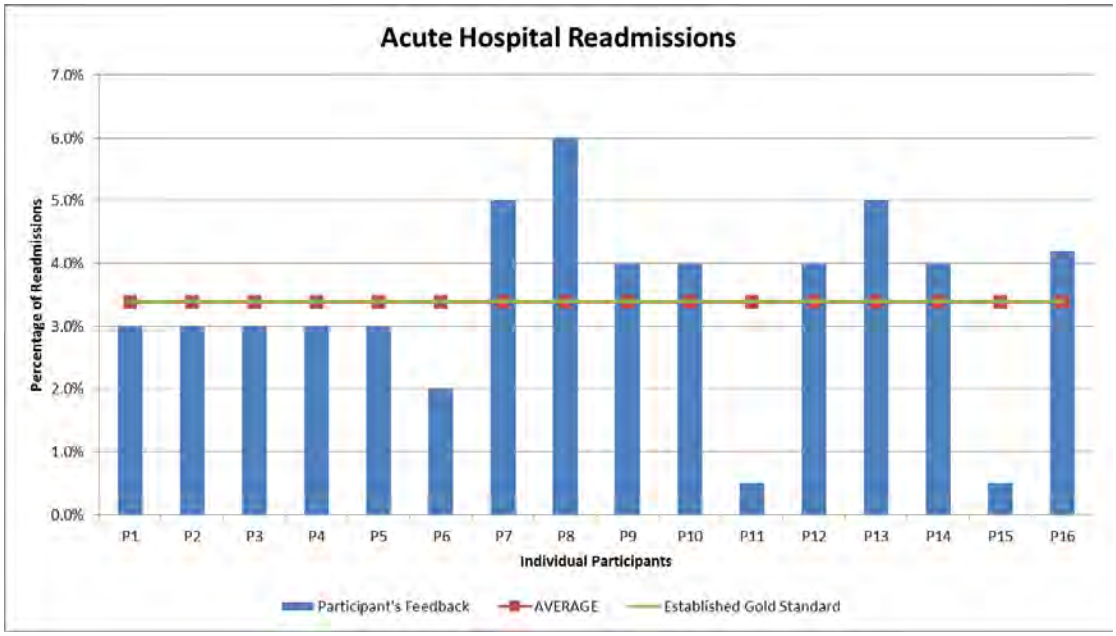



Figure 5: Acute Hospital Readmissions

Data definition: Percentage readmitted within 28 days of index discharge

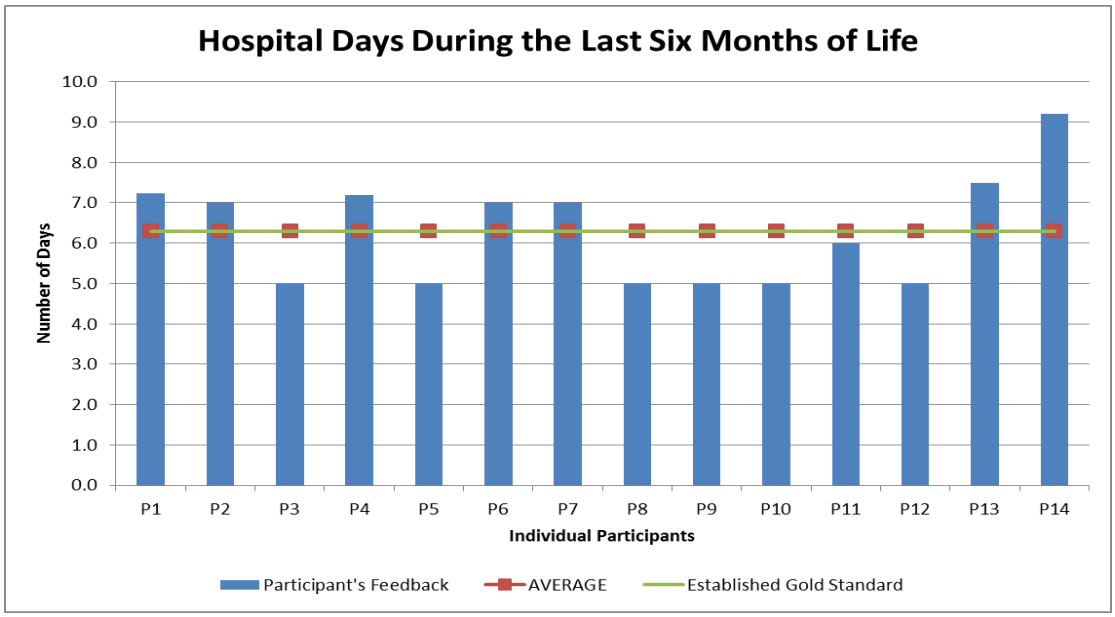



Figure 6: Hospital days during the last six months of life

Data definition: Total hospital days in the last six months for patients who have had a death recorded in hospital.

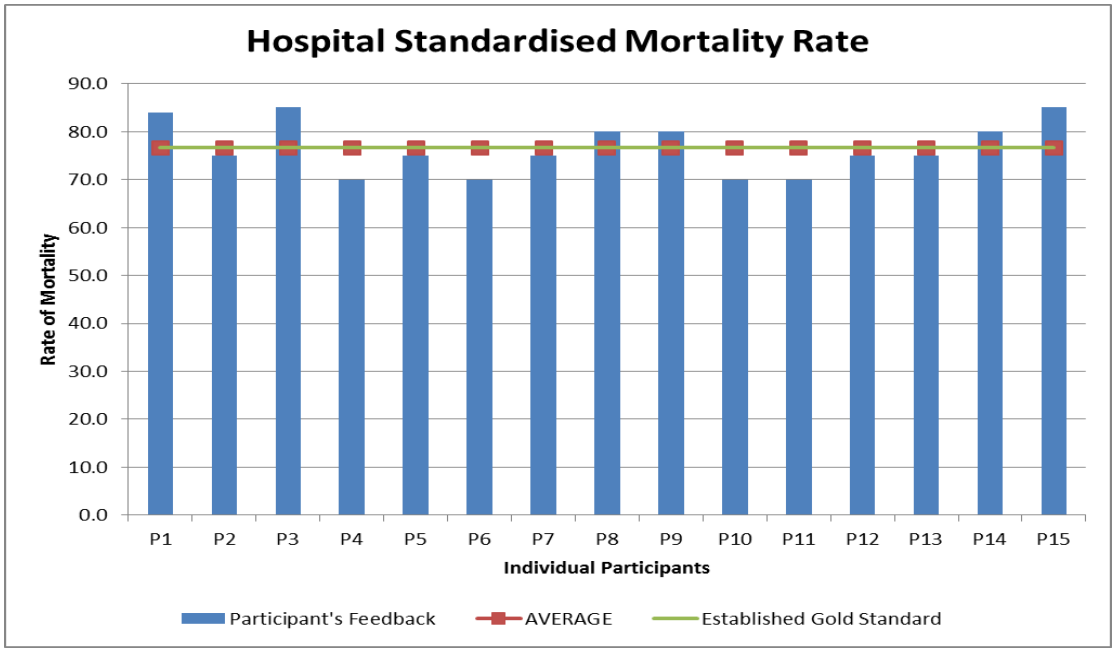



Figure 7: Hospital Standardised Mortality Rate

Data definition: 100 * Observed Deaths / Expected Deaths - Data source: Health Roundtable (based on Risk-Adjusted Canadian model)

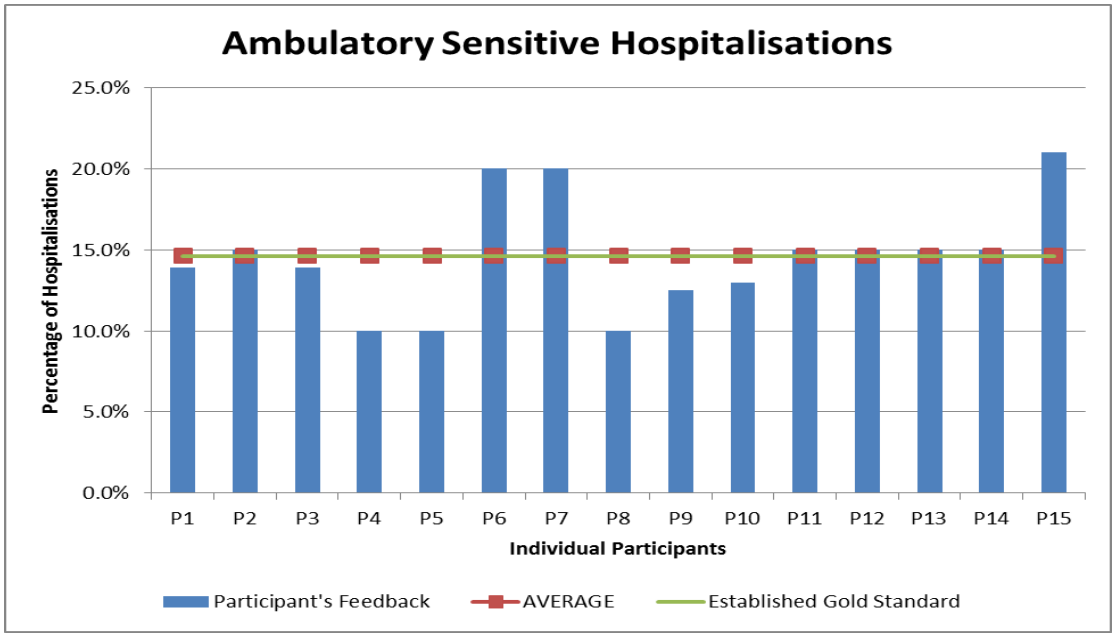



Figure 8: Ambulatory Sensitive Hospitalisations

Data definition: Admission rate per 1,000 for those admitted with an ASH condition and domiciled in CM Health District Health Board locale.

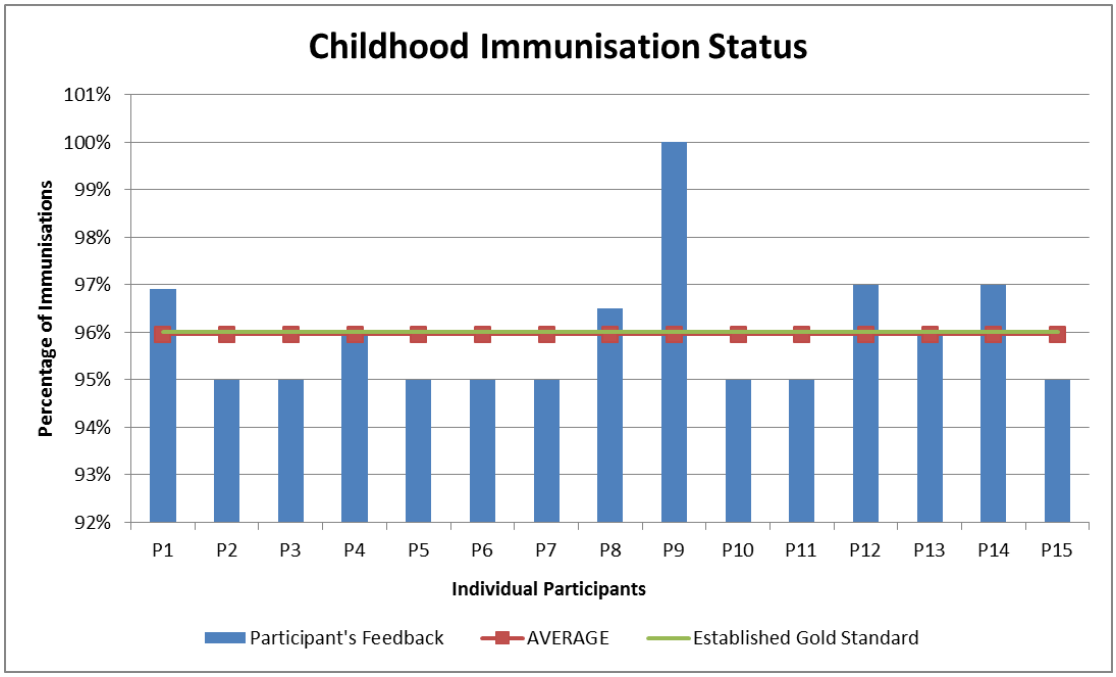



Figure 9: Childhood Immunisation Status

Data definition: Percentage of children fully immunised at 8 months of age.

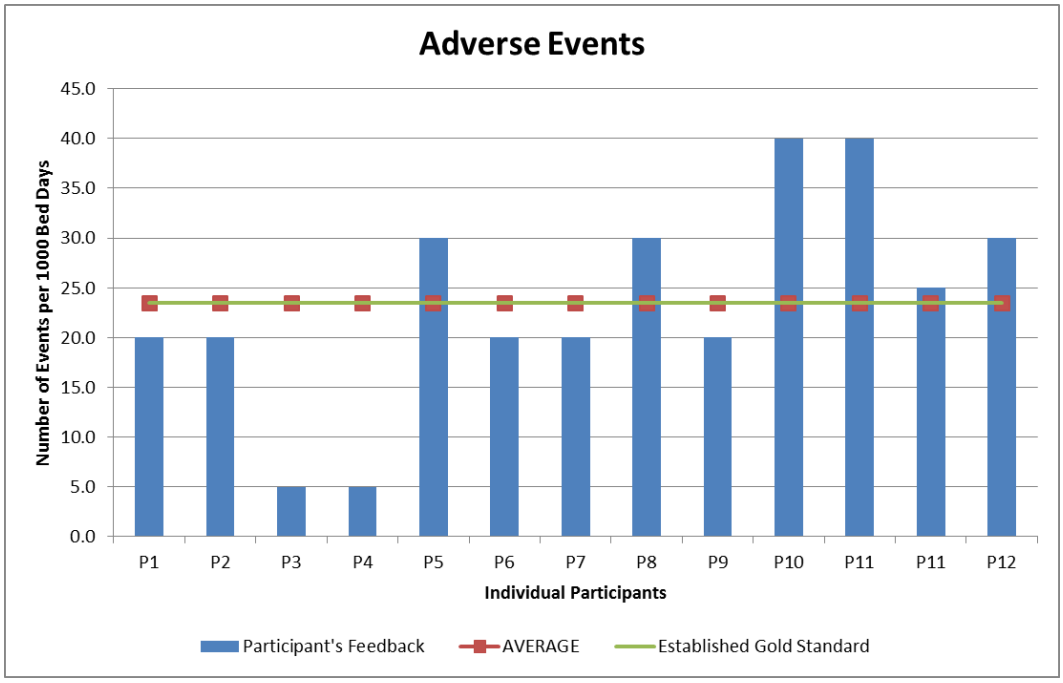



Figure 10: Rate of Adverse Events

Definition: This measure is defined as the rate of adverse events (AEs) that cause harm to the patient, based on a review of a representative sample of hospitalized patients' medical records. AEs per 1,000 Bed Days = (Total number of AEs / Total length of stay for all patient records reviewed) * 1,000. This measure is based on the IHI Global Trigger Tool methodology.

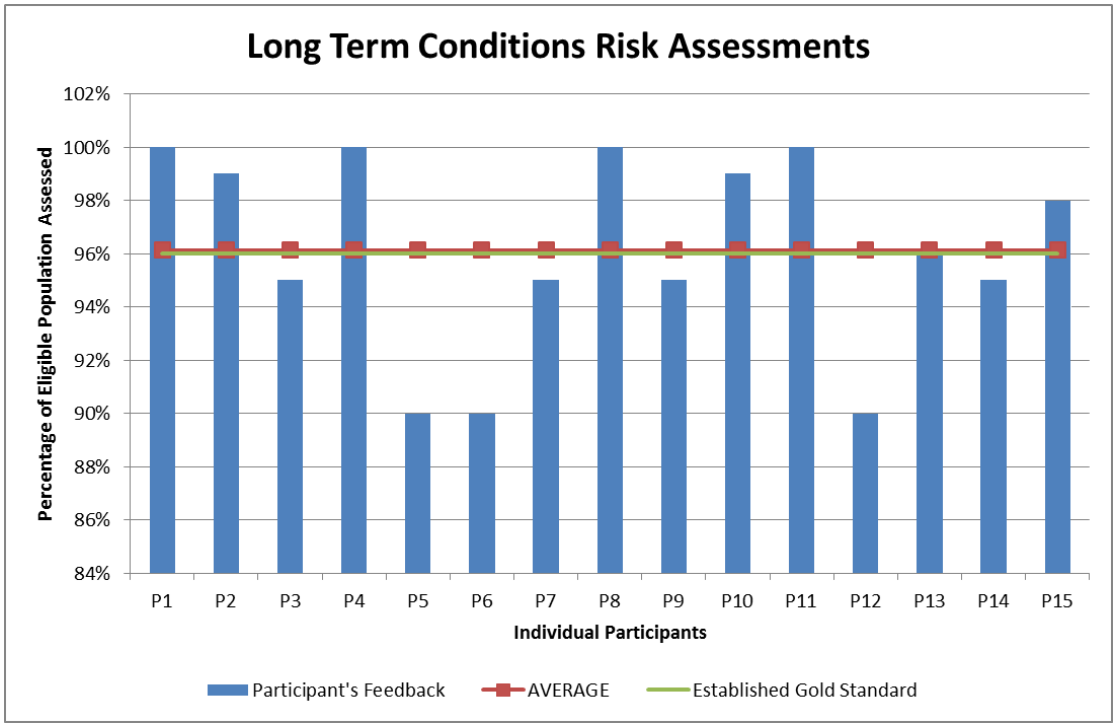



Figure 11: Long Term Conditions Risk Assessments

Data definition: Percentage of the eligible population (8,074) will have had their long term condition risk (CVD and diabetes) assessed in the last five years.

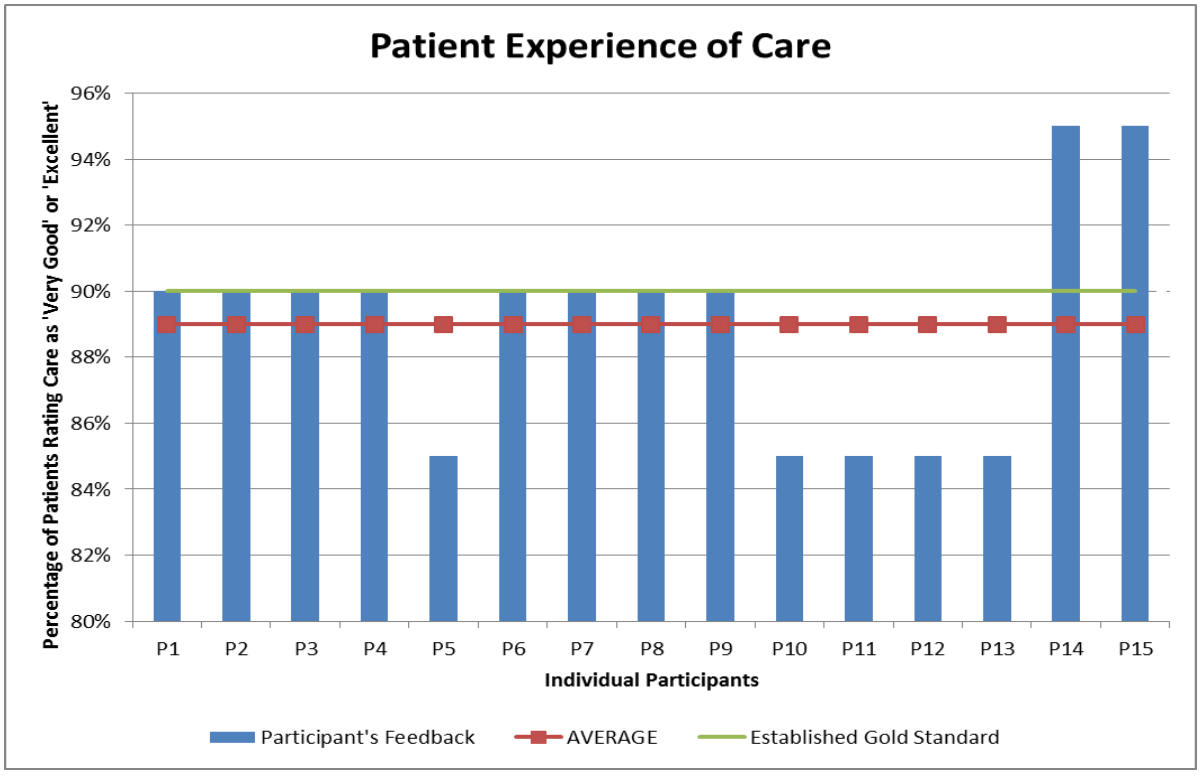



Figure 12: Patient Experience of Care

Data definition: Overall care and treatment ratings of inpatient care %

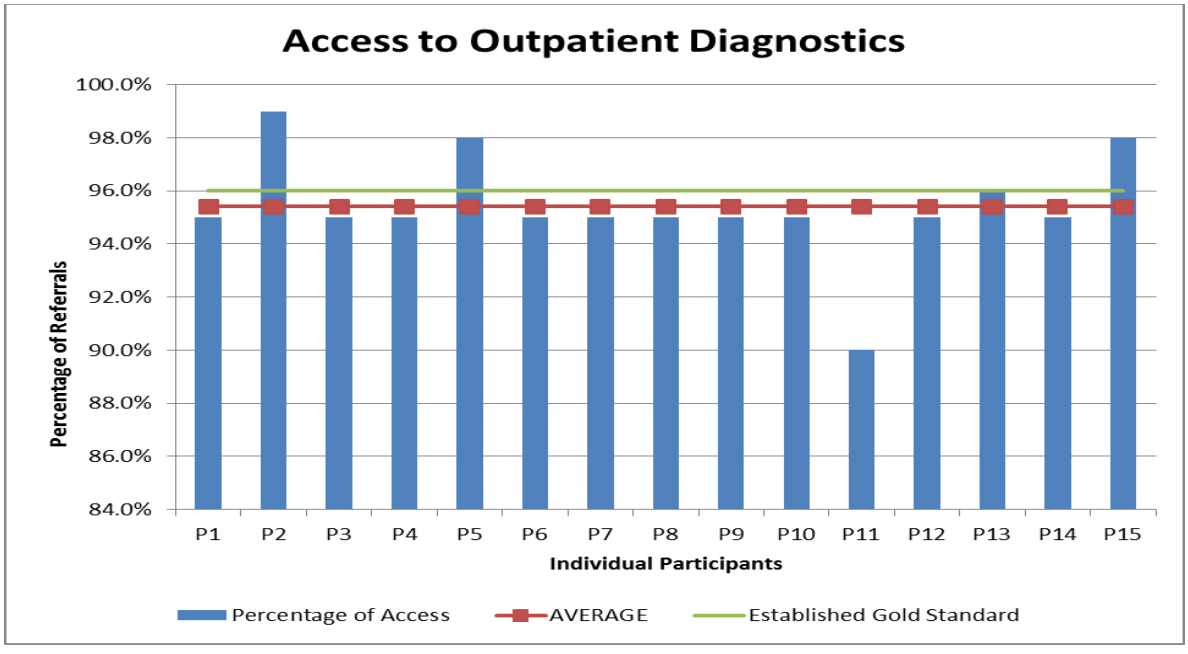



Figure 13: Access to Outpatient Diagnostics

Data definition: Percentage of all outpatient referrals for radiology completed within 6 weeks

