



Guide to Using the System Level Measures Framework for Quality Improvement

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1. Purpose of this Guide

The System Level Measures Framework has evolved from the Integrated Performance and Incentive Framework (IPIF). While IPIF focused mainly on primary care, the focus has now been broadened to include the whole health system. This broader focus reflects the vision of the IPIF Expert Advisory Group report and the priorities of the updated New Zealand Health Strategy (the Strategy). The System Level Measures Framework has provided the opportunity for IPIF to evolve into the system level performance measurement envisioned in the Strategy.

This guide explains how the System Level and contributory measures can be used to support improvements in the health system and address equity for Māori and other population groups with significant health disparities.

The guide also introduces the Measures Library, the basic concepts of improvement science, and provides links to further information and quality improvement tools. A case study is included as an example of how contributory measures can be selected and used. The guide should be used by district alliances to guide the development of their improvement plans. Sections seven, eight and nine provide suggested tools and approaches that could be used by frontline clinicians and managers involved in developing and running the quality improvement activities, particularly for those districts with fewer resources and/or who are starting this journey. Districts that are already well advanced in this work are likely to continue to use their current tools and processes.

2. System Level Measures Framework – How it fits with the Health Strategy

The *New Zealand Health Strategy: Future direction*, outlines a new high-level direction for New Zealand's health system.

New Zealanders rightly expect high-quality health services, and a health system that strives to continually improve. There should be equitable¹ access to services and all New Zealanders should have the same opportunity to live well, stay well and get well. There is a special relationship between iwi and the Crown under the Treaty of Waitangi, which prioritises the reduction of health inequalities for Māori.

We face a number of challenges, including a large number of children who do not get the best start in life which has many implications for their future health and well-being, and increasing numbers of older people who are living with long-term health conditions and disabilities. Stronger partnerships and changing approaches will help manage these challenges, and promote good stewardship of health resources.

The Strategy has five themes:

- People-powered
- Closer to home
- Value and high performance
- One team
- Smart system.

The *value and high performance* theme places a greater focus on health outcomes, equity and meaningful results. This theme requires greater accountability from providers of health services, including ongoing

¹ The World Health Organisation defines equity as the absence of avoidable or remediable differences among groups of people.

monitoring and improvement of services. Providers must reorient their services and performance and planning approaches to ensure high-quality care is provided throughout the health system.

*The New Zealand Health Strategy: Roadmap of Actions 2016*² sets out 27 areas for action over the next five years to implement the Strategy. Two of these actions are:

- Develop and implement a monitoring framework focused on health outcomes, with involvement from the health and disability system, service users and the wider social sector. This work will build on the Integrated Performance and Incentive Framework and results-based accountability and aims to increase equity of health outcomes, quality and value
- Work with the system to develop a performance management approach that makes use of streamlined reporting at all levels, to make the whole system publicly transparent.

During the update of the Strategy, the Ministry of Health and the sector co-developed a suite of System Level Measures that provide a system-wide view of performance.

The measures will help achieve a health sector that is value for money, sustainable, and provides the best possible health and disability services for New Zealanders.

The measurement framework is a combination of System Level Measures to show national-level progress, and contributory measures to stimulate and support quality improvement at a local level.

The performance of individual clinicians and/or provider organisations, through health activities and processes, are measured by contributory measures. These individual groups must work as *one team* (another of the Strategy's five themes) to improve system-level performance. The System Level Measures also resonate with the *care closer to home*, *people powered* and *smart system* themes of the Strategy.

3. Measures and the Health System

3.1. The purposes of measurement

Measures are used for three main purposes: accountability (judgment), improvement and research.³

Measurement for accountability is undertaken for the purpose of benchmarking (comparing different hospitals or districts), incentivising performance, accreditation of health facilities or staff, public reporting and to ensure public safety.

Measures for improvement help identify problems that need attention, and in particular focus on groups that have poorer access to health care and poorer health outcomes.⁴ They are used to find out if interventions or processes have been effective. Well-designed improvement projects can be a form of research.