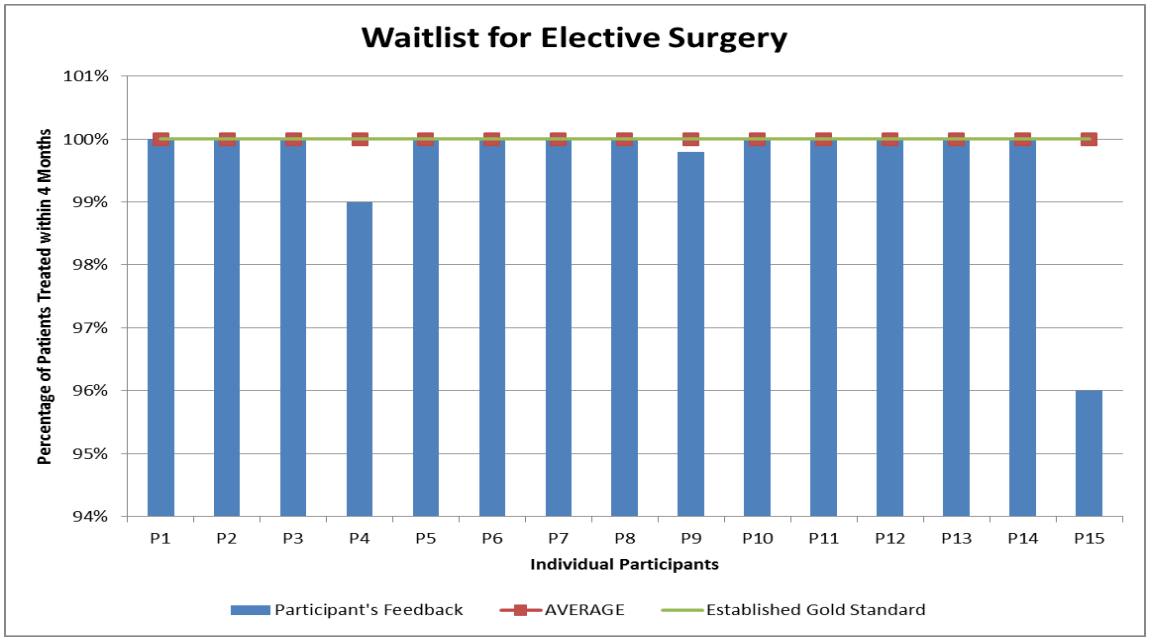



Figure 14: Waitlist for Elective Surgery

Data definition: Elective Services Patient Flow Indicator 5: Patients given a commitment to treatment but not treated within the require timeframe

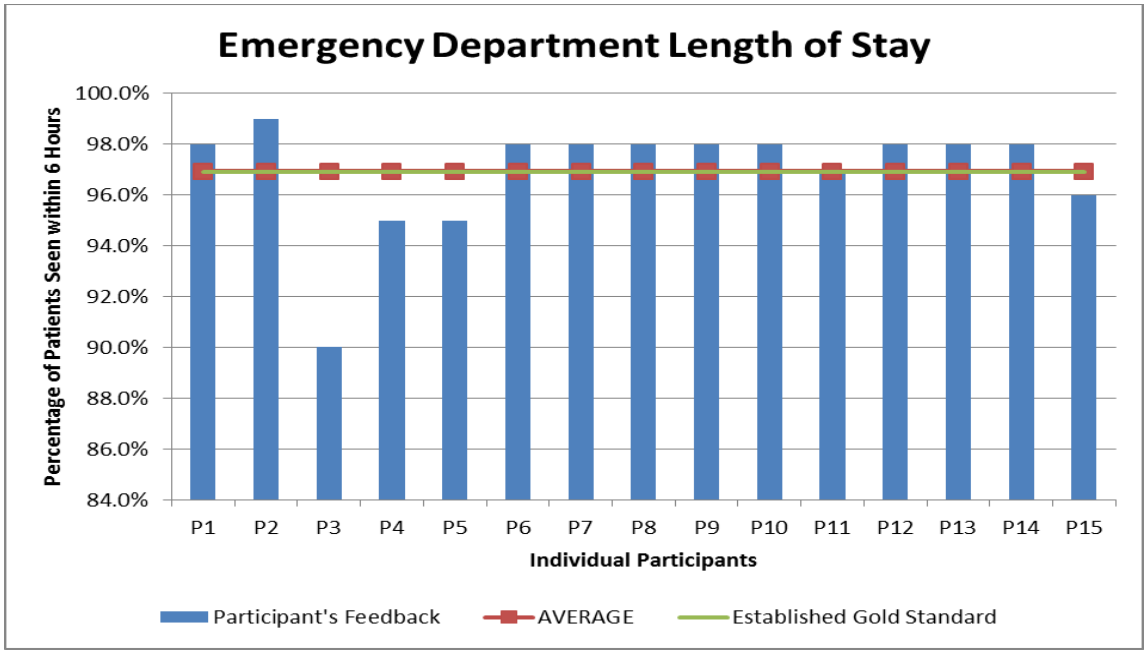



Figure 15: Emergency Department Length of Stay

Data definition: The percentage of patients admitted, discharged, or transferred from the CM Health emergency department (ED) within six hours.

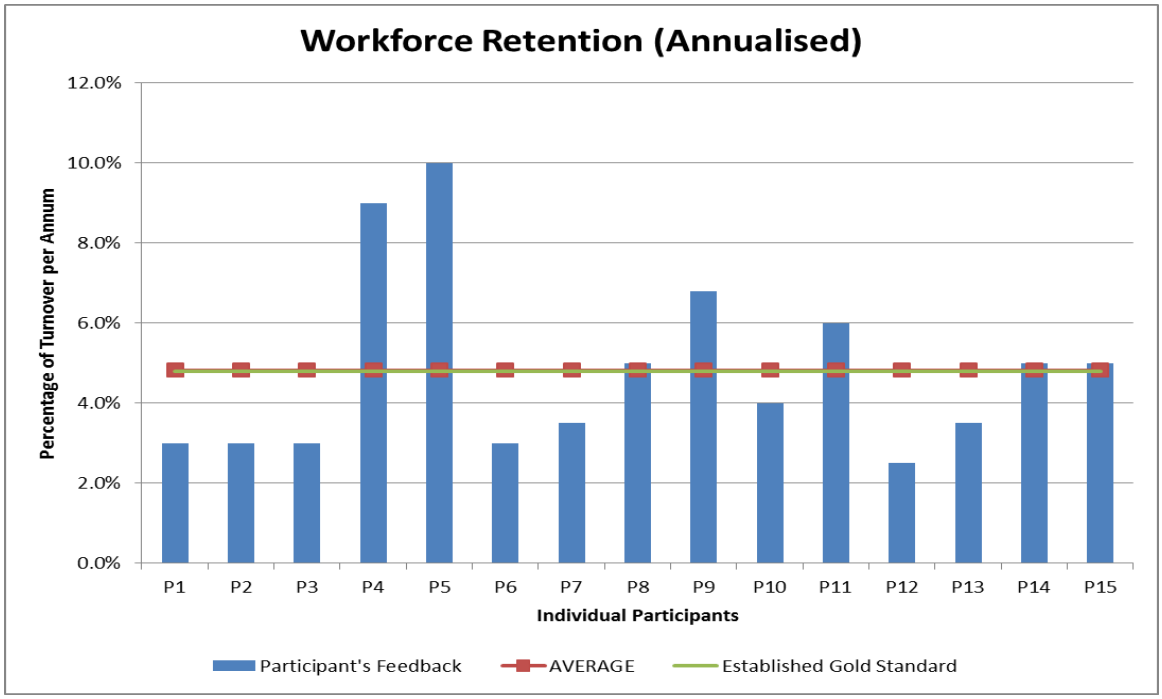



Figure 16: Workforce Retention (Annualised)

Data definition: Percentage of workforce retained

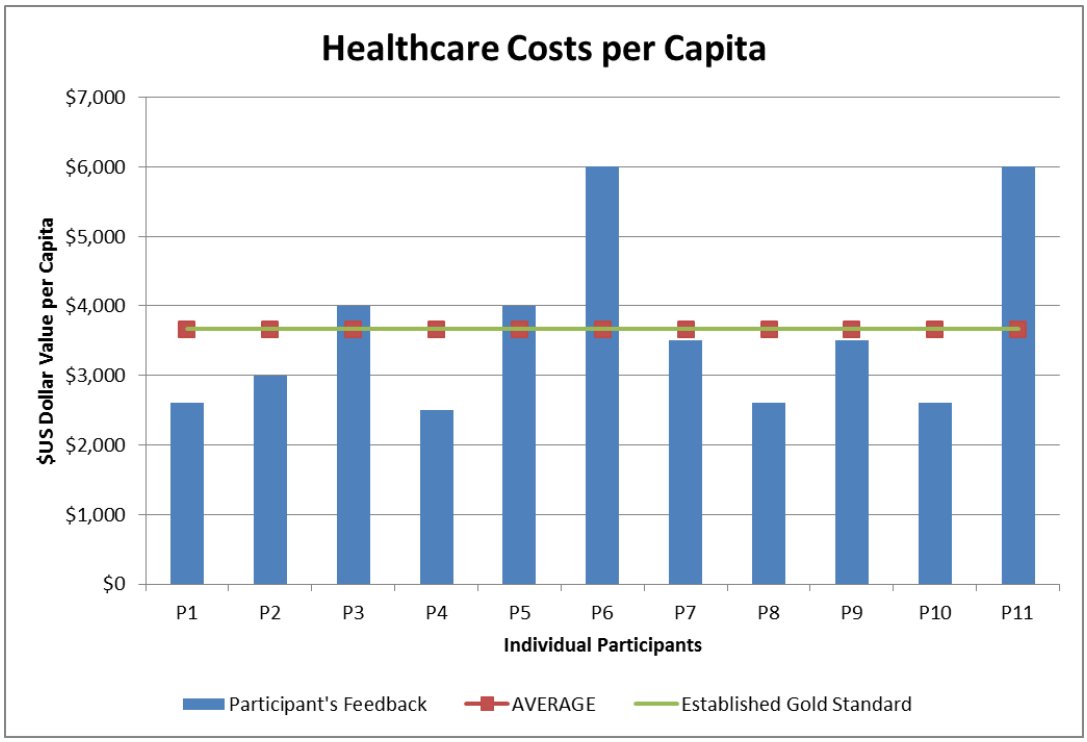



Figure 17: Healthcare Costs per Capita

Data definition: Numerator – The sum of total expenditure on health for CM Health – Denominator: Total CM Health patient population

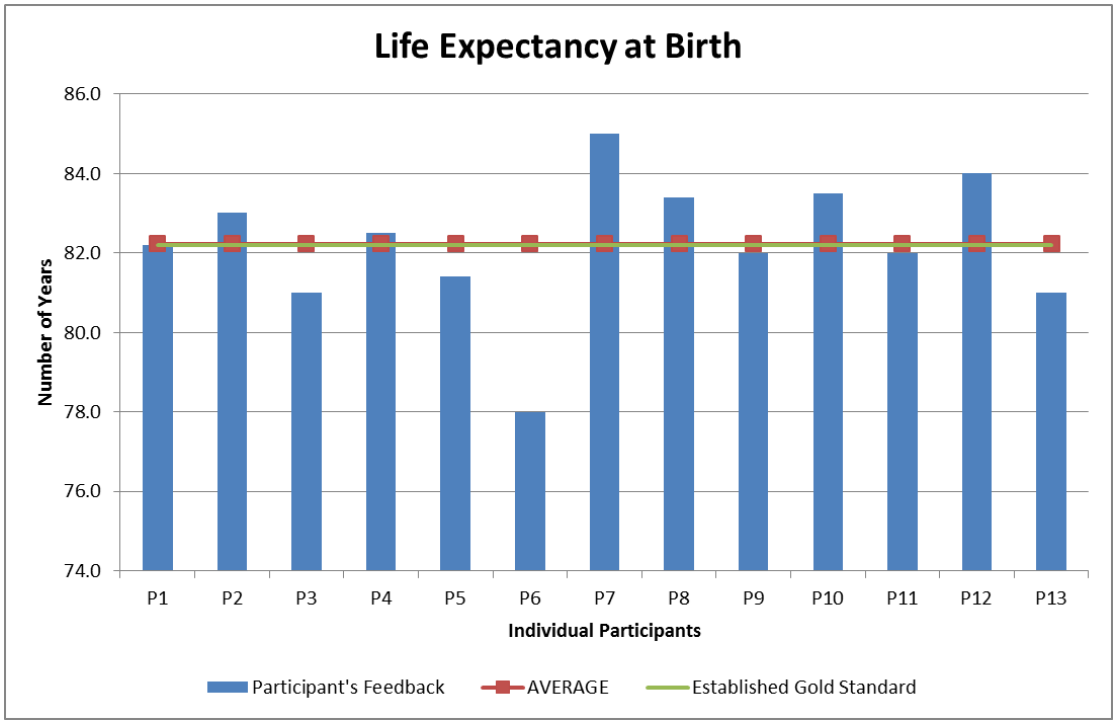



Figure 18: Life Expectancy at Birth

Data definition: estimated life span of an infant if they experience the current mortality rates of their population over the rest of their life

Table 9: Overview of the outcome of the modified Delphi process

| System Level Measure | Mean | Median | Mode | Standard deviation | Interquartile range | Established gold standard |
|---|---|---|---|---|---|---|
| **Health services utilisation** | 1.1% | 1.0% | 1.0% | 0.9% | 1.0% | 1.1% |
| **Acute hospital readmissions** | 3.4% | 3.5% | 3.0% | 1.5% | 3.5% | 3.4% |
| **Hospital days during the last 6 months of** | 6.3 days | 6.5 days | 5.0 days | 1.3 days | 6.2 days | 6.3 days |
| **Hospital standardised mortality rate** | 76.6 | 75.0 | 75.0 | 5.5 | 76.1 | 76.6 |
| **Ambulatory sensitive hospitalisations** | 14.6% | 15.0% | 15.0% | 3.5% | 14.3% | 14.6% |
| **Childhood immunisation status** | 96.0% | 95.0% | 95.0% | 1.0% | 96.0% | 96.0% |
| **Rate of adverse events** | 23.5 | 20.0 | 20.0 | 10.9 | 23.6 | 23.5 |
| **Long term conditions risk assessment** | 96.0% | 9.0% | 100% | 4.0% | 97.0% | 96.0% |
| **Patient experience of care** | 89.0% | 90.0% | 90.0% | 3.0% | 89.0% | 90.0% |
| **Access to outpatient diagnostics** | 95.4% | 95% | 95% | 2.03% | 95.1% | 95.4% |
| **Access to elective surgery** | 100% | 100% | 100% | 1.0% | 100% | 100% |
| **Emergency department length of stay** | 96.9% | 98.0% | 98.0% | 2.3% | 97.7% | 96.9% |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Workforce retention (annualised)** | 4.8% | 4.0% | 3.0% | 2.3% | 4.2% | 4.8% |
| **Health care cost per capital** | $3,664 | $3,500 | $2,600 | 1,280 | $3,314 | $3,664 |
| **Life expectancy at birth** | 82.2yrs | 82.2yrs | 81.0yrs | 1.7yrs | 82.4yrs | 82.2yrs |

## The case studies

The purpose of the case studies is to gain a broad understanding of the elements of quality improvement in healthcare systems recognised as leaders in quality improvement.

This section has two parts:

1. The background of the organisations and people interviewed
2. The findings that have emerged from these interviews, organised by themes.

### Background on participant organisations

*Jönköping County Council*

Jönköping is an elected county council in Southern Sweden, with a population of around 340,000. Healthcare in Sweden is publically funded and county councils provide primary, secondary and allied health services. They locally implement national policy, as well as having significant local autonomy to plan, fund and deliver quality healthcare.

Jönköping has achieved outstanding quality outcomes for patients and the system across several decades, via a number of key programmes. Instrumental in the success of this work and its diffusion to other healthcare systems, including CM Health, has been the role of Qulturum, Jönköping's "…center for development of improvement knowledge and innovation in healthcare…[7]

Participant: Göran Henriks, Qulturum's Chief Executive of Learning and Innovation.

*Salford Royal NHS Foundation Trust*

The Salford Royal NHS Foundation Trust is a state-funded acute, primary and community care provider in the North of England, with around 7,000 staff. It provides local services to the City of Salford and specialist services to the Greater Manchester region.

The Trust is well-known for its goal to be the safest organisation in the NHS and was the first Trust to be rated "Outstanding" by the UK's Care Quality Commission. It has been

[7] http://plus.rjl.se/index.jsf?nodeId=43080&nodeType=13. Page accessed 20/10/15.

particularly active in quality improvement since 2007 and in 2015 launched its third Quality Improvement Strategy.

Participant: Sir David Dalton, the Trust's Chief Executive, and follow up on a number of points by email with Siobhan Moran, the Trust's Assistant Director of Quality Improvement.

*Cincinnati Children's Hospital Medical Centre*

Cincinnati Children's, a nonprofit academic medical centre, provides comprehensive clinical services, from treatments for rare and complex conditions to well-child care. It has over 600 registered beds, with more than 1.1 million patient encounters annually. It serves its local population, as well as a large number of national and international patients.

Cincinnati Children's first set in place a strategic quality plan in 2000 and since then has been marked by a very strong commitment to an evidence base and rigorous, action-oriented methodology for quality improvement. It has documented improvement across many domains, including patient and family outcomes, and has become well-known internationally for its quality improvement work. It launched the James M Anderson Centre for Health System Excellence in 2010 to further this work.

Participant: Dr Uma Kotogal, Senior Vice President, Quality, Safety and Transformation and Executive Director of the James M Anderson Centre for Health System Excellence.

*Alfred Health*

The Alfred is a tertiary referring hospital in inner south-eastern Melbourne, the capital of the Australian state of Victoria. It provides ambulatory, inpatient and community (but not primary care) services to its local community and is a major specialist provider of state-wide services in Victoria.

Alfred Health is recognised for its commitment to patient-centred care: "Patients Come First" is the primary goal of its 2012-2015 Strategic Plan. It also publishes daily and monthly quality and safety dashboards, using internal, state-wide and national measures.

Participants: Margaret Way, Director of Clinical Governance, and Suzanne Corcorran, Manager of Patient Experience and Community Participation.

*Curtin University*

Participant: Professor Dorothy Jones

Professor Jones is the Professor of Clinical Safety & Quality at Curtin University. She has 30 years' experience in the Australian public sector as a clinician and senior executive, including as Executive Director, Performance Activity & Quality Division at the Western Australia Health Department.

*Agency for Clinical Innovation*

The Agency for Clinical Innovation (ACI) is one of five healthcare system pillars of the Australian state of New South Wales. Its role is to design and promote better healthcare, with work focussing on redesign with consumers, innovation advice, capability and knowledge building, and implementation support.

ACI is active across a large number of clinical networks from the very focused to the system-level. Its main work is in hospital and secondary services, as these are state-funded, while primary care is federally-funded.

Participant: Dr Nigel Lyons, the ACI's Chief Executive.

*Counties-Manukau Health*

Participants: Dr Gloria Johnson, Chief Medical Officer, Denise Kivell, Director of Nursing, Dr Lynne Maher, Director of Innovation, and Renee Greaves, Patient and Whanau Care Advisor.

Seven interviews took place with people from organisations external to CM Health, with an additional person followed up by e-mail. Four people from CM Health were interviewed. Although fewer interviews took place than anticipated, data saturation was achieved.

## Interview themes

The inductive thematic analysis of the interview text data revealed five themes. The theme's label, associated descriptor, the findings and illustrative text data from participant interviews (presented as indented text in italics) are set out below.

The five themes are:

- quality improvement methodology
- engagement
- context
- sustainability
- quality measures.

## Theme 1: Quality improvement methodology

*Descriptor of theme*

The methods used in quality improvement, both in terms of the methods themselves and their application.

*Findings*

All participants were very clear on the importance of using a QI methodology to structure QI initiatives. Doing so allowed initiatives to use well-documented and well-understood frameworks and tools – essentially to follow international best practice. Reference was typically made to the work of Deming[8], the Institute for Healthcare Improvement[9], the Toyota Specification[18] and Malcolm Baldrige[36]

> *There's a science to QI. There's a science to systems thinking. There's a science to co-production. All of these sciences have been described in a lot of different literature, and our job is really to bring them all together to change the world.* (Interviewee 3)

A feature of QI methods noted by participants was their organic and iterative nature – they develop over time as they gets localised to the macro/meso/micro contexts of the initiatives. The methods are iterative also because QI programmes first involve early adopters and others later, identified as a key tenet of improvement science. The extensive use of prototyping, testing and feedback makes the methods adaptable. Participants stressed their confidence in their methods' abilities to cope with new challenges (for

[8] https://en.wikipedia.org/wiki/W._Edwards_Deming;
[9] www.ihi.org

example, starting to work with the community sector in the case of a previously hospital-based project).

> *We have to work with the confidence that setting the table right, setting the platform right, providing people with the tools, having the measures, allowing experimentation, will produce answers.* (Interviewee 5)

Participants argued there is a scientific base to QI methods. An important part of this was the continual improvement loop between the QI goals, the measures put in place to track achievement of them, and feedback to participants.

Below are the key findings on the practical experiences of participants with QI methods in QI initiatives and projects.

- Training in the QI method empowers and upskills the workforce: they feel more optimistic about their ability to create and sustain change.

  > *Instead of simply saying, "Oh, I can't do anything," people now have the skills to solve the problems. They can come together and move big dots. Yeah, that's a big part of it.* (Interviewee 3)

- Training can have downstream effects on the non-healthcare workforce too.

  > *If we're able to address community health that's a huge, huge issue in terms of workforce development downstream, less prisons. If kids can't read in third grade, they can't do eighth grade math, they have a very high probability of not having a job.* (Interviewee 3)

- There needs to be a robust overall governance and project management approach in a QI initiative to ensure stakeholders have the appropriate information: – for example, whether leadership is seeing the cost/benefit or that patients and staff are seeing improved outcomes. This robust approach is particularly important where there is a large amount of work going on across multiple projects.

- A related finding is that the workload of key QI participants needs to be managed:

> *…the system has only a certain amount of capacity for managing change processes as well. We're getting strong feedback that you can't ask a system where often these things fall to a few key people in organisations to have a myriad of programs or projects underway all at the same time. They don't have the bandwidth to deal with it.* (Interviewee 7)

- *One of the solutions offered to this bandwidth problem is to think about "improvement waste". Does each initiative require an improvement project or are some things assigned to jobs and specifications, and then just be specific about what people must do ?* (Interviewee 3)

Finally, there was unanimous agreement that the QI method requires real engagement with patients and families[10], particularly where measures or outcomes are patient and/or family-centred. The findings on engagement follow next.

## Theme 2: Engagement

*Descriptor of theme*

How all stakeholders work with a QI initiative. The term *stakeholder* is used to indicate that a person or group has some relationship to a QI initiative or project.

*Findings*

Engagement occurs in many contexts, in many ways. Participants identified several dimensions of engagement:

- Degree: initiatives and projects engage to differing degrees with different stakeholders;
- Proximity: a stakeholder's centrality to a QI initiative or project particularly affects degree;
- Time: a stakeholder's proximity can change over time;
- Direction: engagement can be something done by a QI project to an external stakeholder, or the engagement may come externally in to the project.

[10] 'Patients and families' includes people who are not patients or the family of one.

The most common aspect of engagement raised in interviews was engagement between a QI project team and patients and families. Participants clearly believed that this engagement must be real: the term most often used was *partnership*. The rationale for partnership was commonly expressed as it being an aspect of quality, in that a QI initiative or project is more likely to be effective and sustainable – of higher quality – when patients' and families' input is used to design a solution that meets their needs. This is recognised in QI methods as *co-design[37]*.

Participants suggest co-design is particularly important to address quality where the solutions lie across the continuum of care or in addressing the determinants of health – where the patient and family needs to be activated and engaged in their care (the Chronic Care Model was often used as a point of reference). If the intended solution does not meet the needs of patients or families then it is no solution:

> *What we've ended up doing in our coproduction work, one is having patients and families at the table so they are coproducing working with us to figure out what the answers are.* (Interviewee 3)

One perspective on engagement with patients and families is different, illustrating the dimension of degree:

> *…the involvement of patients and families is to hear about their experience and for us to be trying to understand with them what it is that we could be doing differently which we would then have to test whether we are able to make those changes and sustain them .* (Interviewee 2)

This person is referring to projects where the staff are leading projects around clinical safety. There is less patient involvement required as

> *[staff are] the ones that are disrupting the system that they have a responsibility for…* (Interviewee 2)

This person believed though that as their organisation engaged more in primary and community care that they would have to engage more closely with patients and families, for the same reasons as set out above. This is seen in their use of "bases":

> *"…partnerships of people and groups in each of neighbourhoods now meeting regularly to work on the health needs of individuals and the populations of the neighbourhood" (Interviewee 8).*

All participants suggested that engagement with internal and external stakeholders was difficult. Mitigating against this difficulty:

- in regard to stakeholders in leadership and governance, it is important to have strong internal project structures to share information;
- with staff, understanding context is very important, especially localisation to clinical practice

> *…the culture and the environment you're going into is the key component.* (Interviewee 7)

> *…one of the biggest lessons I learned is that local identity and local context is critical.* (Interviewee 6)

Engagement with patients and families was considered especially difficult. A number of reasons were offered for this:

- strong cultural norms work against people taking responsibility for their own healthcare;
- different cultural groups provide feedback in different ways and to different degrees, and this needs to be accounted for;
- patients and families often do not understand what partnership is and it is necessary to work this through with them;
- there is a natural attrition of participants in co-design, such that the project may be left with few representatives after some time.

Participants also offered ways in which engagement with patients and families can be made easier:

- tools from the discipline of design are very helpful

  *…using methods that people use in other industries to very clearly understand what the consumer wants and needs, even when they're not able to say it* (Interviewee 3);

- using community resources and organisations that already exist, such as disease or patient support groups, and especially the leaders of these organisations;
- patient stories are an effective means of engaging clinicians;
- in asking patients, families and community groups early in a QI project to supply data and information, people prepared to engage over time will self-identify;
- recognising the importance of prioritising engagement

  *What we should value is how well we take care of the people that really need our services and not listen so much to the people that don't use our services.* (Interviewee 1)

All participants thought most staff strongly believe in the importance of quality initiatives. Culture, both professional and organisational, was the determining factor of this, aided and abetted by values-based leadership and management. Context and culture are discussed in the following section.

## Theme 3: Context

*Descriptor of theme*

The socio-political context in which the QI initiative operates, including various dimensions of culture.

*Findings*

Participants were aware that QI initiatives and projects need to account for the socio-political context and dimensions of culture in which they operate. They consistently argued that these factors need to be consciously designed for in establishing a QI initiative or project.

> *…is this environment in which we're trying to make the change going to be fertile, is it going to be one that will willingly accept the need to do things differently and are there things set up to support that change being embedded into the way business is now done…* (Interviewee 7)

Participants identified a number of contextual and cultural factors that impact on QI and need to be accounted for in QI design:

- national/regional/local culture: for example, cultural norms in relation to self-management or the progressive re-distribution of resources;
- financial incentives: as a way to change behaviour in a desired direction;
- system structures: for example, if a local healthcare system also provides social services;
- organisational structure: particularly effective governance;
    - governance was suggested to as a way to ensure overall QI initiative risks and opportunities are well-considered
- organisational dynamics: for example, leadership support for QI;
- clinical practice: for example, these practices may not be standardised across (or within) sites.

A particularly important dimension of context and culture identified was the workforce, and this too needs to be accounted for in QI design:

- that organisational values and staff culture are aligned. Attracting the right people is a key part of this: for example, by recruiting for values and training for skills. Also important here was that workforce culture is supportive of the context of QI: for example, that co-design is accepted as a legitimate and effective activity for enabling patient-centred outcomes;
- that effective governance includes clinical governance and effective organisational leadership involves clinicians;
- that staff are supported to be comfortable in a culture of transparency;
- that staff are trained and supported to test new ways of working

> *I think the biggest thing has been giving power to the staff, giving them permission to disrupt our systems, and to see whether they can find alternative ways of services being delivered.* (Interviewee 2);

- that different professions have different cultures, expressed by some participants as different priorities in regard to treating a disease or seeing a person holistically;
- and, finally, that the workforce culture is actually amenable to change.

> *Even in our community I think the obstetricians have picked up on [our quality improvement method]. We now have school nurses that are trained in quality improvement. We're starting a community quality improvement course that would enable us to really take the tools that we've taken to people in healthcare to other sectors, to teachers, to councilmen, to agencies that work on outcomes that seem to spend a lot of money but not get any results…*(Interviewee 3)

This spread of a QI culture touches on the next theme: the importance of sustainability for effective QI.

## Theme 4: Sustainability

*Descriptor of theme*

The benefits of a QI initiative or project will continue to accrue once the initial impetus provided by the initiative or project reduces. Essentially, that the QI initiative or project becomes normalised in routine healthcare practice as 'business as usual'.

*Findings*

Participants were all concerned that QI work continues to produce benefits over time, particularly once the one-off resources provided to plan and implement an initiative or project are reduced.

> *…we often see improvements for a period of time and then, eighteen months, two years, three years down the track those benefits or*

*improvements aren't able to be sustained at the level that they were in the initial phase.* (Interviewee 7)

There was also a sense that sustainability is an underlying factor in all quality improvement and safety work: one participant suggested it is part of systems thinking.

The main finding for all participants in regard to this theme is to ensure projects are designed to address factors affecting sustainability. The factors were identified as:

- workforce engagement: ensuring the rationale for the QI work is clear to staff and that they buy in to this. Mitigating for inevitable staff turnover was considered important. Also, the realisation that sustainable change comes from involving key clinical leaders:

  *…they may have a commitment to it which means that they're focused on it and the team around them know it's important, but if they're not there it's not there it drifts off.* (Interviewee 7)

- patient and family engagement: similarly to the workforce, ensuring understanding and getting buy in.

  *If you engage people, then they're part of the change and then they're more likely to help develop the change in the way it's going to meet everybody's needs and then they're more weighted to it, so that they're going to sustain it .* (Interviewee 9)

- context: as set out in the Context section above, making best advantage of the socio-political settings of the QI work;
- culture and values: ensuring the work builds on these aspects of an organisation and workforce;
- project prioritisation: especially choosing the right time to promote a project over others so that it has the optimal chance of success;

- QI methodology: in this case, having a project management approach that supports work transitioning to business as usual and a prioritisation framework that enables new QI projects to start;
- measures: to ensure progress over time is transparent and auditable:

> *Monitoring and giving feedback is to how well each of our wards and departments is doing, and adhering to these new change packages is really important to this and is a component of what we do…* (Interviewee 2)

In the following section, findings in relation to the theme of measures are outlined.

## Theme 5: Measures

*Descriptor of theme*

The use of quantitative and qualitative quality measures.

*Findings*

There were two key findings in regard to quality measures. First is a reiteration of a key principal of systems improvement science: that if there is no measure, we cannot know if there has been change: "We can only be sure to improve what we can actually measure"[38]. Participants stressed the need to set goals and have measures for progress towards them in order for QI initiatives and projects to succeed:

> *From an improvement perspective, if there are no goals for reducing disparity, then disparity won't be reduced.* (Interviewee 3)

The second key finding is that the measure must encourage a behaviour or action that will move the measure in the direction intended by the goal, and avoid behaviours and actions that do the opposite. The measure must:

> *fit the purpose for what we want the health system to be like* (Interviewee 9)

In this, it is considered important that the relationship between the measure and the behaviours and actions must be transparent. One aspect of this is that there should be an archetype of the behaviour that should be engendered by the measure.

> *You just have to map…I would want to see this measure is important because this measure reflects on something. Then a key driver that says to move this measure, what do people have to do?* (Interviewee 3)

Also relevant here is the importance of distinguishing between measures for judgement and measures for improvement. This difference is important for keeping the focus on quality improvement, but also for maintaining staff motivation.

Other findings in regard to measures include:

- attribution: it can be difficult to attribute change in measures to activities, because:

  > *there [are] so many factors that play that might impact on them…* (Interviewee 7)

- re-use: a measure can be re-used in other ways. For example, a "safety thermometer" measures its inverse as incidences of harm.

  > *What we want to do is to flip this idea, and say, "Can we actually see how many patients are receiving 'harm free' care throughout the organization?"* (Interviewee 2)

- relevance: the measure must be considered relevant on some criteria meaningful to staff and/or patients and families. The measure essentially must be of something they care about:

  > *If it's going to make a difference to patients, it's sellable, but if it's just going to ... If it's not going to be packaged up in that way, tell somebody who cares.* (Interviewee 10)

and be expressed in a way that makes sense to the intended audience. All organisations publish their measures, using a wide range of methods, including on-line dashboards, whiteboards in wards or quality account reports, but effort must also be made to understand what matters to the intended audience. For example, one participant suggested:

*…people are still quite tuned in to those fundamental clinical risks, even though they don't refer to them as clinical risks but I suppose, you know, how safe is my hospital*. (Interviewee 11)

- feedback: reporting measures back to staff must be done transparently and with support:

*We also display the level of nursing standards that are being reliably achieved on that ward. We do that, even if it could be a ward achieving the lowest standards in the organization. Those that [are] having difficulty, we can offer them support and intervene as necessary.* (Interviewee 2)

*An organisation needs to make sure that the staff's experience with making data public is supportive and provides staff with the time and tools needed to improve if necessary.* (Interviewee 8)

- change: most participants recognised measures can change over time as priorities change or goals are achieved. It was considered important to have a method for considering and making changes to a suite of measures.
- measures get more difficult to establish and enumerate as the setting moves into the community.

Finally, attribution and relevance were considered crucial to understand

…actually sometimes you can hit the target and miss the point. *(Interviewee 10)*

# Section four: Discussion, synthesis and recommendations

This evaluation set out to determine if improvement within the CM Health healthcare system was evident within the context of the organisation's SLM framework. In addition it aimed to establish how improvement had been achieved based not only within the broader context of the SLMs but also by understanding how other healthcare systems had gone about their QI journey. Due to the establishment of the SLMs framework, CM Health was also keen to conduct comparisons and establish performance specifications or gold standards for each SLM as part of establishing progress toward the organisational goal of being the best healthcare system in Australasia. The findings related to this process are also discussed. The first part of this section discusses the broad implications of the findings from the comparison of CM Health SLMs with other healthcare systems and the subsequent interviews with key people from healthcare systems that are achieving more than CM Health on specific SLMs. It is structured in accordance with key messages that emerge from the evaluation and that are collated in the table below.

**Table 9: Key messages**

| Key messages |
|---|
| To successfully achieve performance specifications, it is at least as important to pay attention to aspects of softer intelligence as it is to the more traditional aspects. |
| Performance on System Level Measures appears to be less of a determinant of the success of a quality improvement initiative than the structures and culture of the organisation. |
| Be careful when analysing patient experience feedback as key information may be missed using methods from hard metrics. |
| Having a well thought through, locally relevant System Level Measures framework enables an organisation to pinpoint to a high level of accuracy where issues are present in a system. |
| When organisations develop SLMs frameworks they can advance thinking around system level metrics and, as a consequence, innovative measures emerge. |
| By undertaking the development and implementation of a framework of SLMs, CM Health has been successful in enhancing the understanding of senior clinicians and managers regarding the complex and interrelated nature of their whole system. |
| The current SLMs framework needs to be considered a fluid framework to ensure that it continues to reflect the priorities of CM Health and as a consequence reduce improvement waste. |

| |
|---|
| Counties Manukau Health is an organisation which embraces a learning culture. |
| Counties Manukau Health largely has in place the structures necessary for a successful QI initiative. |
| Counties Manukau Health has recognised the need to address the human factors in change management and has in place a range of appropriate approaches to further this. |
| Counties Manukau Health has recognised the underpinnings of its QI culture and supports and promotes them. |
| The building blocks for continual improvement are in place. |
| Counties Manukau Health must continue to work towards the sustainability of the QI initiative by addressing the intrinsic motivations of staff, patients and families. |
| Counties Manukau Health has created the institutional foundations to embed already identified systems and processes to drive sustainability of the QI initiative. |

Counties Manukau Health is the leading healthcare organisation on three of their SLMs: health service utilisation, long term conditions risk assessments, and waitlist for elective surgery. Patient experience of care is a relatively new measure in New Zealand, and international comparators were not found. The interviews with key people from healthcare organisations who were achieving more than CM Health on other SLMs identified key themes that appear to assist in ensuring a high level of performance in relation to an SLM. These themes can be mapped to domains of the energy for change model.[39] This model is significant as it relates to the capacity and drive of a team, organisation or system to act and make the difference necessary to achieve its goals. The model has five domains: social, spiritual, psychological, physical and intellectual [39]. It draws attention to the importance of the first three as these make change more meaningful and important to those with high emotional energy, while others will still be motivated by and focus on the intellectual information.

**Key message:** To successfully achieve performance specifications, it is at least as important to pay attention to aspects of softer intelligence as it is to the more traditional aspects.

Based on the comparison of the SLMs it could be argued that CM Health has not been successful in its attempt to become the best healthcare system in Australasia. However, we

do not know if there are any other healthcare systems that are lead performers on three or more SLMs at any one time. In other words, to be considered the best, how many measures do you need to be the top achiever in? It may be that CM Health *is* better than its peers; without extensive further investigation we cannot definitively say.

What is clear though is CM Health in a good position to be one of the best healthcare systems at getting better. This is because the conditions for positive change to occur, based on an existing culture of quality improvement and a commitment to staff engagement, have been fostered and enhanced by the CEO, senior staff and Ko Awatea.

**Key message**: Performance on System Level Measures appears to be less of a determinant of the success of a quality improvement initiative than the structures and culture of the organisation.

Other learnings have also emerged from the focus on the SLMs. Unlike the Health Quality and Safety Commission's analysis of their patient experience survey, the SLM team have drilled down into the patient experience of care measure and analysed the feedback by ethnicity and age group and found that the responses vary by ethnicity and age group. While their analysis is currently hampered by low response rates, pooling these numerical data over time may highlight more clearly ethnic and age differences in how patients experience care. Equally, the organisation needs to value the narrative feedback it receives via its patient experience of care survey and avoid the temptation to aggregate these data down into meaningful themes by remaining open to hearing distinct voices contained within the narrative feedback.[40]

**Key message**: Be careful when analysing patient experience feedback as key information may be missed using methods from hard metrics.

By taking the time to develop not only the SLM framework – the big dots, but also determining the contributory measures, the little dots – the SLM team are able to drill down to a specific level of the system to determine where issues are present. This level of specificity means that any initiative developed to address an SLM is able to be targeted. A recent example of this was in relation to the "acute hospital admissions" SLM. To determine what was driving an increase in acute readmissions, the SLM looked at

readmissions by service, by long term condition, by exploring the influence of shorter in-patient stays, and the effect of transfers, and they found that the increase was driven by the Plastics and Orthopaedic services. An audit of clinical notes from these two services, however, determined that the issue was one of inappropriate coding.

**Key message**: Having a well thought through, locally relevant System Level Measures framework enables an organisation to pinpoint to a high level of accuracy where issues are present in a system.

The system level measure of healthcare utilisation used by CM Health is the percentage of people who have used healthcare services but are not yet enrolled in a Primary Health Organisation. The recent paper published by Chan and colleagues[41] (see appendices) highlights the potential benefit of putting energy into engaging with this population group, due to the well-recognised benefits of access to primary health care.[42]

**Key message**: When organisations develop SLMs frameworks they can advance thinking around system level metrics and, as a consequence, innovative measures emerge.

In the paper *Developing and Implementing a Framework for System Level Measures: Lessons from New Zealand* (see appendices) those interviewed spoke of the process of developing the framework as resulting in "conversations and debates that would otherwise not have occurred", and "forcing you to look at the whole system". Clearly the process of reviewing data and the resultant conversations that underpinned the establishment of the SLMs framework can be considered as an effective strategy that enabled senior clinicians and managers to start to make sense of their healthcare system.

**Key message**: By undertaking the development and implementation of a framework of SLMs, CM Health has been successful in enhancing the understanding of senior clinicians and managers regarding the complex and interrelated nature of their whole system.

Not all of the SLMs have generated improved patient outcomes or resulted in the establishment of their own improvement projects. For example, the long term conditions risk assessment measure has seen an improvement in performance, however, this has not necessarily been accompanied by an improvement in patient outcomes. In the case of the rate of adverse events measure, a raft of interventions to address harm were already in

place, and in the case of the childhood immunisation measure, the SLMs team consider their influence has been minimal. A key challenge for CM Health is to ensure it has in place a mechanism that enables it to understand whether its performance measures are having the intended impact and, if not, why not. Figure 19 illustrates this process.

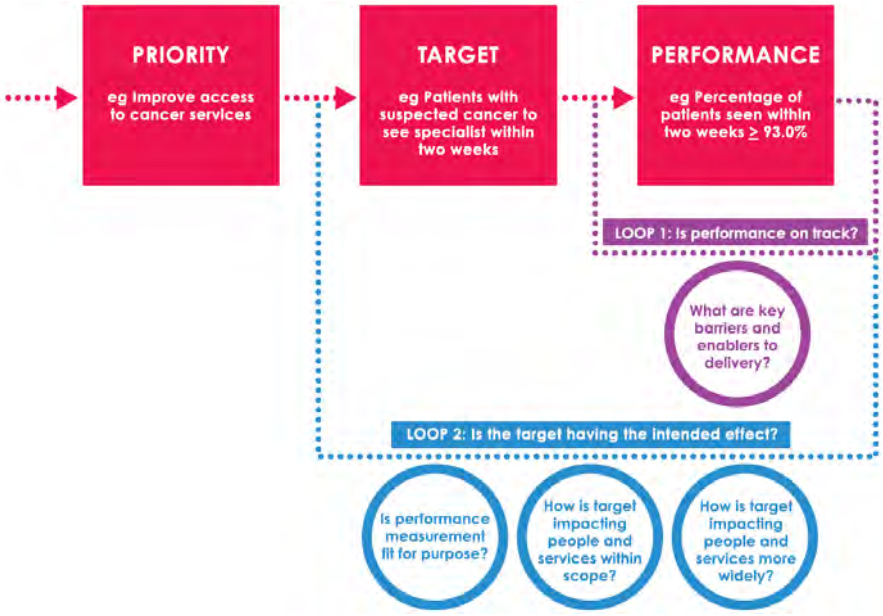



Figure 19: Is the system performing against the measures set?

Figure nineteen is taken from a report by the Health Foundation.[43] Loop two considers whether the measure remains appropriate. In view of the workload associated with SLM reporting (see appendices (*Developing and Implementing a Framework for System Level Measures: Lessons from New Zealand*)) this is an important consideration as measures may need to change in response to feedback, unintended consequences and changes in technology, knowledge and practice, or alternative measures may offer a better representation of performance.[43] Indeed there may come a time when the current suite of SLMs no longer reflects the most pressing areas for CM Health and the organisation may have to face the challenge of removing one or more of the measures.

**Key message**: The current SLMs framework needs to be considered a fluid framework to ensure that it continues to reflect the priorities of CM Health and as a consequence reduce improvement waste.

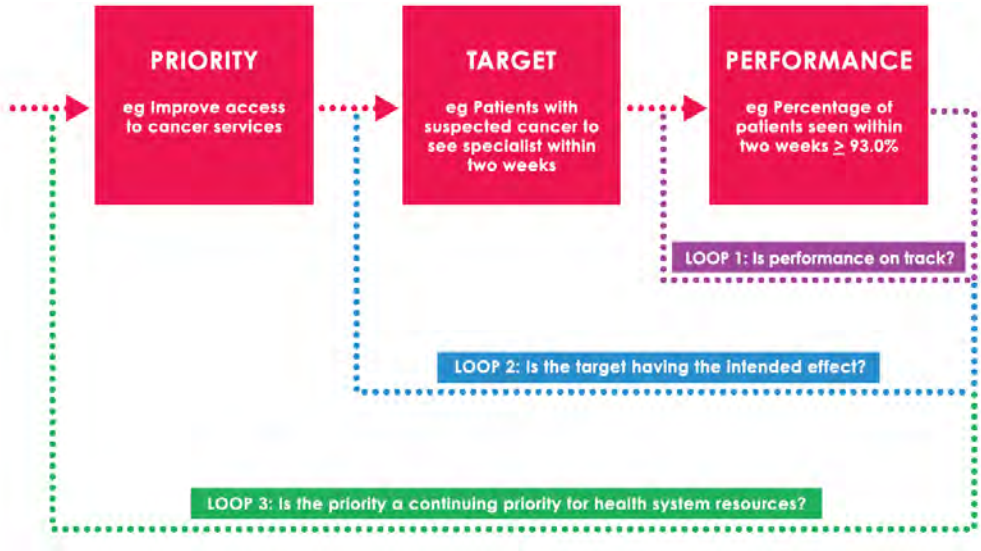



**Figure 20: Is CM Health performing against its SLMs and do these measures reflect the priorities of the organisation**

The two phase Delphi process was successful in establishing gold standards for fifteen of sixteen SLMs (one measure was context specific to NZ and consequently it was not included in the process). Counties Manukau Health was courageous in supporting this process to take place as it allowed external independent experts to establish a measurement framework to assess whether or not they were achieving a gold standard provision of healthcare across their system. This openness typifies the receptivity of the organisation to external input. It also reflects the organisation's ability to recognise the usefulness of new external information and their openness to assimilating and applying this new knowledge – facets recognised as being critical to innovative capability.[3] The role of a learning culture in relation to quality improvement was summed up by Don Berwick as follows:

*"Rules, standards, regulations and enforcement have a place in the pursuit of quality but they pale in potential compared to the power of pervasive and constant learning"*.[44]

Furthermore, patient harm is reduced when the ethic of learning is embraced wholeheartedly by an organisation and its staff are supported to learn, understand and apply modern methods of quality control, quality improvement and quality planning.[44]

**Key message**: CM Health is an organisation which embraces a learning culture.

To discuss the case-study interviews and how these help understand the CM Health experience, the framework set out in the figure 21 is used. This is sourced from a 2015

Health Foundation[45] report illustrating the "interconnected and symbiotic" challenges identified in an important study of "healthcare organisations that have earned reputations for sustained achievement of QI".[46] The framework presents six universal challenges, which these organisations adapted to their local context. In this section, what has been learnt about CM Health is discussed in terms of these challenges.