System Level Measures are measures for accountability, while contributory measures are measures for improvement. Both may be used as measures for research.

² Minister of Health. 2016. *New Zealand Health Strategy: Roadmap of actions 2016*. Wellington: Ministry of Health.

³ Solberg, Mosser and McDonald. 1997. The Three Faces of Performance Measurement, *J. Quality Improvement* 23, 135-147.

⁴ http://www.nhs.uk/media/2541082/improvement_leaders_guide_-_measurement_for_improvement.pdf

3.2. Accountability

Improving System Level Measures performance and reducing variation for population groups requires cooperation between different parts of the health system. DHBs and PHOs, through their alliances⁵, are responsible for meeting System Level Measures. No one health care provider can be accountable for a particular System Level Measure, though each group is accountable for playing their part. The intent of this framework is to involve as many players as possible in quality improvement along with taking responsibility for implementation of the improvement plan at a district alliance level.

District alliances will lead an integrated approach to planning, measurement, service provision and quality across a local population. Initially alliances are a partnership of the DHB of domicile and its PHOs, but it is expected they will evolve to include relationships with other local provider groups such as midwives, pharmacy and ambulance services.

Locally chosen (district alliance level) contributory measures will have relevance to the local population, and be a catalyst for quality initiatives that is meaningful, relevant and able to be influenced by those providing health services. Parties to the alliance must agree where responsibilities lie. The contributory measures need to be chosen to track the progress of these local responsibilities, directly connected to an organisation's improvement plan.

System Level Measure data will be provided by the Ministry, broken down by ethnicity and New Zealand deprivation index, in addition to the denominator of total population. This will highlight disparities among different groups within the population of a district. It is acknowledged DHB populations differ considerably in the proportion that are Māori, Pacific and Asian and in some instances reporting Pacific and Asian breakdown is not appropriate because of small numbers. Contributory measures data needs to be provided by the DHB and PHO.

DHBs and PHOs, as part of district alliances, must collaborate across all parts of the health system to analyse, understand and reduce inequalities for Māori, Pacific and other population groups with significant health disparities.

4. System Level Measures

4.1. How and why the System Level Measures were chosen

System Level Measures align with the themes of the *New Zealand Health Strategy* and show how the health system is performing. They will be reported nationally.

System Level Measures:

- are designed to create system-wide responses that are not limited to specific programmes or diseases
- are designed to focus the health services on outcomes for patients and populations
- are underpinned by contributory measures
- reflect the contribution of health to broader social outcomes
- are designed to drive our attention to the integration of services
- focus on populations with the greatest health needs.

⁵ A partnership between the DHB of domicile and its PHOs and other contracted providers.

The measures were chosen to reflect the New Zealand Triple Aim for quality improvement:

- improved quality, safety and experience of care
- improved health and equity for all populations
- best value for public health system resources.⁶

Several focus areas were considered when selecting measures.

Measures that identify known disparities in health outcomes for population subgroups were considered. These groups include Māori, Pacific people, those living in areas of high socioeconomic deprivation, and those living with poor mental health or intellectual impairment. Measures were also considered across the different life stages – from conception, infancy, childhood, adolescence, adulthood and older age.

The New Zealand Burden of Disease study⁷ findings were taken into account when the System Level Measures were chosen. The study comments on changes in New Zealand's population structure and patterns of disease. Life expectancy is increasing, and people are living longer in good health but also longer in poor health, and the gains are not shared equally by all population groups. The study shows poor health due to alcohol and drug use and mental health disorders has increased, and health improvements are much slower for children and young people. Infectious diseases and neonatal disorders are still common in childhood.

The goal of a modern health system is to maximise the length of life lived in good health. It can do this by reducing morbidity and health-related disability.

A health system needs to identify people with more than one condition or disease, and manage their illnesses appropriately. People need to be supported to manage their own health and to learn how to get the best out of the health system. Services need to respond to individual and population needs and focus on those who are less able to access health care to ensure equitable care is provided across the whole patient journey. There also needs to be a greater focus on prevention.