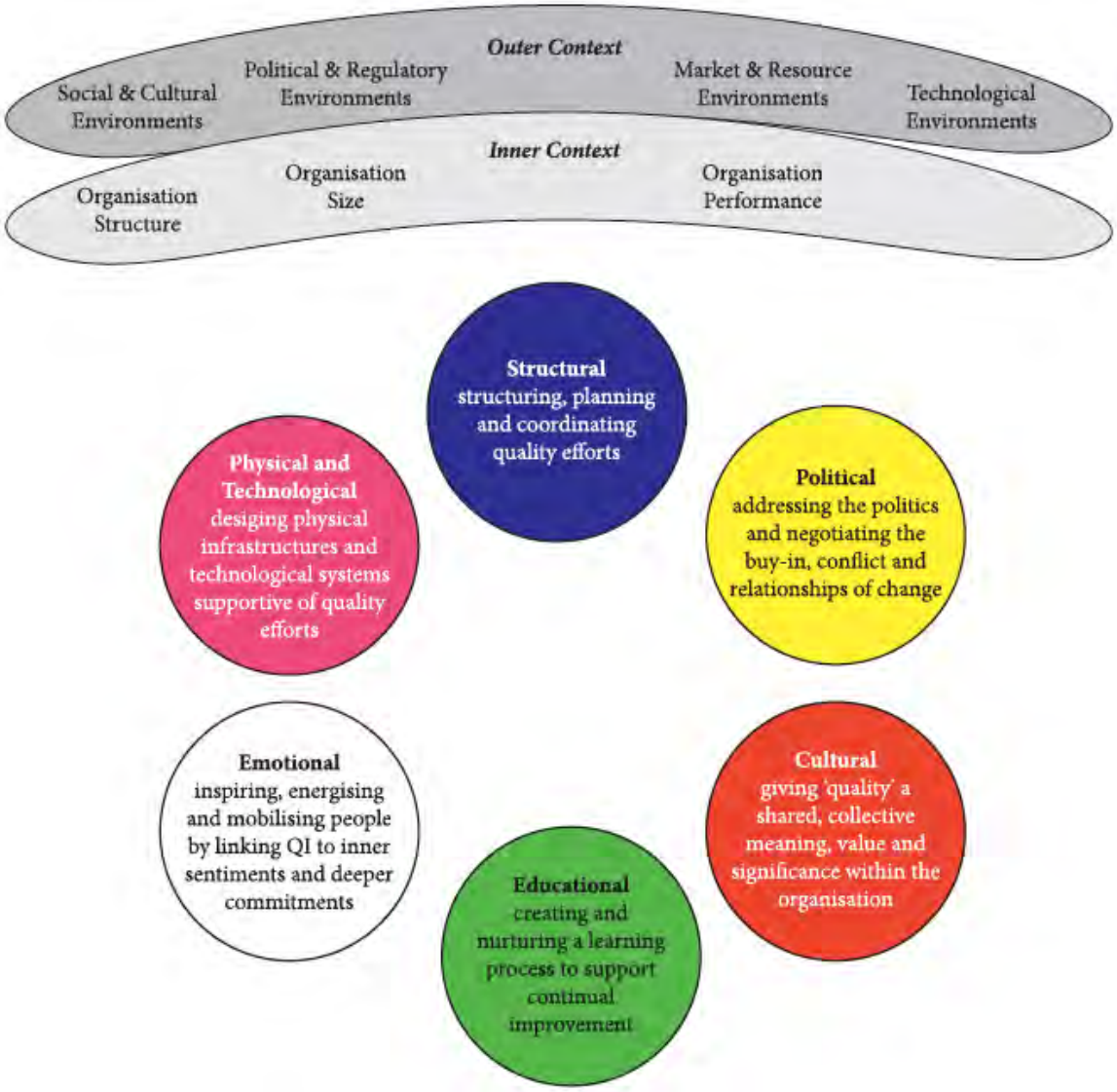



Figure 21: Organising for quality in healthcare: the six universal challenges

To recap, the key findings of the case study interviews fell into five themes:

- quality improvement methodology;
- engagement;

- context;
- sustainability;
- measures.

There is clearly much in common between what the case study participants identified, the other sources used in this study and the six universal challenges. This convergence of findings provides reassurance that the factors crucial to determining CM Health's success are present in the data collected.

In the discussion below, findings about CM Health are grouped into the six challenges. However, it is important to note again here the interconnectedness and symbiotic nature of these challenges – what is identified below is not exclusive to the challenge under which it is set out.

*Structural*

Counties Manukau Health has taken a long term approach to QI, investing time and money in infrastructure such as its workforce, facilities and quality improvement methods. It has also invested heavily in public commitments to quality and to holding itself to account for these commitments. In doing so, it is following key, evidence-based QI precepts. The role of Ko Awatea as a locus of training and innovation is important, as is structured engagement with staff and the community through co-design. Governance structures (at meso and micro levels) supporting QI are in place, though their efficacy has not been assessed. Also worth further investigation by CM Health will be the human resource approaches needed to transfer QI projects into business as usual activity within staff job descriptions. This will be a core component of sustainable QI work.

**Key message:** Counties Manukau Health largely has in place the structures necessary for a successful QI initiative.

*Political*

This is about recognising the possibilites and limits of the QI initiative, especially in regard to the human factors influencing these, and designing for them. Counties Manukau Health has again followed the precepts of improvement science by engaging early adopters and seeking to demonstrate benefits and value to subsequent followers. It encourages buy-in by supporting micro-systems to create their own solutions, advocating for and enabling clinical leadership across the professions, and engaging and working with patients and families in all contexts. The prioritisation of QI projects, and the transparency of this, is an important part of managing change. Counties Manukau Health recognises this, but there was little guidance in our sources on best practice for this. This may be an area for CM Health to investigate further.

**Key message:** Counties Manukau Health has recognised the need to address the human factors in change management and has in place a range of appropriate approaches to further this.

*Cultural*

A shared and significant culture for QI was repeatedly identified by participants as being a key determinant of success. Counties Manukau Health has deliberately sought to engender this by making quality, and the rationale for it, front and centre in its strategy, planning, and reporting. It has also sought to create a kind of QI brand around Ko Awatea and its many activities. This purposive work though is less important to CM Health's success than the supportive values of its staff and communities, which seem to both pre-date and sit alongside the aforementioned, more structurally focussed, QI work. Counties Manukau Health has recognised this, and, for example, seeks to perpetuate it by recruiting people with these values, crucially including leaders who espouse them.

**Key message:** Counties Manukau Health has recognised the underpinnings of its QI culture and supports and promotes them.

*Educational*

For CM Health, this educational challenge shares much with the *structural* and *cultural* ones. The role of Ko Awatea as a training and innovation unit is key across these three

challenges. Again, it is also clear that CM Health is following core tenets of quality improvement by ensuring transparency in sharing information, particularly with staff, ensuring the QI method uses continual improvement principles, and engaging staff, patients and families in co-design.

**Key message:** The building blocks for continual improvement are in place.

*Emotional*

This challenge addresses the crucial concern of sustainability. There is a clear need to do more than education in the creation of sustainable projects, especially once dedicated QI resource moves on, as the intrinsic motivations of participants must then come to the fore. Counties Manukau Health addresses this by thinking of engagement with patients and families as a partnership, by building on existing workforce motivations supportive of quality, and by promoting accountability/ownership by project participants. It will be important for CM Health to pay attention to managing staff workloads on QI projects, particularly for key managers and Ko Awatea staff, to ensure motivation is maintained. The other approach worthy of further thought by CM Health is to build on its design thinking work to understand the latent beliefs of patients and families.

**Key message:** Counties Manukau Health must continue to work towards the sustainability of the QI initiative by addressing the intrinsic motivations of staff, patients and families.

*Physical and Technological*

Many of these physical and technological systems and infrastructures are well-identified in the QI literature and by case study participants. For the most part, these are process systems to enable and manage the QI initiative and individual projects. For CM Health's part in regard to these, it is guided by a logical set of strategies, including on quality, under its Triple Aim goal, has established the SLMs and attendant data needs, has a well thought out system to project manage the QI initiative, and is transparent about publishing progress on its strategies and SLMs. Where our participants identified other system factors (that CM Health could be working on), these tended to relate to the next step of ensuring QI sustainability, such as human resources processes to manage workload and encourage quality to be business as usual, prioritisation frameworks and designing systems that avoid duplication of effort.

**Key message:** Counties Manukau Health has created the institutional foundations to embed already identified systems and processes to drive sustainability of the QI initiative.

## Synthesis of the findings

In this final section we synthesise our discussion of the SLMs and case study via the three objectives of the report.

## Objective 1: If improvement within the health system is evident.

Consideration of the dashboard of SLMs shown in figure 3 displays improvement over time in some of the SLMs, therefore improvement in the healthcare system is evident. We are unable to attribute this improvement to any specific intervention as the necessary data are not yet available. This evaluation, however, found strong evidence that CM Health has addressed many of the factors that underpin successful quality improvement. This is itself an important aspect of long term healthcare system improvement.

## Objective 2: If discernible, how was improvement accomplished?

Counties Manukau Health:

- has largely put in place the organisational and operational *structures* needed to be successful;
- uses accepted techniques to address buy-in and change management;
- has clearly articulated the *cultural* importance of QI, in a QI method that works towards sustainable change and in being a learning organisation;
- has invested in Ko Awatea as an *educational* organisation, and in a QI method that works towards sustainable change;
- has recognised the need to link the *emotional* motivations of staff, patients and families to QI;
- works with appropriate processes and *technologies* to support QI.

## Objective 3: Where gaps remain

It is more useful to characterise "gaps" as opportunities. Counties Manukau Health is on a journey towards its goal of being the best healthcare organisation in Australasia, during which it has achieved a tremendous amount in a complex healthcare system. It

is natural that there are stages on this journey that present opportunities for CM Health to refine and extend its QI initiative.

In our view, that CM Health has performed well on three SLMs is less important than actually having started with SLMs, and therefore having the opportunity to refine and extend. It is difficult to say whether this achievement on three SLMs makes them the best in Australasia – has any other system done as well on three of their quality measures? – but CM Health are likely to be among the best simply by virtue of having started. They are also likely to be among the best by having done a good job of operating their SLMs: for example, by developing an SLM framework that maps to their logic model, by understanding the role of contributory measures, and by establishing the Delphi process. This leads us to the following recommendation:

- **Recommendation 1: refine and extend the use of SLMs.**

There is also clearly an opportunity to extend the reach of the QI initiative and the use of QI methods into CM Health's emerging work with the wider social sector. In the New Zealand 'outer context', this is the intent of the draft New Zealand Health Strategy[11], and is signalled in the Ministry of Health's *Consultation Draft Planning Priorities for Annual Plans and Regional Service Plans 2016/17*[12] (see, for example, the Long Term Conditions Planning Priority). Extending the reach of healthcare in the social sector was also identified in the case study as an important aspect of better outcomes for hard to reach populations. This opportunity may also contribute to CM Health's strategy and goals in regard to equity. Our second recommendation is therefore:

- **Recommendation 2: extend the QI initiative and the use of QI methods, including SLMs, into the wider social sector.**

[11] http://www.health.govt.nz/about-ministry/what-we-do/new-zealand-health-strategy-update. Date accessed 17/11/15.

[12] http://nsfl.health.govt.nz/system/files/documents/pages/consultation_draft_planning_priorities_guidance_2016-17_1.docx. Date accessed 17/11/15.

A key aspect of successful QI is that it creates sustainable change. CM Health has the opportunity, due in large part to the good work already done, to increase the likelihood of such change. This can be done via the meso and micro mix of systems and processes identified above – for example, HR and IT policies and systems, or on-going prioritisation of QI activity – and, crucially, tapping into the intrinsic motivations of staff, patients and families. Leadership at all levels and governance committed to and supportive of QI over time are also important here. Thus, recommendation three is:

- **Recommendation 3: ensure the quality improvement initiative addresses its own sustainability.**

A key attribute of CM Health is their willingness to learn from and share with other organisations – both of these characteristics are very obvious in the use of SLMs. It is also marked by its ability to adapt that knowledge to the local context. Continuing to innovate to generate new knowledge from within the Counties Manukau district is also an important activity and one for Ko Awatea to foster. To accrue the greatest possible healthcare gains, attention needs to be paid to both learning and innovation, especially as aspects of the quality improvement initiative transition to business as usual. This points to our final recommendation:

- **Recommendation 4: ensure learning and innovation remain priorities**.

## Limitations

This evaluation was potentially impacted on by a series of limitations which affect the discussion and synthesis of this study's findings:

- Selected people were interviewed:
    - In the international case study sites, four of the six sites involved only one participant. However, these participants all held key leadership positions and had been integrally involved in their organisation's QI planning and journey. Given their performance, which has been validated in the literature, we had no reason to believe their views should not be taken at face value;
    - Not every healthcare system with a well-regarded QI initiative was interviewed. This may have produced a wider range of perspectives on QI but not necessarily a profoundly different trajectory for the comparative evaluation. The healthcare systems which were included were diverse in that they served different populations in different countries;
- This evaluation focuses on three discrete strategies within the wider CM Health QI initiative;
- The comparison of the SLMs took place at a specific point in time;
- The case-study interviews were semi-structured, possibly restricting the information gathered compared to unstructured interviews. The intent, however, was that the same set of questions were asked of all interviewees.

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# Appendices

# How well does your healthcare system perform? Tracking progress toward the triple aim using system level measures

Fiona Doolan-Noble, Mataroria Lyndon, Sybil Hau, Andrew Hill, Jonathan Gray, Robin Gauld

## Background

Since the delivery of the World Health Organization (WHO) 2000 report on health system performance improvement,[1] there has been increasing international interest in health systems and their assessment.[2] The WHO defined a health system as, "…all the activities whose primary purpose is to promote, restore or maintain health". For New Zealand, and many other developed countries, there is a growing acceptance that health systems, as a whole, have to change to meet the changing healthcare needs of their populations, who are ageing and increasingly likely to be burdened with chronic conditions.[3] To meet these changing demands there is an increasing focus on integration of services at all levels and across all sectors, including social services.[4] Against this backdrop, policy makers and health care managers, therefore, are keen to determine how well their system is responding to changing health care needs in their area, but also how well their health system compares with others.

At the international level, organisations such as the WHO, the Organisation for Economic Cooperation and Development, and the Commonwealth Fund, have taken a lead in developing methods for comparing health systems.[1,5-6] The work of such agencies is useful for national policy-makers in particular, for highlighting performance of their health systems at a relatively abstract level and for cross-national learning in key areas such as quality of care, expenditure and workforce. Beyond this level, the usefulness of such data are limited. Indeed, within a country it is difficult for national or regional health system stakeholders to obtain information meaningful to their organisation from such general level data. Consequently, performance benchmarking at a national level has commenced, providing insights into health system performance within individual countries.[7] Various approaches are emerging, including the development of a national health system performance scorecard for New Zealand.[8] However, scorecards give an overall snapshot of the health system and the New Zealand scorecard requires further development to enhance its utility at the local District Health Board (DHB) level.

Answering the question of how well an individual DHB performs is far from straightforward. This is partly due to the complexity and scope of DHB activity, but also a historical lack of investment in composite measures for performance measurement along with the range of central agencies monitoring and reporting on different aspects of performance. Moreover, most DHBs gather and report a


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range of data from the various components of the local health system–from primary care through to individual hospital and health services. While the measurement challenge is one that an impending national Integrated Performance and Incentive Framework (IPIF)[9] seeks to address, some DHBs have sought to develop their own measures, including Counties Manukau Health (CMH). This should not ultimately result in a duplication of effort, as the development of the IPIF and CMH's approach, as described below, has been an interactive process; each has informed the other, aided by involvement of some CMH staff in the IPIF development.

This brief article describes the process undertaken by CMH to develop a set of system-level measures. It aims to raise interest across the DHB sector, both locally and internationally, in performance measurement, using routinely collected data. In doing so, we seek to fill a gap in the field in New Zealand.[10]

CMH is one of 20 DHBs in New Zealand whose legislated role involves the improvement, promotion and protection of the health and wellbeing of the people in the communities they serve. CMH funds and provides health and disability services for some 500,000 people living in the southern third of Auckland City and in neighbouring Franklin and Papakura districts.

Similar to other DHBs in New Zealand, and health systems in many developed countries, CMH currently has to contend with multiple health care challenges, including an ageing population and increasing chronic illness, resulting in a pressured health care budget. CMH, however, faces the additional challenges of high population growth (between 2-3% annually), the highest birth rate in the country and a very young population with 24% aged 14 years or under.[11,12] Māori and Pacific people make up a significant proportion of the population compared to many of the DHBs, with 17% and 23% respectively, and 34% of the population live in areas of deprivation.[11] CMH, therefore, faces a situation of being doubly disadvantaged, in that it has to meet the needs of an older population burden by chronic illness, as well as the health care needs of a younger population.

In response, CMH has committed to an integrated health system and services development agenda, and identified a mission "to be the best healthcare system in Australasia by December 2015". Their intent is to embed a broader range of services within the community via four primary care 'locality clinical partnerships'. Thus, the DHB's goal is to build a 'whole of system' approach to service delivery that meets the needs of all members of the population, irrespective of health need or disability. Yet to date, how well their health system as a whole meets the diverse pressures it faces and how well the whole of system approach to service delivery is performing is largely unknown. In response, CMH has developed a series of System Level Measures (SLMs) to assess the effectiveness and overall performance of their health system. The SLMs aim to assess performance in relation to health care quality, the integration of care and health care outcomes. They are not intended to induce competition, but rather, help the DHB track its performance on a journey of continual improvement in intentionally selected and measured aspects of the aforementioned dimensions.

## System Level Measures: what are they and why use them?

Two organisations have driven the increasing use of quality indicators in health care, The Institute of Medicine (IOM) and the Institute for Healthcare Improvement (IHI).[13] These organisations have both advocated for and advanced the area of performance reporting systems in healthcare.[13] The IHI was responsible for developing a system of metrics known as Whole System Measures (WSMs)[14] which the CMH SLMs are based on. These measures aim to be indicators that are easy to capture and are designed to provide organisational leaders with data that:

- Show performance of the health system over time
- Allow the organisation to compare its performance relative to strategic improvement plans.
- Allow the organisation to compare

itself to similar organisations.
- Contribute to ongoing strategic quality improvement planning.

The WSMs align with the six dimensions of quality identified by the Institute of Medicine. These are that care should be safe, effective, patient-centred, timely, efficient and equitable, as well as reflecting care in different sites across a continuum of care.[15] In addition, WSMs link to the Baldrige Health Performance Excellence Framework, which is recognised as a robust method for evaluation of health care systems.[16] WSMs are macro-level measures or 'big dots', such as Hospital Standardised Mortality Rate (HSMR) and Acute Readmissions to Hospital, and are designed to provide a comprehensive overview of a health systems overall quality and performance. These 'big dots' are underpinned by specific measures ('little dots') captured at different levels of the system, and known to contribute to the performance of the WSMs. Hence, 'big dots' can be decomposed to 'little dots' to determine what is influencing performance. The IHI's WSMs are not a static collection of metrics but are designed to be modified to reflect an organisation's vision and strategies, as well as its current priority areas.

## The journey so far for CM Health

Using SLMs for internal improvement monitoring and external comparison purposes is not unique to CMH. Numerous healthcare organisations internationally, large and small, collect data to measure their performance using WSMs. Examples of organisations applying SLMs include Jönköping county in Sweden, Public Health Wales, and Cincinnati Children's Hospital in the United States. With the appointment of a director with previous experience of using WSMs to Ko Awatea, CMH's education and health system innovation and improvement centre, came the opportunity for CMH to utilise this improvement and performance measurement approach.

The journey has three distinct phases. Phase one involved a review of the literature and national and international system level quality frameworks including:

A. IHI Whole System Measures
B. New Zealand Health Quality and Safety Indicators
C. Jönköping County System Measures
D. Public Health Wales System Level Improvement Measures
E. Cincinnati Children's Hospital Medical Centre System Level Measures
F. The Commonwealth Fund Score Card.

This process assisted in the selection of potential SLMs. The eventual SLMs were chosen based on their ability to inform the monitoring of progress towards CMH's strategic 'Triple Aim'[17] of improved health and equity for all populations, improved quality, safety and experience of care and best value for public system resources, as well as ability to have a clear logical link to CMH's strategic objectives. Furthermore, the utility of the SLMs to support monitoring of performance over time, comparisons with other organisations and reinforcement of improvement planning were critical considerations, as was the feasibility of utilising existing data collections within CMH. Basing the selection of the SLMs within these criteria has ensured that all major areas of the health system are covered. There was also an endeavour to ensure that the chosen measures complemented one another; in other words, each is not an isolated metric, but related to multiple other measures. In doing this, CMH can monitor how change in one SLM, for example PHO enrolment rates, contributes to increases or decreases in acute hospital readmissions or the rate of childhood immunisations. To date, a suite of 16 SLMs have been selected and their utility and validity assessed. These measures and their interrelationship are presented in Figure 1 (below) and examples of how they relate to the Triple Aim outlined in Table 1.

Some of the SLMs chosen by CMH are more overtly related to its own controllable actions than others. CMH does, however, have an influence on all the chosen measures including life expectancy and ambulatory sensitive hospitalisations. While the ability to determine exactly the influence of CMH on some measures is more challenging than others, the ability to drill down from the 'big dots' to their contributory factors, as discussed next, does allow CMH to uncover potential reasons

**Figure 1:** CMH's system level measures across the continuum of care (Adapted from the IHI Whole System Measures) [14]

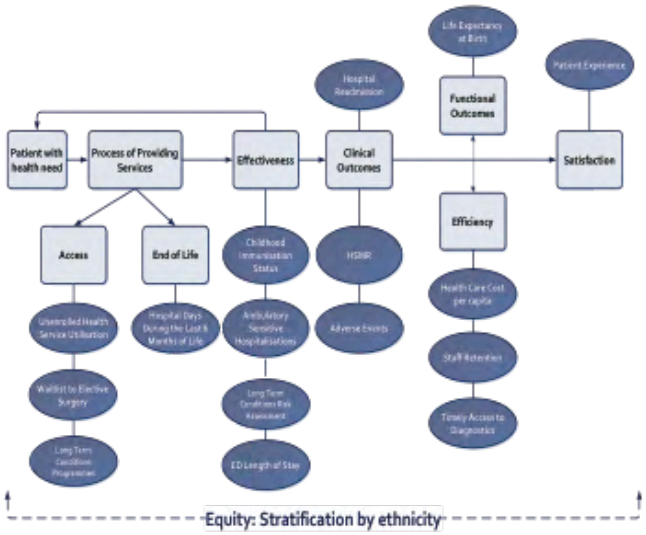


**Table 1:** Examples of SLMs and their relationship to the Triple Aim

| | TRIPLE AIM | | |
|---|---|---|---|
| | **Population Health** | **Patient Experience of Care** | **Cost and Productivity** |
| **SLMs** | Un-enrolled Health Service Utilisation* | Rate of Adverse Events | Healthcare Cost per Capita |
| | Ambulatory Sensitive Hospitalisations | Acute Readmission to Hospital within 28 Days | Workforce Retention |

*Un-enrolled refers to those iin the population who use in-patient services but are not enrolled in a Primary Health Organisation

**Figure 2:** Terminology related to SLMs

**System measurement framework:** a measurement framework based on the 'Triple Aim' that reflects the overall quality and performance of a healthcare system

**System Level Measures:** these are a set of system measures that aim to evaluate performance on quality and value across a whole system, thereby providing input into strategic quality improvement planning.

**'Big dots':** these are the system level measures and these equate to core processes or functions of the organisations in the system. They are not programme, unit, or disease specific.

**'Little dots':** these are process and outcome indicators at a programme or unit level.

**Scorecard:** reports on a defined number of measures providing managers with information on the performance of the organisation.

**Dashboard:** unlike a scorecard which is a snapshot in time, a dashboard uses real time data to assist decision making.

**Benchmark:** the best result previously achieved by an organisation or department. A benchmark can be used in conjunction with other comparative data to interpret and evaluate performance and set goals.

for changes in the measures overtime. In addition, the drill-down process highlights potential caveats on the data, as well as areas for further research.

Phase two is (at the time of writing in December 2014) underway and ongoing. This phase involves the careful consideration and identification of robust contributory measures ('little dots') for each SLM. This process of 'drilling down' on each SLM enables identification of measures that influence SLM performance. The on-going nature of this phase is necessary to allow enough time to develop certainty around the appropriateness of the contributory measures chosen. In addition, a dashboard (see Figure 2 for a descriptor of a dashboard and other SLM terminology) has been developed, providing senior managers at CMH a real-time snap shot of the systems performance across the measures selected.

In May 2014 phase three commenced. This phase is being undertaken collaboratively with researchers commissioned by Ko Awatea. This third phase has multiple objectives, including the identification of potential health care systems to compare CMH to and establishing appropriate benchmarks. This phase of the project contains various challenges which are discussed next.

## Challenges, methodological and operational

Although cross-country comparisons of health system performance have the potential to enhance cross-country learning, there are some well recognised difficulties which make comparisons, particularly international ones, intrinsically difficult.[7] These include population variations, definitional issues and coding differences, to name a few.[18] However, strategies are available to address these methodological challenges, such as age and sex standardisation of populations, and the use of indicators using internationally standardised definitions for coding.[19] There are also innate tensions in deciding which SLMs to collect: ones that allow for cross-country comparisons or ones that are strongly aligned with organisational priorities, or a mixture? Essentially, this is a question of breadth or depth of performance comparison.[20] Another tension arises between the need for consistency of definitions, numerators and denominators, yet accepting of a level of flexibility to accommodate comparison with different countries.[20] Furthermore, there is also a potential for unintended consequences to emerge when using SLMs to guide performance or even quality improvement. For example, there is a possibility that the focus on the specific SLMs diverts attention and possibly finance from other parts of the system, potentially resulting in misprioritisation.[21] However, CMH's SLMs are philosophically based on an improvement, not a performance judgement, framework. As as the name suggests, they focus on the system. A performance framework, such as the IPIF, tends to use financial and other incentives, such as increased DHB autonomy, to enhance performance in discrete areas. Such approaches can, therefore, result in unfairly focusing attention on a service, process or health outcome.

Closer to home the challenges relate more to operational issues. These include whether the organisation has the technical capability to capture and retrieve the data related to the SLMs of interest. These data frequently come from a variety of repositories, so data linkage can be challenging.[22] In addition, analysis of these data requires an understanding of the origins and any related limitations linked to the data, for example, their reliability and the extent to which the data have been validated, before they can be utilised effectively.[20,23] The need for a person to lead a team of data analysts and provide strong data collection oversight is, therefore, an essential prerequisite in assuring data quality over time.[19] In addition to operational issues, there were also the usual challenges for CMH in terms of deciding which measures to include in a multidimensional framework. These were handled through an iterative and consultative developmental process within CMH's SLM development group, meaning that there was considerable scope for wide-ranging discussion around measures that were and were not included.

While the literature contains information regarding some of the challenges and unintended consequences, less is written


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ISSN 1175-8716 
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regarding potential supplementary benefits of undertaking this type of initiative. In their article regarding the ancillary benefits of clinical performance measurement, Powell et al[1] drew attention to benefits that may equally be related to the implementation of a system of SLMs.[21] These include an increase in the pride with which staff view the organisation, increased motivation and increased confidence that the care provided is evidence based. The authors also mention patient benefits, such as increased patient satisfaction, which again may also be an unintended benefit of a health care system monitoring SLMs.

## Next steps

The immediate next steps involve collaborating with countries considered appropriate for comparison to assess the feasibility of data comparisons. Once it has been established that data are comparable between health systems, a pilot comparison of one or two SLMs will be conducted and assessed, prior to comparing a larger group of SLMs. It is anticipated that these comparisons will be on-going, assisting learning and quality improvement in all sites.

## Conclusion

A core component of any high-performing health system is the employment of a comprehensive measurement system to advance quality improvement. Focusing on SLMs will provide CMH with robust information on the quality and safety of their health services, inform performance improvement strategies within the system and support progress towards the 'Triple Aim'. As a result, this health system will be one where quality is the result of conscious and responsive design with indicators intended to reflect the core strategic focus of the organisation.

By aiming to compare with other similar health systems internationally, CMH will be provided with opportunities for mutual learning and networking with system performance experts, which is crucial for stimulating improvement. Moreover, by comparing with a similar but acknowledged high-performing sub-national health system, such as Jönköping in Sweden, could allow CMH to develop aspirational benchmarking targets in relation to specific SLMS that are relatively easy to compare. Examples include childhood immunisations status and hospital standardised mortality rates. The leadership at CMH is committed to openly sharing experiences and lessons learned along the way, as well as providing leadership to the wider health sector in New Zealand on the development of SLMs. This work also enables the organisation to contribute to the literature in the field of quality improvement, measurement and evaluation of health systems. It is now time for other DHBs, alliances and other health care providers in New Zealand, to similarly focus their efforts on system improvement aided by system-wide measurement.

**Competing interests:** Nil

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Quality Management in Health Care

# Developing and implementing a framework for System Level Measures: Lessons from New Zealand.

--Manuscript Draft--

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| **Manuscript Number:** | QMH - 2015 - 0046 |
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| **Corresponding Author's Institution:** | University of Otago Dunedin School of Medicine |
| **Abstract:** | Objective<br>To describe factors that support or hamper the development of a framework of System Level Measures.<br>Subjects and methods<br>Senior clinicians and managers working within a New Zealand District Health Board were interviewed using a semi-structured interview approach. The interviews were audio-recorded and transcribed verbatim. Text data was thematically analysed.<br>Results<br>Ten interviews took place which resulted in six facilitative and five obstructing themes emerging. Facilitative themes included: dispersed and focused leadership; communication; data; alignment of the measures with organisational strategic plans and values; stakeholder engagement; and a dedicated project team. The process of development and implementation was considered to be impeded by the following themes: reaching consensus; perfection versus pragmatism; duplication and process burden; achieving buy-in and workload.<br>Conclusion<br>This study distinguished factors that enable and hinder the development and establishment of a framework of System Level Measures. These findings are particularly relevant as researchers and policy makers elsewhere increasingly aim to adopt measurement frameworks for health systems which address equity, safety, quality, access and cost. |
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**Title page**

**Title**

Developing and implementing a framework for System Level Measures: Lessons from New Zealand.

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**Background**

Measuring performance is now the norm in health systems and central to both quality assurance (QA) initiatives and quality improvement (QI).[1] Donabedian defines quality assurance as "all the arrangements and activities that are meant to safeguard, maintain and promote the quality of care",[2] with Ruelas and Frenk defining it as "a systematic process for closing the gap between actual performance and the desirable outcomes".[3] Therefore, QA initiatives encompass QI activities. System Level Measures (SLMs), implemented at New Zealand's (NZ's) Counties Manukau Health (CMH) are designed to support QI activities undertaken across the health system. Based on a measurement framework developed by the Institute for Healthcare Improvement and adopted by over thirty health care systems internationally,[4] the measures aim to assist organisations monitor their own improvement efforts and provide data intended to:

- Demonstrate the longitudinal performance of the system;
- Enable the organisation to see how it is performing in relation to strategic plans for improvement;
- Facilitate comparisons with similar organisations; and
- Inform quality improvement planning.[4]

In theory, SLMs reflect performance across an entire health system using only a small set of measures,[4] bridging traditional intra- and inter-organisational boundaries, and enabling quality improvement to take place within the global context of a health system.[5] Clearly they also support quality assurance.

Minimal research has been undertaken to untangle factors that enable or constrain the development and implementation of a SLM framework. Drawing from industry, as well as healthcare literature, the following factors appear to support the process of

quality improvement. Leadership is deemed key for any quality improvement initiative,[6] and leadership distributed across the different levels of an organisation appears beneficial.[7] Acceptance of measurement throughout an organisation and the mapping of measures to an organisation's strategic objectives and its priorities and values are additional enablers.[8 9]

In relation to developing performance measurement systems, Kolberg and Elg identified four key challenges specific to this activity, namely: reaching consensus around the measures to be used; maintaining competence in a wide range of fields within the project team; accepting scrutiny and critique of the project; and clarifying the end users of the system and determining their varying needs.[10] Additional barriers cited in the literature include a lack of dedicated human resources with the suitable skills to identify the appropriate measures and their related true drivers; the inflexible nature of information systems which, in healthcare, are frequently designed to enable the collection of administrative and clinical data and not necessarily constructed to report on performance measures; a focus on perfection which can stymie success, as can lack of staff engagement; and misjudging the time and expense required for development.[6 8 9]

Dixon-Woods and colleagues also highlight factors that can impact on the sustainability of this type of activity.[6] Development can be treated like a project with a beginning and an end, meaning the need to embed processes is limited and even missed. Over-reliance on certain individuals through the development process, underestimating the need to be explicit about the intent of the measurement intervention from the start and having the ability to demonstrate relevancy were considered additional threats to sustainability.[6]

This article discusses the practical experiences of developing and implementing a SLMs framework within the context of a NZ District Health Board (Board). By providing a description of factors that assisted and hampered the development of the framework the article fills an important gap in the SLM literature.

**Study setting**

Counties Manukau Health is one of twenty government-funded Boards in NZ, providing most health services for approximately 500,000 people in its geographic location. Its responsibilities include improving, promoting and protecting the health and wellbeing of its population. It does this by funding the majority of the health and disability services in the region including hospital, primary and community care and population health services.[11] High numbers of Maaori, Pacific and Asian peoples live in the CMH district which is also home to a relatively youthful population and characterised by high rates of deprivation.[11] In common with other Boards in NZ, and with international trends, CMH also has an ageing population and increasing rates of chronic illness. Consequently, as a funder and service provider CMH faces multiple challenges driven by its population's demographic, socioeconomic and illness profile.[11] These challenges and the focus on building a cohesive district health system underpinned the need to have a system of measures in place to determine the performance of the health care system as well as opportunities for improvement. In addition, the aspirational goal set by the CEO of 'being as good as or better than comparable health systems anywhere in the world and beginning with being the best healthcare system in Australasia by December 2015', also required the establishment of a measurement framework.

To this end, CMH commenced a phased process of developing a set of SLMs late in 2013. The end result, finalised in 2014, was a suite of 16 SLMs (figure 1) which

conceptually are similar to those used in other healthcare organisations, such as Sweden's Jönköping.[12]

**Figure 1: CMH System Level Measures (System Level Measures are in dark blue ovals). Adapted from the Institute of Healthcare Improvement Whole of Systems Measures**

**Methods**

A purposive sample of thirteen senior managers and clinicians involved in the construction of the suite of SLMs were identified. All had involvement in the work either through their role on the developmental group, or in their capacity within the Clinical Governance Group or the Executive Leadership Team of CMH. Invitees also represented the spectrum of services provided by CMH: population health, and primary and secondary care. Participants were e-mailed an information sheet and consent form.[13] An interview schedule was developed to guide the semi-structured interviews. One of the researchers (FDN) undertook all the interviews for consistency. Interviews were recorded and transcribed verbatim. Transcriptions were read by FDN and RG and thematically analysed based on a general inductive approach.[14] This research protocol was reviewed and approved by the University of Otago Human Research Ethics Committee, reference number D14/314.

**Findings**

Of the thirteen personnel invited to participate, two declined and one failed to respond; consequently ten interviews were conducted. Analysis of the narratives revealed key factors that facilitated the development and implementation of the SLMs framework, as well as challenges to be negotiated. These are illustrated in figure 2.

Figure 2: Factors that enable and constrain the development of SLMs

**Facilitators**

**Leadership**

In terms of facilitators, those interviewed identified the leadership shown by the CEO as vital. It was felt he made tangible the aspirations of those working in the organisation when he set the goal of being the best health care system in Australasia by December 2015. It was thought that by articulating this goal he had given impetus to the need to establish a framework for measuring system performance and improvement. The leadership shown by the CEO was not the only leadership valued by interviewees. The leader for the SLM initiative was deemed, *"Absolutely the right person to go forward with it (the initiative)"* and the engagement of one of the clinical leaders within the organisation to work alongside the project team was viewed positively, *"I think it was really good having XX as the Clinical Champion because he could open lots of doors because of his clinical reputation".* In addition, having guidance from a senior manager who had established a similar system elsewhere was judged beneficial. Leadership was, therefore, provided from a strategic, theoretical, clinical, experiential and project management level in relation to the establishment and implementation of SLMs at CMH.

**Communication**

All interviewees were very clear about the rationale for establishing the SLM framework. This was viewed as enabling various activities underpinning improvement, such as benchmarking, as opposed to judgement which can be counterproductive. They also considered it provided a mechanism for assessing progress towards the IHI Triple Aim[15] which the organisation uses to guide its planning process. In addition, it was felt it assisted in monitoring progress towards

the goal set by the CEO and facilitating comparisons with other health systems, nationally and internationally.

**Data**

Data were seen as a key facilitator and viewed as a "can-opener". Interviewees spoke of the data, *"prompting conversations and debates that otherwise would not have occurred"*; "*forcing you to look at the whole system"* and *"making sense of the multiplicity of activities that take place within a health system"*. The data that underpin the SLMs and form the contributory measures, (measures that are at a lower level and which roll up into the system level measures), were also deemed significant.

> *"After defining some system level measures actually building the conversations around the contributory measure we sparked really important discussions. It starts to drive at what the logic is behind our measurement and our improvement"*.

**Alignment and ownership**

The importance of the SLMs aligning with CMH's six executable strategies (Better health outcomes for all; First do no harm; System Integration; Ensuring financial sustainability; Enabling high performing people; Delivering patient and whanau centred care) developed in response to the Triple Aim was also voiced, as was having ownership of the measures. This was considered important as it enabled the organisation to, *"identify our own priorities and our own opportunities for improvement"*, as well as providing *"the ability to reflect on ourselves"*. In NZ's government-funded health system this was considered preferable to the many measurement demands predetermined by the Ministry of Health.[16]

**Stakeholder engagement**

The project team considered it important to have broad stakeholder engagement, for example, *"we worked across different teams to enable them to propose measures".* The project team then reported back on the proposed measures and contributory measures and presented the various teams with information regarding how their proposed measure functioned. This level of engagement was seen as not only facilitating the development of a robust framework but also assisting with the implementation and utilisation of the framework once it became active. One interviewee summed up the engagement process as follows: *"You'd have to say it was a successful engagement process as the whole thing has been implemented'.* However, the project team acknowledged that the effort required to engage with a range stakeholders was considerable, *"…there is a lot of hard work, the engagement stuff, a lot of hard work".* This in part was driven by the need to expand their stakeholder consultation due to the interest shown by many people in having input into the initiative.

**Project team**

The final facilitator acknowledged by interviewees was the presence of a dedicated project team. In this instance the team comprised the following roles: an analyst, a clinical lead and project managers, equating to 1.5 full-time equivalents. Interviewees recognised the initiative required a huge effort by the project management team; *"That puts a lot of work on the system level measure people as opposed to anybody else doing any of the work".*

**Challenges**

**Reaching consensus**

Certain factors were identified as hampering the establishment and implementation of the SLMs framework. At the development stage, reaching consensus was

deemed challenging and a cause of tension: "*There was a lot of appropriate fighting over inclusion and exclusion".* As a result, the initial plan to have twelve SLMs expanded to sixteen because *"there was the argument that we were not representing primary care enough"*. However, one interviewee summed it up,

> *"Well…the biggest problem's been people having their own agenda. They're not really understanding what they're all about. So if people sort of think… we need the primary care measure…they're not really understanding what the point of the big dot is. Primary care is plainly a feature of the organisation, but you know, aspects of it are just feeders to a big dot. Umm, you know nothing in an organisation should really exist in isolation".*

**Perfection versus pragmatism**

Friction arose around the desire to establish a perfect set of measures and contributory measures versus taking a pragmatic, 'this is good enough' approach, as described by one interviewee:

> *"The huge challenge that came through all the time was a desire to make these perfect before we engaged in any further exploration and I know that um, I pushed very, very hard to get things on the table even if they weren't perfect".*

Many of those engaged with the development of the measures were accepting of this approach as it allowed for an area of interest to be acknowledged, for example, patient experience of care, even if appropriate data was lacking, therefore, limiting the usefulness of the measure in the interim.

**Duplication**

Duplication was another hurdle. Some measures already existed on other performance monitoring dashboards. Participants pointed out that the timetables of

the different reporting requirements frequently did not align, resulting in process burden as another set of reports had to be generated and another set of analysis undertaken. The need to generate different reports for the same measures was driven by variations in definitions, denominators and numerators dependent on who the report was for.

**Buy-in**

Achieving buy-in was another challenge, *"that we probably got wrong initially"*. Those involved in the stakeholder engagement felt that there was an initial underestimation of the number of people who wanted to be involved. Consequently, a wider engagement approach was instigated.

**Workload**

The final challenge identified was the workload associated with the SLM development and subsequent implementation. One participant pointed out that the work involved more than just determining, developing and assessing the appropriateness of a series of measures. It also included communication, reporting and associated work, such as, data analysis. Due to the newness of this approach, roles and responsibilities were perhaps not clearly defined, leaving the project team unsure about the parameters of their work:

> *"I said maybe we aren't able to do that, maybe our audience are the executives and boards and clinical governance and maybe it is for them to push it through, you know"*.

The formative stage of the process including the need to have a project plan documented, appropriate resourcing estimations carried out and a business owner identified for the initiative was recognised as a key area for improvement.

**Discussion**

The interviews revealed several factors that enhanced but also hindered the development and implementation of SLMs within a health system. These include the importance of dispersed and focused leadership, the role of data, the value of having measures that align with the strategic direction and aims of an organisation, the need to spend time engaging with stakeholders, and the benefit of putting a project team in place. These factors have been reported elsewhere in the health care and performance management literature.[17-26] This study, however shows they are also relevant in the context of SLM development.

Leadership, not just that of the CEO, was seen as crucial to the development and implementation process associated with the SLMs. The goal set by the CEO was seen as prioritising quality improvement initiatives and giving direction to senior management, galvanising them with a shared understanding and agreement about the tasks ahead. In turn, this fostered alignment across the various parts of the health system. The use of SLMs and their contributory measures to monitor the direction of travel towards the organisational goal meant that senior managers began to understand how different parts of the system, such as hospital and primary care, interact with one another. The CEO, therefore, provided direction, promoted alignment and fostered commitment within the senior management team which are recognised as key for improvement.[27-29]

Data were both an enabler and an obstacle. Data were viewed as initiating conversations or, as one interviewee phrased it, the “can-opener” during the developmental phase. As a result the conversations and debates, prompted questions, enhanced the understanding of the system as a whole, and altered the way people assessed problems. While the data, and the discussions and debates generated, were viewed as pivotal to the process, processing and interpreting the

data were viewed as resulting in duplication and, as such, producing an increased burden on some staff.

Overall the narratives revealed a sense that the health system had been 'unlocked' by the provision of the SLMs and their contributory measures, resulting in a greater awareness of how the system that is CMH functioned as a whole which, of course, is an implicit aim of whole system measurement. In other words, the data and discussions that took place throughout the development of the SLMs framework appeared to enable those involved with the initiative to 'make sense' of their health system; it helped them develop a shared understanding of how different components within the structures that underpin activity within the organisation all interrelate. Furthermore, the conversations promoted collaborative cross system thinking, as opposed to thinking in competitive service delivery silos. Thus, conversations, recognised as pivotal to 'sensemaking',[30] were integral to the process of developing the SLMs by engendering a greater appreciation of how the components of the system interconnect.

When asked about the benefits of the SLMs many interviewees spoke of the advantage of the measures being owned by the organisation, instead of being externally imposed which can lead to various levels of gaming and goal displacement.[31] Interviewees saw the SLMs as providing opportunities for reflection, generating a sense of accountability, and providing a sense of relevance to the organisation.

The use of champions to generate buy in and commitment from stakeholders was another enabler identified, with functional similarities to the 'knowledge broker' role reported elsewhere.[32] Interviewees noted the importance of making the time for champions to work on engaging and involving different teams in the developmental

process, depending on the SLM in question. Conversely, the time required for stakeholder engagement was a key challenge.

Essentially, improvement efforts take time: time for stakeholder engagement; time to debate the suitability and relevancy of various performance measures; time to determine the true drivers of performance measures (the contributory measures); and time to undertake analyses and develop reports. In addition, knowing who to engage with internally within the organisation was identified as a problem, partly driven by the uniqueness of the initiative and hence a level of unfamiliarity regarding who to involve. Having a project team to manage all the associated tasks, as well as stakeholder liaison was considered important by those interviewed. A facilitator highlighted in other studies of cross-organisational initiatives.[32-34]

Reaching consensus on the SLMs was recognised by several interviewees as a difficult process, causing tension and frustration. This was partly driven by confusion regarding the nature and functions of SLMs and the desire by various participants for the measures to reflect their specific area, as opposed to the broader health system. The desire for a perfect set of measures and ancillary contributory measures versus the desire to action the measures and modify them as issues emerged was an additional cause of friction.