Taking these factors into account, the most health benefit would come from a focus on:

- maternity care and having healthy babies
- the health of children and young adults, including a focus on respiratory illness and gastroenteritis, mental health and injury
- prevention, early detection and effective management of long-term health conditions
- delivering patient-centred care by design
- using health resources effectively.

The measures were developed by clinicians from primary and secondary care, academics, data analysts, managers, patient groups and others. The measures cover different life stages and the continuum of health care (primary, community and secondary care). There are only a small number of measures to ensure a focused approach by alliances to the identification of activities and development of realistic and achievable improvement plans. It is likely the measures will be revised over time in response to feedback and their impact on performance improvement.

⁶ <http://www.hqsc.govt.nz/about-the-commission/>

⁷ Ministry of Health. 2013. *Health Loss in New Zealand: A report from the New Zealand Burden of Diseases, Injuries and Risk Factors Study, 2006–2016*. Wellington: Ministry of Health.

4.2. System Level Measures from July 2016

The System Level Measures from July 2016 are:

- ambulatory sensitive hospitalisations (ASH) rates for zero to four year olds
- acute hospital bed days per capita
- patient experience of care
- amenable mortality rates under 75 years

In 2016/17 measures will be developed in the areas of:

- youth access to and utilisation of youth-appropriate health services
- proportion of babies who live in a smoke free household at six weeks post birth.

ASH rates in 0–4 year olds seeks to reduce admission rates to hospital for a set of diseases and conditions that are potentially avoidable through prevention or management in primary care. In children, these conditions are mainly respiratory illnesses, gastroenteritis, dental conditions, and cellulitis.

ASH rates are higher for Māori and Pacific children and addressing this inequity would significantly reduce potentially avoidable hospitalisation rates. Analysing ASH rates by ethnicity and deprivation level will highlight the effects of the broader determinants of health such as housing and access to primary care.⁸

Acute hospital bed days per capita measures the use of hospital resources, predominantly relating to adults and older people. For example, streamlined diagnostic and treatment processes, discharge planning and community based health and restorative care. Effective management of long-term illnesses and disease prevention and the provision of effective care in the community after discharge have the potential to reduce hospital bed days. Good communication between clinicians across the health care continuum is vital. The rate of acute bed day use is higher for Māori and Pacific people.

The patient experience of care measurement tools in primary and secondary care give insight into how consumers experience the health care system, and how integrated their care was. In their review of evidence on the links between patient experience and clinical safety and health outcomes, Doyle et al⁹ concluded that patient experience is positively associated with adherence to recommended medication and treatments, engagement in preventive care such as screening services and immunisations and ability to use the health resources available effectively. This measure will provide new information about how people experience health care. It may highlight areas that districts need to have a greater focus on, such health literacy and communication.

Amenable mortality is a measure of the effectiveness of health care based prevention programmes, early detection of illnesses, effective management of long-term conditions and equitable access to health care. It is a measure of deaths that could have been avoided through effective health interventions at an individual or population level. Health care service improvement across the system, including access to diagnostic and secondary care services, may lead to reduction in amenable mortality. Amenable mortality rates are higher in Māori and Pacific people. Rates have reduced over time, but not as quickly for Pacific people as for other population groups.

⁸ Scott N and Lawrenson R. May 2015. Potential for health gain equity. *NZMJ*. Vol 128, No 1415.

⁹ Doyle C, Lennox L, Bell D. 2013. A systematic review of evidence on the links between patient experience and clinical safety and effectiveness. *BMJ Open*, 3:e001570.doi:10.1136/bmjopen-2012-001570.

The amenable mortality measure applies to the under-75 population.

The youth health measure (12-25-year age group) is intended to address behavioural factors, mental health conditions, sexual and reproductive health, alcohol and other drug use, and injury prevention. Engagement with education, employment and training is critical as is building healthy relationships and making good choices. Rates of pregnancy and mental health conditions are higher among Māori and Pacific youth and those living in low socioeconomic areas. The System Level Measure for this domain has yet to be defined and is in development for 2016/2017.