The workload associated with the initiative was viewed as challenging by those intimately involved in its day to day facilitation. It appeared that the scope of the work and the changing skill set required as the initiative evolved was not fully recognised at the outset. Consequently, the initiative leader was required to undertake functions which would normally be part of the role of other contributors meaning there was some propensity toward work intensification, shown elsewhere to be associated with improvement activities.[35]

The limitations of this study need acknowledgement. First, although interviewees spanned clinical and managerial roles, no-one specifically representing population health at CMH participated in the study. While a population health perspective is not necessarily the exclusive domain of the public health specialists, a population health perspective on the SLMs chosen and the process undertaken, which might differ from the views expressed by the clinicians and managers, is missing. Similarly, no-one from the health intelligence and informatics team was interviewed, meaning the challenges described in this study related to data extraction and analyses are possibly understated. Second, as with any qualitative study, the data reported here are reflective of a small number of interviewees.[36] While saturation was reached in the interview process and there is no reason to believe any interviewee mis-represented the reality, there are potentially restrictions on the extent to which the findings could be translatable into other settings.[37] Third, three of this article's authors (ML, JG and AH) also participated as interviewees. While it could be considered that there is an element of conflict of interest in this, as noted, all interviews and thematic analyses of interview data were undertaken by two of the authors (FD-N and RG) with all transcripts and interviewees anonymised. The findings were discussed with the interviewee authors who provided assistance with interpretations. Final analytical and editorial decisions on material and discussions in this article rested with F D-N and RG.

System level measures are likely to be developed by all of NZ's Boards,[16] yet, as noted in this article, there remain challenges with implementing the approach. Set within the context of a NZ Board, this study has distinguished factors that enable and hinder the development and establishment of a framework of SLMs. These findings are particularly relevant as researchers and policy makers elsewhere increasingly

aim to adopt measurement frameworks for health systems which address equity, safety, quality, access and cost.[38] Very importantly, this study revealed the importance of a coming together of two streams of activity which, in the CMH context, were pivotal to successful SLM development: the technical element of designing the measures and their contributory measures; and the leadership and organisational components required to ensure their establishment and implementation.

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Figure
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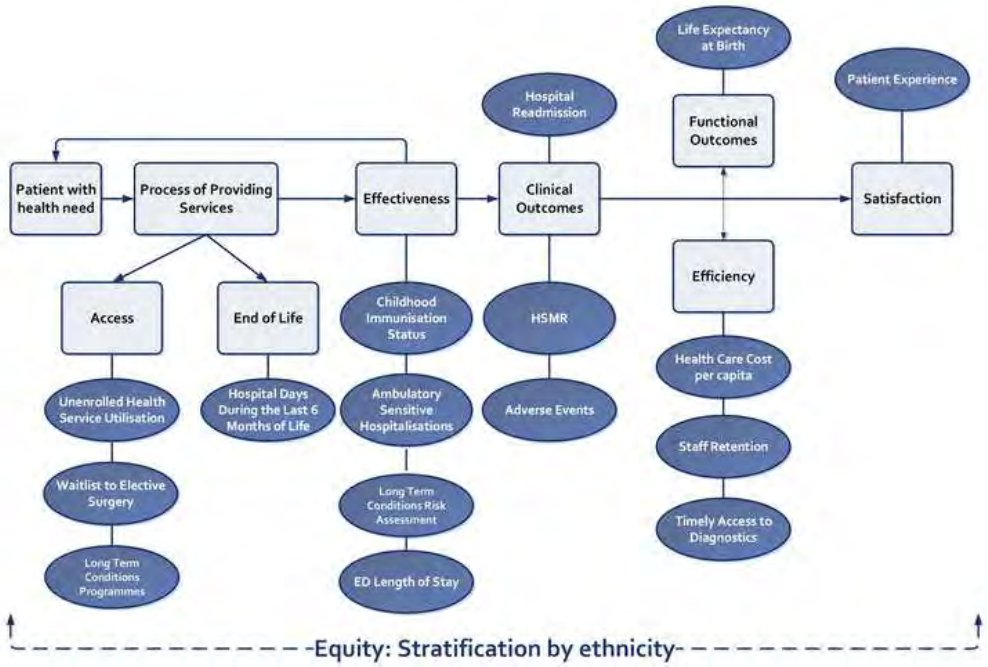


Figure
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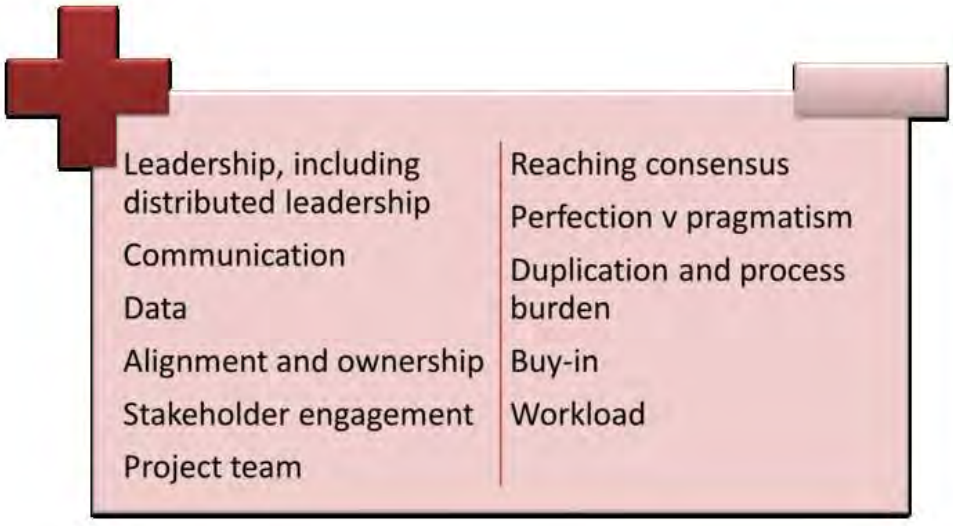


COUNTIES MANUKAU HEALTH DELPHI PROCESS ROUND ONE

DEVELOPING GOLD STANDARD BENCHMARKS FOR SYSTEM LEVEL MEASURES

The following pages display 14 System Level Measures (SLMs) currently used by Counties Manukau Health (CMH). We would like you to:

Decide what you think should be the gold standard benchmark for each measure for any health system using them. This has three aspects:

1. The best performance you are aware of;
2. A new standard of performance;
3. What would you consider an acceptable improvement trajectory?

Please provide a rationale for your answers to point 2 and 3.

**Note**: the charts provided for SLMs 1, 3, 5, 7, 11 and 12 have a red line which is the mean and an upper and lower line, yellow and blue respectively denoting control limits. Any observations outside these limits, or systematic patterns within, suggest special-cause variation.

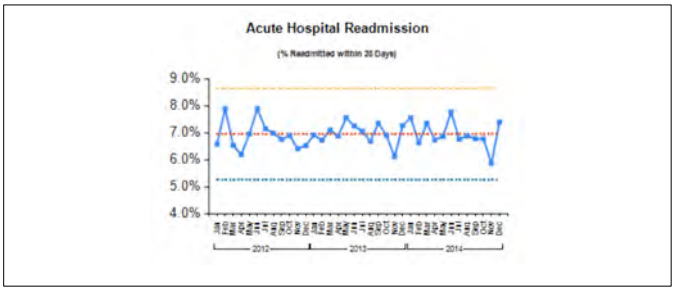
The appendix contains all technical data definitions.

Thank you for taking the time to share your thoughts and wisdom with us.



**SLM 1: Acute Hospital Readmissions**

**Data definition**: Percentage readmitted within 28 days of index discharge. Note: Any acute readmission to hospital within 28 days of index discharge, *where the readmit speciality is same as the index discharge speciality*.




1. Best known performance:
2. Break through level of performance:
3. Suitable improvement trajectory:

Rationale for 2 and 3

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**SLM 2: Health Services Utilisation**

**Data definition**: Percentage not enrolled in a primary health organisation (primary care physician/general practitioner) within a month of discharge from secondary inpatient care.


1. Best known performance:
2. Break through level of performance:
3. Suitable improvement trajectory:

Rationale for 2 and 3

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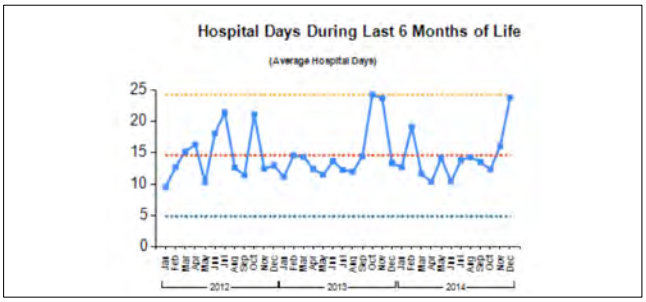
**SLM 3: Hospital Days During The Last Six Months Of Life**

**Data definition**: Total hospital days in the last six months for patients who have had a death recorded in hospital.




1. Best known performance:
2. Break through level of performance:
3. Suitable improvement trajectory:

Rationale for 2 and 3

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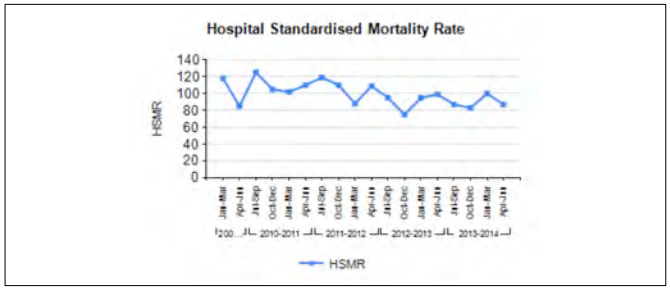
**SLM 4: Hospital Standardised Mortality Ratio**

**Data definition**: The observed number of deaths compared with expected number of deaths based on case mix and demography.




1. Best known performance:
2. Break through level of performance:
3. Suitable improvement trajectory:

Rationale for 2 and 3

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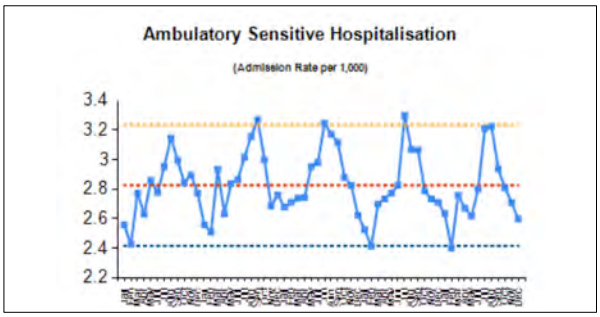
5

**SLM 5: Ambulatory Sensitive Hospitalisations**

**Data definition**: Admission rate per 1,000 for those admitted with an ASH condition diseases (potentially sensitive to prophylactic or therapeutic interventions that are deliverable in a primary health care setting) and domiciled in CMDHB.




1. Best known performance:
2. Break through level of performance:
3. Suitable improvement trajectory:

Rationale for 2 and 3

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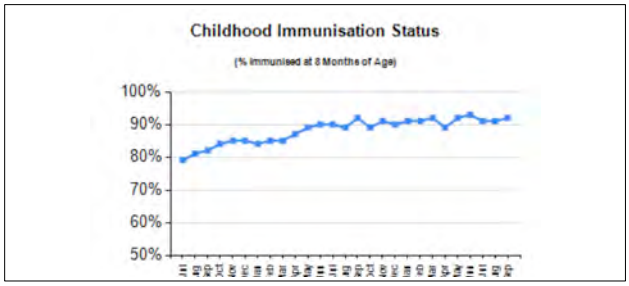
6

**SLM 6: Childhood Immunisation Status**

**Data definition**: Percentage of children fully immunised at 8 months of age.




1. Best known performance:
2. Break through level of performance:
3. Suitable improvement trajectory:

Rationale for 2 and 3

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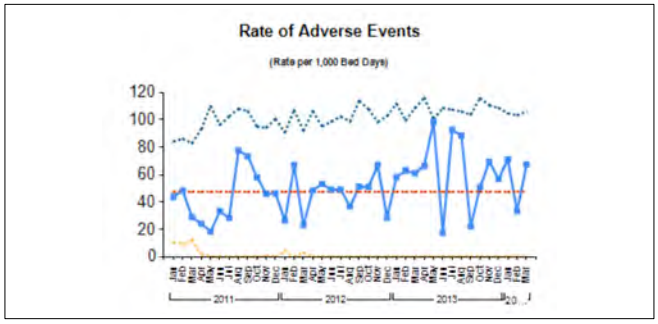
7

**SLM 7: Adverse Events**

**Data definition:** The number of Adverse Events per 1,000 Bed Days (based on Global Trigger Tool).




1. Best known performance:
2. Break through level of performance:
3. Suitable improvement trajectory:

Rationale for 2 and 3

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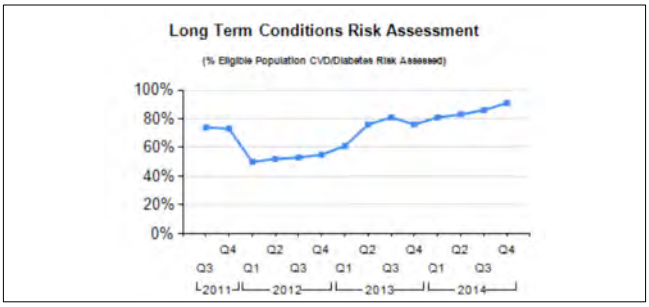
8

**SLM 8: Long Term Conditions Risk Assessments**

**Data definition**: Percentage of the eligible population with their cardiovascular risk assessed in the last five years.




1. Best known performance:
2. Break through level of performance:
3. Suitable improvement trajectory:

Rationale for 2 and 3

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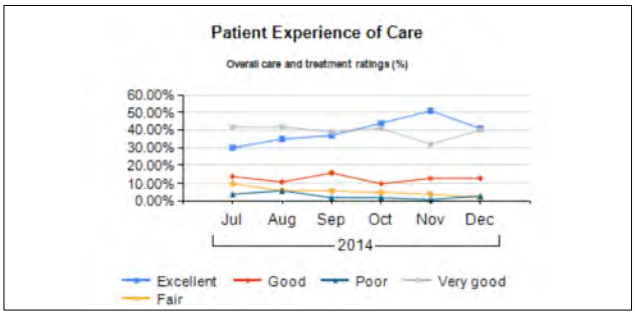
**SLM 9: Patient Experience of Care**

**Data definition**: Overall care and treatment ratings %




1. Best known performance:
2. Break through level of performance:
3. Suitable improvement trajectory:

Rationale for 2 and 3

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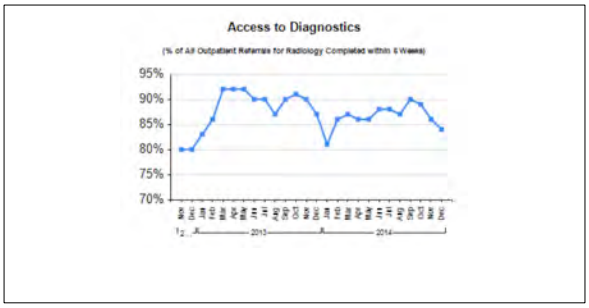
**SLM 10: Access To Outpatient Diagnostics**

**Data definition**: Percentage of all outpatient referrals for radiology completed within 6 weeks.




1. Best known performance:
2. Break through level of performance:
3. Suitable improvement trajectory:

Rationale for 2 and 3

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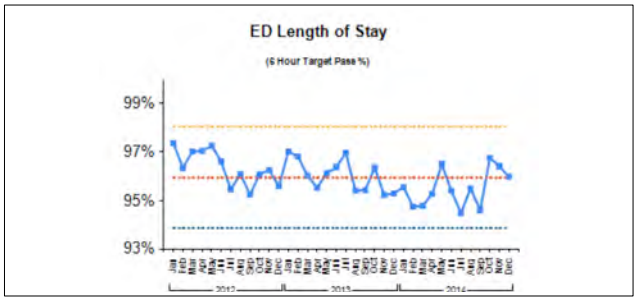
11

**SLM 11: Emergency Department Length Of Stay**

**Data definition**: The percentage of patients admitted, discharged, or transferred from the CMDHB emergency department (ED) within six hours.




1. Best known performance:
2. Break through level of performance:
3. Suitable improvement trajectory:

Rationale for 2 and 3

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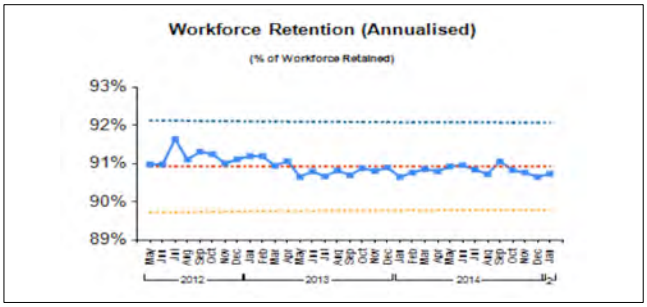
12

**SLM 12: Workforce Retention (Annualised)**

**Data definition**: Percentage of workforce retained annually.




1. Best known performance:
2. Break through level of performance:
3. Suitable improvement trajectory:

Rationale for 2 and 3

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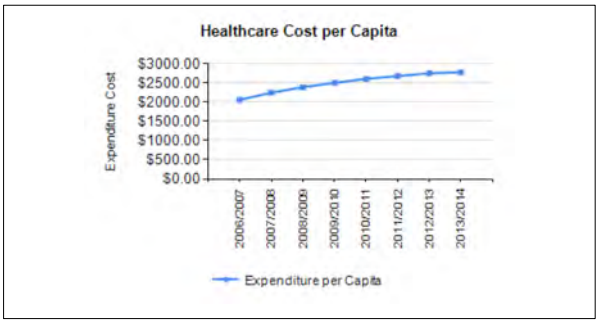
**SLM 13: Healthcare Costs per Capita**

**Data definition**: Numerator – The sum of total expenditure on health for CMDHB – Denominator: Total CMDHB population




1. Best known performance:
2. Break through level of performance:
3. Suitable improvement trajectory:

Rationale for 2 and 3

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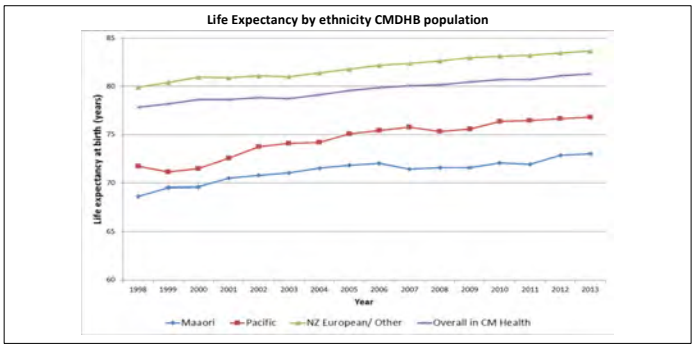
**SLM 14: Life Expectancy at Birth**

**Data definition**: Summary measure of the death and survival rates of the CMDHB population




1. Best known performance:
2. Break through level of performance:
3. Suitable improvement trajectory:

Rationale for 2 and 3

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15

## Appendix - Technical Definitions

SLM 1: **Acute Hospital Readmissions**

Data definition: Percentage readmitted to hospital within 28 days of index discharge

Note: Any acute readmission to hospital within 28 days of index discharge, *where the readmit speciality is same as the index discharge speciality*.

Numerator: Number of cases readmitted to same specialty within 28 days of index discharge.

Denominator: Total number of inpatient admissions.

SLM 2: **Health Services Utilisation**

Data definition: Percentage not enrolled in a primary health organisation within a month of discharge from secondary inpatient care.

Numerator: The number of people discharged from Middlemore who are not enrolled (anywhere in NZ) in 2013 within a month of discharge.
Denominator: Casemix acute, arranged and elective discharges from Middemore Hospital in 2013.
People who died within one month of discharge were excluded.

SLM 3: **Hospital Days During The Last Six Months Of Life**

Data definition: Total hospital days in the last six months for patients who have had a death recorded in hospital.

Numerator: Total per patient days for all hospitalisations during the last six months of life for all patients who have a date of death recorded in hospital.
Denominator: All patients who have a date of death recorded in hospital.

SLM 4: **Hospital Standardised Mortality Rate**

Data definition: The observed number of inpatient deaths compared with expected number of deaths based on case mix and demography.

Numerator: 100 * Observed number of inpatient deaths Denominator: Expected number of deaths.

Data source: Health Roundtable (based on Risk-Adjusted Canadian model)

SLM 5:**Ambulatory Sensitive Hospitalisation**

Data definition: Admission rate per 1,000 for those admitted with an ASH condition and domiciled in CMH District Health Board

Numerator Hospitalisations of people resulting from diseases potentially sensitive to prophylactic or therapeutic interventions that are deliverable in a primary health care setting for the period under review. Denominator Population of people within the CMDHB region based on Census Data.

SLM 6: **Childhood Immunisation Status**

Data definition: Percentage of children fully immunised at 8 months of age.

Numerator: Number of enrolled children within the reporting periods who turned eight months of age and have received full set of age appropriate vaccines included in the New Zealand national immunisation schedule and health target.
Denominator: Number of enrolled children who turned eight months old within the reporting period being measured.
Source: NZ Ministry of Health Target

SLM 7: **Adverse Events**

Definition: The rate of adverse events that cause harm to the patient, based on a review of a representative sample of hospitalized patients' medical records.
Numerator: Total number of AEs
Denominator: Total length of stay for all patient records reviewed * 1,000

SLM 8: **Long Term Conditions Risk Assessment**

Data definition: Percentage of the eligible population will have had their cardiovascular risk assessed in the last five years.
Numerator: Number of the eligible population will have had their cardiovascular risk assessed in the last five years. Denominator: Total number of the eligible population.
Source: NZ Ministry of Health Target

SLM 9: **Patient Experience of Care**

Data definition: Overall care and treatment ratings % for inpatient hospital care.
Numerator: Number of responses choosing each of the 5-point Likert scale ratings.

Denominator: Total number of responses.

SLM 10: **Access To Outpatient Diagnostics**

Data definition: Percentage of all outpatient referrals for radiology completed within 6 weeks. Numerator: The number of all accepted outpatient radiology referrals completed within 6 weeks. Denominator: The number of all accepted outpatient referrals made to the radiology department.

SLM 11: **Emergency Department Length Of Stay**

Data definition: The percentage of patients admitted, discharged, or transferred from the CMDHB emergency department (ED) within six hours.

Numerator: Number of patients admitted, discharged, or transferred from the CMDHB emergency department (ED) within six hours. Denominator: Total number of presentations to ED.

SLM 12: **Workforce Retention (Annualised)**

Data definition: Numerator: The total number of permanent employees who have remained with CMDHB over one year.

Denominator: The total number of permanent employees as at 12 months ago.

SLM 13: **Healthcare Costs per Capita**

Data definition: Numerator – The sum of total expenditure on health for CMDHB – Denominator: Total CMDHB population

**NOTE**: A spending comparison table is provided on the next page

SLM 14: **Life Expectancy at Birth**

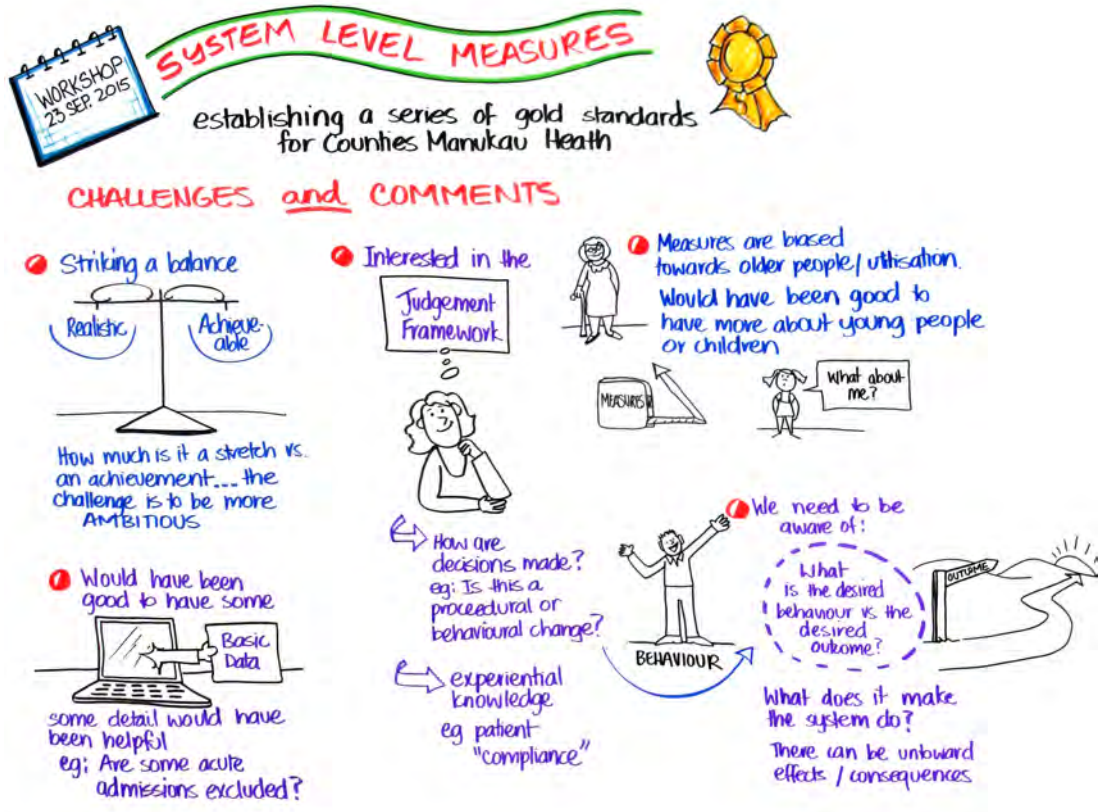
Data definition: Summary measure of the death and survival rates of the CMDHB population

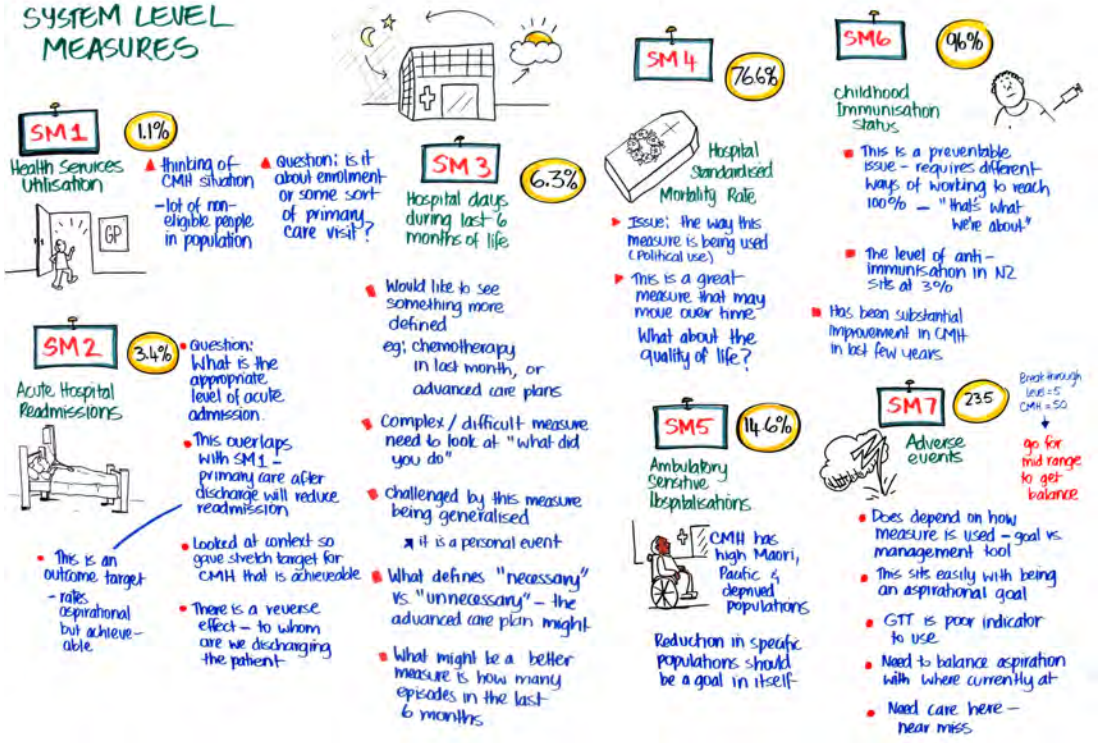
The average number of years to be lived by a group of people born in the same year, if mortality at each age remains constant in the future.

**Table 1: Spending comparison table**

| | Australia | Canada | Denmark | France | Germany | Italy | Japan | Netherlands | New Zealand | Norway | Singapore | Sweden | Switzerland | UK | US |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| % GDP spent on health care | 9.1% | 10.9% | 11.0% | 11.6% | 11.3% | 9.2% | 10.3% | 12.1% | 10.0% | 9.3% | 4.7% | 9.6% | 11.4% | 9.3% | 16.9% |
| Health care spend per capita | $3,997 | $4,602 | $4,698 | $4,288 | $4,811 | $3,209 | $3,649 | $5,219 | $3,172 | $6,140 | $2,881 | $4,106 | $6,080 | $3,289 | $8,745 |

COMMENTS: please feel free to provide any additional commentary below


WORKSHOP 23 SEP. 2015
SYSTEM LEVEL MEASURES
establishing a series of gold standards for Counties Manukau Heath
CHALLENGES and COMMENTS
Striking a balance
Realistic
Achievable
How much is it a stretch vs. an achievement... the challenge is to be more AMBITIOUS
Would have been good to have some
Basic Data
some detail would have been helpful eg; Are some acute admissions excluded?
Interested in the
Judgement Framework
How are decisions made? eg: Is this a proceedural or behavioural change?
experiential knowledge eg patient "compliance"
Measures are biased towards older people / utilisation.
Would have been good to have more about young people or children
MEASURES
What about me?
We need to be aware of:
BEHAVIOUR
What is the desired behaviour vs. the desired outcome?
OUTCOME
What does it make the system do?
There can be unforward effects / consequences


SYSTEM LEVEL MEASURES
SM1
1.1%
Health Services Utilisation
GP
thinking of CMH situation
-lot of non-eligible people in population
Question: is it about enrolment or some sort of primary care visit?
SM2
3.4%
Acute Hospital Readmissions
Question: What is the appropriate level of acute admission.
This overlaps with SM1 - primary care after discharge will reduce readmission
This is an outcome target - ratio aspirational but achievable
Looked at context so gave stretch target for CMH that is achieveable
There is a reverse effect - to whom are we discharging the patient
SM3
6.3%
Hospital days during last 6 months of life
Would like to see something more defined eg; chemotherapy in last month, or advanced care plans
Complex / difficult measure need to look at "what did you do"
Challenged by this measure being generalised
it is a personal event
What defines "necessary" vs. "unnecessary" - the advanced care plan might
What might be a better measure is how many episodes in the last 6 months
SM4
76.8%
Hospital Standardised Mortality Rate
Issue: the way this measure is being used (Political use)
This is a great measure that may move over time
What about the quality of life?
SM5
14.6%
Ambulatory Sensitive Hospitalisations
CMH has high Maori, Pacific & deprived populations
Reduction in specific populations should be a goal in itself
SM6
0.6%
Childhood Immunisation Status
This is a preventable issue - requires different ways of working to reach 100% - "that's what we're about"
The level of anti-immunisation in NZ sits at 3%
Has been substantial improvement in CMH in last few years
SM7
235
Adverse events
Break through level = 5
CMH = 50
go for mid range to get balance
Does depend on how measure is used - goal vs. management tool
This sits easily with being an aspirational goal
GTT is poor indicator to use
Need to balance aspiration with where currently at
Need care here - near miss


SM8
Long term conditions risk assessments
Issue: what is the eligible population age or clinically defined
This is NZ health target which has age, ethical & clinical considerations
96% mid range consensus
SM11
no debate
100%
Wait list for elective Surgery
NO WAIT
SM14
Healthcare cost
Cost
Spend
$3664
What is the relevance for CMH? – no influence on pot, only distribution of it
This is a high level blunt measure but does provide the basis for a conversation around spend
ED
SM12
Emergency Dept Length of Stay
96.9%
Stretch target
UK target is 4 hours
SM15
82.2
(consensus for the average)
Life expectancy
Is this a time scale measure?
It is constantly pushing ahead eg 3 months/year
Focus on reduction in disparities will lift overall average up
SM9
89%
consensus to go for mid range
PATIENT EXPERIENCE OF CARE
SM10
95.4%
Access to Outpatient Diagnostics
99% is the UK target so it is doable
Context: patient access issue
This is a population with a lot of ill health
A lot of issues here are Procedural
SM13
4.8%
Workforce Retention
This is very contextual
See this as odd indicator
England = 10.4% turnover
As an organisation you do need to refresh – see 3% as stagnation
Question: What is a healthy level of turnover?
Every 10th person leaving is an unstable system
CONTEXT:
the local labour market - urban more mobile than rural
other factors outside health impact this
look at intent to stay instead
Different occupations = different rates eg. nursing & allied health turnover impact on the number
IMPACT:
Look at impact on clinical care – safety / protocols & cost
This is a crude proxy for employee engagement

# Service planning implications of estimating Primary Health Organisation enrolment rate based on a Health Service Utilisation population rather than a census-derived population

Wing Cheuk Chan, Dean Papaconstantinou, Doone Winnard


## ABSTRACT

**AIM:** Estimating Primary Health Organisation (PHO) enrolment rates with a census-derived estimated resident population denominator may provide misleading results because of numerator and denominator mismatch. This study uses the Health Service Utilisation (HSU) population denominator as an alternative.

**METHOD:** A HSU population was generated by record linkage of routinely collected datasets from the Ministry of Health via encrypted National Health Index (NHI). We compare PHO enrolment rates by age and ethnicity in Counties Manukau District Health Board (CMDHB) in 2013.

**RESULTS:** In CMDHB, 98% of people who had utilised publicly-funded health services in 2013 were enrolled in a PHO in 2013. Using the HSU population as a denominator, PHO enrolment rates for Maaori, Pacific, Asian, New Zealand European/Other population groups were 98.3%, 97.7%, 97.6%, and 98.3% respectively. Just under 4% of people discharged from CMDHB inpatient facilities were not enrolled in a PHO within a month from the day of discharge in 2013.

**CONCLUSION:** Using the HSU population as a proxy of health services need, PHO enrolment rates were similar across ethnicities in the CMDHB population. Support to improve PHO enrolment coverage would be more efficient if the HSU population were used to target people who are not yet enrolled in a PHO.


The vision of the New Zealand Primary Health Care Strategy (PHCS) is that people are "part of local primary health care services that improve their health, keep them well, are easy to get to and co-ordinate their ongoing care" and that primary health care services "focus on better health for a population, and actively work to reduce health inequalities between different groups".[1] A key element of the implementation of the PHCS was the formation of Primary Health Organisations (PHOs) and population enrolment in PHOs. Along with the benefit of a nominated primary healthcare team to co-ordinate a range of health services including opportunistic and/or proactive preventive care, the advantages of PHO enrolment include lower co-payment for primary care visits.[2]

Ideally, all eligible New Zealand residents should be enrolled. However, 100% PHO enrolment is unlikely because PHO enrolment is voluntary,[2] and some people who are not enrolled may be well, and not perceive themselves to have any immediate health needs. These people may not see any advantage in PHO enrolment.

PHO enrolment is considered an important indicator of access to primary health care services, and is a mandated indicator in DHB Maaori* health plans.[3] This paper explores the possible explanations that may account for the long-standing observation of low Maaori and Asian PHO enrolment and over 100% Pacific enrolment in New Zealand as reported in many published documents.[4-7] Furthermore, it considers how efforts to improve PHO enrolment, to facilitate access to primary health care services, might be better targeted by using available administrative health data sets.

Standard calculation of PHO enrolment uses the Statistics New Zealand estimated resident population as a denominator.[8] This paper describes an alternative method to calculate PHO enrolment by ethnicity using a Health Service Utilisation (HSU) population as a population denominator.

Recent health service utilisation can be seen as a proxy of recent health services need, albeit an imperfect proxy. People who have had recent health service utilisation are more likely to benefit from PHO enrolment than people have not had recent health service utilisation. For example, if a primary care follow-up is required following a hospitalisation, being enrolled in a PHO may result in lower co-payment fees and gives the opportunity for that care to be integrated with ongoing care by the primary care team of the patient's choice. Since the contact details of people who have recently used health services are routinely recorded, the use of the health service utilisation population can potentially enable the health sector to readily identify people who have utilised health services recently but are not yet enrolled in a PHO. Therefore, people who might be missing out on the benefits of PHO enrolment could be better targeted. Since only routine administrative data from the Ministry of Health have been used, the methods can be readily replicated by the Ministry of Health, District Health Boards, and Primary Health Organisations.

The estimated resident population used as a denominator in the standard calculation of PHO enrolment is one of two common population outputs from Statistics New Zealand, namely the census usually resident population, and the estimated resident population. These two populations are often misunderstood by the health sector; they should not be used interchangeably. The differences between the two concepts and how they should be used are discussed in the appendix.

## Methods

In Aotearoa New Zealand, virtually all healthcare users are assigned a unique alphanumeric code, the National Health Index (NHI), at the time of their first contact with the health care system. The encrypted form of NHI was used in this study to ensure privacy and anonymity of individuals. As all datasets were entirely based on anonymous non-identifiable administrative data, and this work was carried out under the function of DHBs to assess and monitor the needs of their population for services,[9] no formal ethical review from the Health and Disability Ethics Committee was required, as per New Zealand ethical guidelines.[10]

The following datasets were sourced from the Ministry of Health.

1. National Minimum Dataset (inpatient hospital events; NMDS, New Zealand coverage)
2. National Non-admitted Patient Collection (outpatients, ED and community visits; NNPAC, New Zealand coverage)
3. Pharmaceutical Collection (PHARMHOUSE, Northern region coverage only)
4. Laboratory Claims Collection (Northern Region coverage only)
5. Primary Health Organisation (PHO) Enrolment Collection, (New Zealand coverage)
6. General Medical Subsidy Data Mart (New Zealand coverage)
7. National Mortality Collection (New Zealand coverage)
8. Master encrypted and secondary encrypted NHI look up list

All the unique encrypted NHIs recorded in 2013 from any of the above datasets

* Double vowels are used rather than macrons where appropriate in Te Reo words in this article in keeping with the Tainui convention, as Tainui are Mana Whenua for the Counties Manukau district

were merged to form a 'Health Service Utilisation' (HSU) population. The latest domicile code for an individual as recorded in any of the datasets was used to determine the DHB of domicile. The master encrypted and secondary encrypted NHI look-up list was used to ensure any known duplicated encrypted NHIs were not double counted. Effectively, the HSU population includes virtually everyone living in the area covered by the datasets (in this case limited to the Northern region because not all datasets had national coverage) who had a publicly-funded health service contact or was enrolled in PHO in 2013.

The HSU population is the inclusion criteria of this study. Ethnicity for the HSU population is derived from the NHI used to link the datasets and in keeping with the New Zealand health sector standard,[11] ethnicity was prioritised from multiple ethnic codes in the following order: Maaori, Pacific peoples, Asian, New Zealand European/'Other'.

Aggregated estimated resident population numbers and population projections (MOH version 2013 based on New Zealand Census 2006) were sourced from Statistics New Zealand. This estimated resident population denominator was provided by Statistics New Zealand for the Ministry of Health in November 2013 which was based on projections from the 2006 Census.

### 1. 'Standard' method of calculating the percentage of people enrolled in a Primary Health Organisation

Calculating PHO enrolment rate using the standard method typically involves using the number of people enrolled in an area of interest divided by the corresponding estimated resident population in the same time period of interest. The numerator and denominator are not individually linked.

Definitions:

- Denominator: Estimated resident population from Statistics New Zealand in 2013 by age, gender, ethnicity and DHB.
- Numerator: The corresponding number of people enrolled by age, gender, ethnicity and DHB as per PHO enrolment 2013 Quarter Three. Quarter Three coincides with the annual June population estimate from Statistics NZ for the relevant year.

### 2. Alternative indicator: Percentage of people enrolled in a PHO within the CMDHB Health Service Utilisation population in 2013

The denominator is the Health Service Utilisation (HSU) population in 2013 derived as described above from record linkage of Ministry of Health datasets via encrypted NHI. The HSU population for this study were defined as below:

- people who were domiciled in Counties Manukau in 2013, and
- enrolled in a PHO, or had a publicly-funded health service contact in 2013, namely inpatient and outpatient services, pharmaceutical dispensing, community laboratory test, GMS claims, and
- were still alive at 31 December 2013.

The numerator is the number of people who were enrolled in a PHO (anywhere in New Zealand) at some point during 2013, as determined by record linkage at encrypted NHI level within the HSU population. The HSU population is the inclusion criteria of the study population and the PHO enrolment status is determined for each individual within the HSU population via encrypted NHI linkage between the PHO enrolment data and HSU population. Since the numerator and denominator are individually linked, the ethnicity and demographic variables in the study were identical for an individual, based on the NHI used for linkage, so the numerator-denominator mismatch described in previous reports is eliminated.[12] Note that ethnicity in the PHO register may differ from the ethnicity recorded in the NHI, and this study uses the NHI ethnicity for an individual to avoid numerator denominator mismatch.

Six quarters of PHO enrolment (2013 Q1–4, 2014 Q1–2) were used to determine the enrolment status in 2013, based on the starting date of enrolment, because some of the 2013 enrolment statuses were subsequently recorded late, in the 2014 PHO enrolment datasets.

### 3. Subgroup analysis:

a. The percentage of people discharged from either of the two key inpatient facilities for CMDHB: Middlemore Hospital (MMH) and Manukau

Surgical Centre (MSC) in 2012 and 2013 who were not enrolled within one month of discharge.

Definitions:

- Denominator: Number of people who were discharged from CMDHB hospital facilities in 2012 and 2013 (casemix acute, arranged and elective discharges). People who died within one month of discharge were excluded. Note: One individual may be discharged more than once in a year.
- Numerator: The number of people discharged from MMH and/or MSC who were not enrolled (anywhere in New Zealand) based on the date of enrolment in 2012 and 2013 as recorded in the PHO enrolment data within a month of hospital discharge. Four quarters of PHO enrolment data in the relevant year and the first two quarters of PHO enrolment data in the subsequent year were examined. The start date of enrolment as recorded in the PHO enrolment record was used. The latest/end date of enrolment determines the latest quarter that an individual is present in the PHO data. The cut off dates for financial claims were used; eg, if an individual is last present in Q1 then it is assumed the person is enrolled on 20 November in the previous year, Q2: 20 February in the year of interest, Q3: 20 May, Q4: 20 August.

b. A simplified 'annual' method of estimating the percentage of enrolment can be carried out by determining whether people discharged (excluding deaths) in 2013 were enrolled in the 2014 Q2 PHO enrolment, or not.

Definitions:

- Denominator: Number of people with CMDHB hospital casemix discharges in 2013 excluding death.
- Numerator: Out of people who were discharged from CMDHB hospital facilities in 2013, the number of people who enrolled in 2014 Q2 nationally (Cut-off date: 20 February).

# Results

## Standard method of calculating PHO enrolment:

Comparing the population estimates released from Statistics New Zealand with the PHO enrolment data at a high level suggests PHO enrolment for the CMDHB population had a coverage of 97% in a 'snapshot' view at Quarter Three that coincides with the annual June population estimate, 2013. The estimated percentage of PHO enrolment is the number of people enrolled, divided by estimated resident population from Statistics New Zealand in CMDHB in the corresponding age group in 2013.

Females of child-bearing age appear to have a relatively high level of enrolment (Table 1). Males between the ages of 15 to 29 appear to have a lower level of enrolment. In the older age groups, there are more people enrolled than the Statistics New Zealand population estimates.

When enrolment is compared across ethnic groups, Maaori PHO enrolment appears to be much lower that might be expected when compared to estimated resident population from Statistics New Zealand ('89% enrolment' in Quarter Three 2013) (Table 2). On the other hand, Pacific PHO enrolment is much higher than the number expected based on the corresponding estimated resident population ('111% enrolment' in CMDHB). This pattern of PHO enrolment for CMDHB is generally consistent with the overall New Zealand pattern for people of these ethnicities (Table 2) and, as discussed subsequently, needs to be considered in the light of likely dataset mismatch in relation to identified ethnicity.

## Alternative indicator: Percentage of people enrolled within the CMDHB Health Service Utilisation population in 2013

In CMDHB, out of the people who had contact with publicly-funded health services in 2013, 98% were enrolled at some point in 2013 (Table 3). In other words, only 2% of the Counties Manukau population who had used publicly-funded health services were not enrolled. In contrast to the standard method, the percentage of enrolment was similar across all the selected ethnicities (Table 3). Overall, females had a marginally

**Table 1:** Estimated PHO enrolment rate for the CMDHB population in 2013 by age by the standard method

| Age (years) | Number of people enrolled as per 2013 Q3 PHO enrolment register | | Estimated Resident Population from Stats NZ in 2013 | | Estimated PHO enrolment rate (standard method) | |
|---|---|---|---|---|---|---|
| | Females | Males | Females | Males | Females | Males |
| 0-4 | 20,183 | 21,339 | 20,460 | 21,440 | 99% | 100% |
| 5-9 | 20,439 | 21,727 | 20,060 | 21,060 | 102% | 103% |
| 10-14 | 18,971 | 19,975 | 19,460 | 20,430 | 97% | 98% |
| 15-19 | 18,918 | 19,066 | 19,660 | 20,270 | 96% | 94% |
| 20-24 | 19,135 | 18,048 | 19,800 | 20,960 | 97% | 86% |
| 25-29 | 17,987 | 15,447 | 18,230 | 18,020 | 99% | 86% |
| 30-34 | 17,538 | 14,719 | 17,540 | 15,510 | 100% | 95% |
| 35-39 | 17,058 | 14,533 | 16,990 | 14,730 | 100% | 99% |
| 40-44 | 18,796 | 16,621 | 19,220 | 16,730 | 98% | 99% |
| 45-49 | 17,830 | 16,863 | 18,340 | 17,090 | 97% | 99% |
| 50-54 | 16,576 | 15,618 | 17,170 | 16,050 | 97% | 97% |
| 55-59 | 13,603 | 13,001 | 13,940 | 13,480 | 98% | 96% |
| 60-64 | 11,571 | 11,076 | 11,810 | 11,180 | 98% | 99% |
| 65-69 | 9,466 | 9,061 | 10,010 | 9,390 | 95% | 96% |
| 70-74 | 6,965 | 6,461 | 7,190 | 6,610 | 97% | 98% |
| 75-79 | 4,826 | 4,209 | 4,930 | 4,170 | 98% | 101% |
| 80-84 | 3,573 | 2,673 | 3,500 | 2,690 | 102% | 99% |
| 85-89 | 2,180 | 1,404 | 2,030 | 1,260 | 107% | 111% |
| >90 | 1,228 | 492 | 1,200 | 500 | 102% | 98% |
| **Overall** | **256,843** | **242,333** | **261,540** | **251,570** | **98%** | **96%** |

higher PHO enrolment than males. Pacific people had a marginally lower enrolment rate than Maaori.

Using the HSU population as a denominator, children aged 0–4 years had one of the lowest rates of PHO enrolment (Table 4).

The PHO enrolment rate was similar across the four ethnicities using the HSU population as a denominator (Table 5).

The difference in enrolment rates by ethnic group between the standard method for calculating PHO enrolment and our alternative method relates to the difference in the ethnic population size in the numerators and denominators used. The health service utilisation population has considerably higher numbers of people identified as Pacific and lower numbers of people identified as Asian than the estimated resident population. In the PHO enrolment register the percentage of people identified as Maaori and Asian is considerably lower than the percentage in the NHI used to link datasets for the HSU population.

### Subgroup analysis: The percentage of people discharged from either of the two key inpatient facilities for CMDHB: Middlemore Hospital (MMH) and Manukau Surgical Centre (MSC) in 2012 and 2013 who were not enrolled within one month of discharge.

Overall, 3.6% of people discharged from an inpatient event in MMH and MSC combined were not enrolled in a PHO

**Table 2:** PHO enrolment rate by District Health Board in New Zealand and ethnicity in Quarter 3 2013, using the standard method

| DHB | Maaori | Pacific | Asian | NZ European & others | Overall |
|---|---|---|---|---|---|
| Auckland | 79% | 115% | 71% | 102% | 93% |
| Bay of Plenty | 93% | 93% | 93% | 99% | 97% |
| Canterbury | 80% | 96% | 74% | 99% | 95% |
| Capital and Coast | 86% | 99% | 79% | 96% | 93% |
| Counties Manukau | 89% | 111% | 77% | 105% | 97% |
| Hawkes Bay | 92% | 96% | 90% | 99% | 97% |
| Hutt | 85% | 94% | 98% | 100% | 97% |
| Lakes | 100% | 90% | 73% | 102% | 100% |
| MidCentral | 85% | 94% | 76% | 96% | 93% |
| Nelson Marlborough | 87% | 93% | 97% | 99% | 98% |
| Northland | 104% | 83% | 93% | 102% | 102% |
| South Canterbury | 77% | 104% | 115% | 101% | 99% |
| Southern | 79% | 99% | 68% | 95% | 92% |
| Tairawhiti | 100% | 93% | 81% | 98% | 98% |
| Taranaki | 87% | 84% | 76% | 100% | 97% |
| Waikato | 94% | 100% | 75% | 100% | 97% |
| Wairarapa | 103% | 105% | 96% | 103% | 103% |
| Waitemata | 79% | 100% | 76% | 101% | 94% |
| West Coast | 91% | 102% | 115% | 96% | 96% |
| Whanganui | 87% | 108% | 73% | 100% | 96% |
| **Overall New Zealand** | **89%** | **106%** | **76%** | **100%** | **96%** |

**Table 3:** Percentage of PHO enrolment within the CMDHB Health Service Utilisation population in 2013 by ethnicity

| Ethnicity | Enrolled | Not enrolled | Number of people in the CMDHB health service utilisation population | Percentage of enrolment |
|---|---|---|---|---|
| Maaori | 85,436 | 1,457 | 86,893 | 98.3% |
| Pacific | 130,985 | 3,150 | 134,135 | 97.7% |
| Asian | 97,302 | 2,357 | 99,659 | 97.6% |
| NZ European & Others | 198,228 | 3,472 | 201,700 | 98.3% |
| **Overall** | **511,951** | **10,436** | **522,387** | **98.0%** |

**Table 4:** Percentage of PHO enrolment within the CMDHB Health Service Utilisation population by summarised age groups and gender

| Age (years) | Females | | | | Males | | | |
|---|---|---|---|---|---|---|---|---|
| | Enrolled | Not enrolled | Number of people in the CM HSU population | % of enrolm't | Enrolled | Not enrolled | Number of people in the CM HSU population | % of enrolm't |
| 00-04 | 20,979 | 719 | 21,698 | 96.7% | 22,361 | 802 | 23,163 | 96.5% |
| 05-14 | 40,434 | 592 | 41,026 | 98.6% | 42,575 | 665 | 43,240 | 98.5% |
| 15-24 | 39,170 | 910 | 40,080 | 97.7% | 37,887 | 1,141 | 39,028 | 97.1% |
| 25-44 | 72,848 | 1,255 | 74,103 | 98.3% | 62,503 | 1,921 | 64,424 | 97.0% |
| 45-64 | 61,281 | 785 | 62,066 | 98.7% | 57,821 | 1,025 | 58,846 | 98.3% |
| 65 & over | 29,027 | 334 | 29,361 | 98.9% | 25,065 | 287 | 25,352 | 98.9% |
| **Overall** | **263,739** | **4,595** | **268,334** | **98.3%** | **248,212** | **5,841** | **254,053** | **97.7%** |

**Table 5:** Percentage of PHO enrolment within the CMDHB Health Service Utilisation population by age and ethnicity

| Age (Years) | Maaori | Pacific | Asian | NZ European and others |
|---|---|---|---|---|
| 00-04 | 97.2% | 96.5% | 95.6% | 97.0% |
| 05-09 | 99.0% | 98.1% | 98.1% | 99.0% |
| 10-14 | 98.7% | 97.8% | 98.6% | 99.1% |
| 15-19 | 98.1% | 97.8% | 97.5% | 98.1% |
| 20-24 | 97.7% | 97.1% | 94.7% | 97.5% |
| 25-29 | 98.1% | 97.6% | 96.1% | 96.9% |
| 30-34 | 98.3% | 97.8% | 97.7% | 97.0% |
| 35-39 | 98.2% | 98.0% | 98.4% | 97.6% |
| 40-44 | 98.2% | 98.0% | 98.7% | 97.9% |
| 45-49 | 98.5% | 98.3% | 98.5% | 98.4% |
| 50-54 | 98.7% | 98.1% | 98.6% | 98.4% |
| 55-59 | 99.0% | 98.2% | 98.6% | 98.6% |
| 60-64 | 99.3% | 97.9% | 98.5% | 98.8% |
| 65-69 | 99.4% | 97.9% | 98.9% | 99.2% |
| 70-74 | 99.4% | 97.3% | 98.6% | 99.1% |
| 75-79 | 99.7% | 96.3% | 97.6% | 99.3% |
| 80-84 | 99.3% | 96.9% | 97.7% | 99.4% |
| 85+ | 98.1% | 96.9% | 97.7% | 99.3% |
| **Overall** | **98.3%** | **97.7%** | **97.6%** | **98.3%** |

**Table 6:** Percentage of PHO non-enrolment one month post discharge from CMDHB inpatient facilities in 2012 and 2013

| Year | Middlemore Hospital | | Manukau Surgical Centre | |
|---|---|---|---|---|
| | 2012 | 2013 | 2012 | 2013 |
| Number of case mix discharges | 65,824 | 66,239 | 10,475 | 10,839 |
| Number of people discharged not enrolled within a month of discharge | 2,650 | 2,627 | 120 | 145 |
| Percentage of non-enrolment one month post hospital discharge | 4% | 4% | 1% | 1% |

**Table 7:** Number and percentage of PHO non-enrolment post discharge from MMH & MSC in 2013 by age (comparison between one month post discharge vs a simplified method using enrolment as at Q2 2014 PHO enrolment)

| Age (years) | Number of non-enrolment within a month of discharge | Percentage of non-enrolment within a month of discharge | Percentage of non-enrolment as at Q2 2014 PHO enrolment data (simplified 'annual' method) |
|---|---|---|---|
| 00-04 | 477 | 6.5% | 5.1% |
| 05-09 | 76 | 3.7% | 4.1% |
| 10-14 | 68 | 3.7% | 3.7% |
| 15-19 | 187 | 5.4% | 5.6% |
| 20-24 | 303 | 7.2% | 7.1% |
| 25-29 | 288 | 8.0% | 7.2% |
| 30-34 | 189 | 5.4% | 5.0% |
| 35-39 | 154 | 4.7% | 4.9% |
| 40-44 | 148 | 3.8% | 3.7% |
| 45-49 | 132 | 3.2% | 3.6% |
| 50-54 | 135 | 3.0% | 3.3% |
| 55-59 | 110 | 2.7% | 3.3% |
| 60-64 | 95 | 2.3% | 3.1% |
| 65-69 | 56 | 1.4% | 2.2% |
| 70-74 | 63 | 1.7% | 2.8% |
| 75-79 | 62 | 1.9% | 2.9% |
| 80-84 | 45 | 1.6% | 3.3% |
| 85+ | 39 | 1.5% | 3.9% |
| **Total** | **2,627** | **4.0%** | **4.2%** |

within a month from the day of discharge in both 2012 and 2013 (Table 6). The percentage not enrolled was lower for those discharged from the MSC than from MMH. This would seem logical given that discharges from MSC are from elective procedures and referral from primary care is usually part of the journey to get to the event of surgery.

Infants and young children aged 0 to 4 years, along with 20 to 29-year-olds had the highest rates of non-enrolment within a month of discharge in 2013 (Table 7).

Higher proportions of Maaori, Pacific, and Asian people were not enrolled one month post discharge compared to New Zealand European/Other groups in 2013 (Table 8).

At a high level, the non-enrolment rate post discharge from CMDHB inpatient facilities is similar to other publicly-funded hospitals in the Auckland metro region (Table 9).

# Discussion

These health data linkage analyses suggest the standard method of estimating PHO enrolment may not be a reliable indicator to determine the true enrolment rate by ethnicity. The long-standing observation of low Maaori enrolment and over 100% Pacific enrolment in New Zealand suggests there is, at least in part, an artefact related to the inconsistent way ethnicity is recorded in the health datasets compared to the census-based population estimates.

There are a number of practical advantages of using the alternative Health Service Utilisation (HSU) population to inform health service planning and provision. The HSU population is an actual count of people who have accessed publicly-funded health services. Unlike some of the population outputs from Statistics New Zealand, which

**Table 8:** Number and percentage of PHO non-enrolment one month post discharge from MMH & MSC in 2013 by age and ethnicity

| Age (years) | Maaori | | Pacific | | Asian | | NZ European & others | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| 00-04 | 130 | 7% | 214 | 6% | 76 | 10% | 57 | 5% | 477 | 7% |
| 05-09 | 15 | 3% | 35 | 4% | 13 | 5% | 13 | 3% | 76 | 4% |
| 10-14 | 11 | 2% | 36 | 5% | 13 | 8% | 8 | 2% | 68 | 4% |
| 15-19 | 32 | 4% | 78 | 7% | 40 | 14% | 37 | 3% | 187 | 5% |
| 20-24 | 56 | 5% | 103 | 7% | 73 | 17% | 71 | 6% | 303 | 7% |
| 25-29 | 63 | 7% | 76 | 7% | 81 | 15% | 68 | 6% | 288 | 8% |
| 30-34 | 31 | 4% | 68 | 7% | 34 | 6% | 56 | 5% | 189 | 5% |
| 35-39 | 33 | 5% | 51 | 5% | 25 | 5% | 45 | 4% | 154 | 5% |
| 40-44 | 27 | 4% | 47 | 4% | 20 | 4% | 54 | 3% | 148 | 4% |
| 45-49 | 29 | 3% | 47 | 4% | 19 | 4% | 37 | 2% | 132 | 3% |
| 50-54 | 17 | 2% | 52 | 5% | 19 | 4% | 47 | 2% | 135 | 3% |
| 55-59 | 19 | 3% | 43 | 4% | 18 | 4% | 30 | 2% | 110 | 3% |
| 60-64 | 13 | 2% | 33 | 3% | 17 | 3% | 32 | 2% | 95 | 2% |
| 65-69 | 9 | 2% | 26 | 3% | 7 | 2% | 14 | 1% | 56 | 1% |
| 70-74 | 6 | 1% | 31 | 4% | 6 | 1% | 20 | 1% | 63 | 2% |
| 75-79 | 5 | 2% | 20 | 3% | 17 | 6% | 20 | 1% | 62 | 2% |
| 80-84 | <5 | 1% | 14 | 4% | 12 | 5% | 17 | 1% | 45 | 2% |
| 85+ | <5 | 6% | <5 | 2% | <5 | 1% | 32 | 1% | 39 | 1% |
| **Total** | **501** | **4%** | **977** | **5%** | **491** | **7%** | **658** | **2%** | **2,627** | **4%** |

**Table 9:** Percentage of hospital casemix discharges in 2013 where the person was not enrolled as per 2014 Q2 PHO enrolment dataset (simplified method), Auckland metro inpatient facilities

| Hospital | Percentage of non-enrolment post discharge |
|---|---|
| Middlemore Hospital +Manukau Surgical Centre | 3.9% |
| North Shore Hospital | 4.2% |
| Waitakere Hospital | 3.7% |
| Auckland City Hospital | 4.0% |

are derived from statistical and modelling methods,[13] people who have utilised health services are potentially contactable based on the contact details of the last health care visit. There is a defined intervention path that may potentially improve PHO enrolment using the HSU population as a denominator. On the other hand, for the short-fall of PHO enrolment compared to the census-based population estimates, there is no clear defined path to improve PHO enrolment. In other words, there is no absolute certainty that these people in fact exist or are contactable and would benefit from PHO enrolment.

The way the health sector prioritises ethnicities within the health data and how health services are funded, such as PHO capitation funding, may create an inadvertent artefact of undercounting Maaori if multiple ethnicities of individuals are not fully captured, as in the case of PHO enrolment. Enrolling Maaori or Pacific people attracts a higher level of capitation payment than other ethnicities.[14] However, there is no additional financial gain/loss in

accurately differentiating between Maaori and Pacific ethnicities (or recording multiple ethnicities as long as either one of the Maaori and Pacific ethnicities was recorded).

It is important to differentiate the issue of non-enrolment from the need for having more accurate ethnicity coding in the health sector. The current study proposes the use of an HSU population as a proxy of health services need, and as the denominator of PHO enrolment as well as inclusion criteria of the study. Ethnicity records were derived from the NHI and applied to both the numerator and denominator consistently at the individual basis to estimate PHO enrolment rate. The proposed method cannot correct for any underlying miscategorisation of ethnicity. Some people who are Maaori may be counted for example as Pacific or New Zealand European. However, if the primary concern is that they are missing out on care because of non-enrolment, given enrolment across all ethnicities is around 98%, it seems unlikely that they are missing out on enrolment advantages, whatever group they are classified in. Improving the quality of ethnicity recording has a number of wider benefits, but the overall number of people who benefit from PHO enrolment may not actually increase as a consequence of better quality ethnicity recording.

While there is value in improving the quality and consistency of the ethnicity data in the health sector, it is important to acknowledge that even if the process of recording ethnicity within the health sector were perfectly aligned with the health sector standard,[11] the proportions and the number of people by ethnicities would not necessarily be perfectly identical to the census-based estimates for a number of reasons.

Firstly, the self-reported concept of ethnicity allows individuals to report different ethnicities in different locations or context.[15] Indeed, previous literature has noted that self-reported ethnicity responses can vary depending on the context of the question and individuals' responses can change over time.[15,16]

Secondly, there are a number of adjustments made to improve the reliability of the estimated resident population by Statistics New Zealand. All the adjustments made by Statistics New Zealand are sensible and appropriate and they are expected to provide more realistic population estimates compared to census usually resident population at defined point in time, but the adjustments themselves are potential reasons why the population outputs by ethnicity differ from that of the health sector.

Despite these sensible adjustments made for the estimated resident populations by Statistics New Zealand, the inherent limitations related to the census-based population estimates are well documented, but not widely appreciated. Over time the proportion of the population estimated to have not responded to the census has increased. In the 2013 Census, the non-response rate (net undercount and substitute forms) was estimated to be 7.1% compared to 5.2% in 2006 and 5.0% in 2001.[17] Adjustments had to be made for 5.5% of the census-night population who did not provide a response (or a classifiable response) to the ethnicity question of the census.[18] While the number of people sampled has increased over time in the post-enumeration survey that is used to estimate the census undercount, the post-enumeration survey may still miss people who did not fill out the census the first time round.[17] However, these people remain eligible and may seek or have utilised publicly-funded health services (and indeed services provided in other social sectors). It is important to acknowledge that the populations who interact with census and the post-enumeration survey may be slightly different from the populations who have utilised publicly-funded health services, and the differences may be quite marked in some population subgroups as noted in this study.

The HSU population refers to the number of people who were domiciled in a defined geographical area over a period of a year. On the other hand, each quarter of the PHO enrolment released from the Ministry of Health and each version of the estimated resident population produced by Statistics New Zealand are cross sectional measures or estimates at one point in time. The PHO enrolment at some point over the course of a year will provide a slightly higher enrolment percentage than enrolment percentage at one point in time.

Since the PHO enrolment records and health service utilisation records are both NHI linked, an integrated electronic system could potentially alert the responsible clinicians of the people who were yet to be enrolled at the time of health service contact. A recently published paper has described the potential value of the health service utilisation population to form a population register which has the potential to facilitate the clinical actions where clinical benefits are undisputed but implementation at the population level less than ideal.[19]

Arguably the need for a hospital admission is one of the stronger proxies of health services need, but only a proportion of people would be admitted to hospital in a given year. Patients who were admitted to MMH and/or MSC (the local hospitals of CMDHB) are more amendable to system improvement led by CMDHB than those admitted to facilities in other DHBs. Having processes to identify people who are not yet enrolled in a PHO as part of the hospital admission, as well as processes to support those people to enrol, are two important components to improve the PHO enrolment rate of people who have identified health services need. Percentage of PHO non-enrolment one month post discharge from a New Zealand hospital is an indicator of timeliness of enrolment, as many people could benefit from primary health care team follow up soon after hospital discharge. The relatively low enrolment in the 0–4 years age group demonstrated in this paper is likely to improve over time with the policy to automatically nominate a primary care provider for all newborns.[20]

A simplified indicator, such as the percentage of people who have had a hospital discharge in 2013 that were not enrolled as per 2014 Q2 PHO enrolment dataset, is not as analytically intensive and could be more readily taken up by local hospitals/DHBs in New Zealand. Alternatively, since the Ministry of Health has access to both PHO enrolment and hospitalisation data, a more sophisticated version could be run centrally, if such indicators were deemed to be useful by the health sector for quality improvement purposes. The key is not putting too much effort into developing indicators or making adjustments to make the results of the indicator look better, but to define processes that would support improvement of PHO enrolment, eg an NHI look-up system to check whether the person attending hospital (ideally in outpatient settings and ED as well as inpatients) is enrolled or not.

Since the percentage of non-enrolment using a simplified 'annual' method for the 0–4 years age group is lower than that of the percentage of non-enrolment within a month of discharge, the level of enrolment appears to increase with time in that age group. The modest increase in non-enrolment in some of the age groups may be related to a small proportion of people going overseas, or people receiving rest home care who may become unenrolled (because they receive care from a contracted GP who provides care for the whole rest home population and they are not necessarily enrolled in a PHO).

## Limitations

There are a number of late entries in the PHO enrolment register for each quarter. On the other hand, people who are deceased may remain in the PHO enrolment dataset for a number of quarters. While there are a number of ongoing audits in place, a number of duplicate or incorrect entries have been noted in the PHO enrolment data from recent audits.

The estimated residential population denominator used for this report (MOH assumptions, version 2013) was based on the 2006 Census. The 2014 estimates based on the 2013 Census have become available recently, but publicly available reports relating to the data used in this paper were based on the 2013 estimates, so the 2013 estimates have been used to maintain consistency with those reports. However, the main concepts discussed, such as numerator-denominator mismatch and the potential use of the health service utilisation population discussed in this report remain valid.

There are likely a small number of exceptions to the assumption that people who had not utilised health services are healthy, however there is no clearly defined intervention pathway to identify such individuals by the health sector.

## Conclusion

The use of the health service utilisation population as a denominator using record linkage can eliminate the artefact created by numerator-denominator mismatch in calculating PHO enrolment rates. Overall, PHO enrolment in Counties Manukau District Health Board was almost 98% in 2013. Support to improve PHO enrolment coverage would be more efficient if the HSU population were used to target people who are not yet enrolled in a PHO.

### Appendix 1: The difference between estimated resident population and census usually resident population counts

It is important to differentiate the two commonly used census-based population outputs released from Statistics New Zealand, namely census 'usually resident' population and 'estimated resident' population. The census 'usually resident' population counts should *not* be used as the population denominator for health sector data or used as a description of population demography within a defined geographical area. Despite the name, census 'usually resident' population counts provide an underestimate of the actual overall population as well as a less realistic description of ethnicity mix because there are significant differential undercounts by ethnicity. For example, proportionately more Maaori and Pacific people were under-counted by the census in 2013 compared to other ethnic groups. There were also differential non-response rates to the ethnicity question in the census by ethnicity.[21]

Other adjustments made to the census 'usually resident' population counts to get the 'estimated resident' population counts include the addition of residents temporarily overseas at the time of census; and births, deaths and international migration since the census night.[21] Indeed, Statistics New Zealand has clearly stated the adjusted 'estimated resident population' (rather than census 'usually resident' population counts) should be used for the purposes of planning, and decision-making purposes.[22]

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## SLM 14 As Used in Delphi

**SLM 14: Healthcare Costs per Capita ($US)**

Data based on information from the Global Health Observatory Data Repository

http://apps.who.int/gho/data/node.main.78?lang=en