Smoking during pregnancy and exposure to smoking in early childhood strongly influence pregnancy and early childhood health outcomes. The measure of the **proportion of infants living in a smokefree household during the postnatal period** correlates with maternal smoking in pregnancy. The rate of smoking in pregnancy, and worse pregnancy outcome for mothers and babies, is higher among Māori and Pacific women and those living in areas of high deprivation.¹⁰ This System Level Measure is in development for 2016/2017.

4.3. Reporting of measures

Reporting of System Level Measures will take place at a national level, broken down by ethnicity and New Zealand deprivation index. Contributory measures will not be nationally reported. The aim is for districts to learn from each other about what works to improve health outcomes. The Library of Measures (see section 5.2) offers an interactive opportunity for districts to discuss and record use of measures and quality improvement approaches and activities. Each district will be able to select the most appropriate contributory measures from the Library of Measures or use their own measures for quality improvement.

5. Contributory Measures

5.1. Purpose of contributory measures

Contributory measures are tools selected and used at the local level for quality improvement, according to DHB context (eg, population need relative to current service provision). They measure specific health care activities or services that can be influenced by frontline clinical health care services and contribute to the achievement of System Level Measures.

Contributory measures:

- focus on the delivery of specific health care services or activities for defined patient populations and groups experiencing disparities
- use process and outcome measures specific to the programme, unit or condition
- are linked to quality improvement initiatives
- are service-level measurements that are meaningful to clinicians
- may be collected at a national level but are not reported nationally or used for national accountability.

By identifying the right contributory measures to address, and implementing the appropriate initiatives to improve the quality of care, it is expected the System Level Measure will also improve.

¹⁰ New Zealand Child and Youth Epidemiology Service. March 2016. *The Determinants of Health for Children and Young People in New Zealand 2014*.

5.2. The Library of Measures

The System Level and contributory measures are published on Health Quality Measures New Zealand (HQMNZ): www.hqmnz.org.nz.

HQMNZ is a sector wide library of measures used within the New Zealand health system. It is a single collection point for all measures and their definitions.

A System Level Measures 'stack' (under which all of the System Level and contributory measure definitions are loaded), has been created on the HQMNZ. A link to this stack can be found on the HQMNZ homepage.

Measures can be located by either using the search box function, or by browsing through the stack.

The Library includes precise definitions of System Level and contributory measures (such as numerator and denominator descriptions), data sources and calculation methods. It includes the rationale for using measures, standardisation methods, data sources and the inter-relationships of measures (eg, where these can be used as balancing measures [see section 8.5]).

The Library has the status of each measure – 'In development', 'Validated', 'Active' or 'Abandoned'. Measures that are 'Active' or 'Validated' have had their definitions agreed, been peer reviewed and have data available for analysis.

Measures 'In development' are currently being modelled or tested. Where development has stalled, measures have the status of 'Abandoned'. In these instances, the Library will note why development has stopped and Library users will be able to advocate and work on further development of these measures.

The Library can be used to support collaborative learning networks across districts so quality improvement expertise can be shared.

6. Improvement Plan Development

The improvement plan submitted to the Ministry of Health will include:

- improvement milestones (see 6.3 for definition) for the four System Level Measures (total acute hospital bed days, ASH for 0–4 year olds, amenable mortality rates and patient experience of care)
- a suite of contributory measures for each of the four System Level Measures along with the end-of-the-year quantitative goals for each contributory measure. The number of contributory measures and the end-of-the-year quantitative goals of these will be decided locally
- district alliance stakeholder agreement with the improvement plan, improvement milestones and contributory measures. At a minimum the DHB and PHO must sign off the plan. Ideally all stakeholders will sign to confirm their commitment.

Improvement milestones and contributory measures should be based on a district's trend data and baseline and be appropriate for the needs and priorities of local communities and health services.

The National Health Targets will continue in their current form, including the requirements to meet the national target and report quarterly. PHOs and DHBs are expected to meet the targets identified in each individual National Health Target.

6.1. Suggestions for developing improvement plans

The quality and effectiveness of alliances is critical to developing an appropriate quality improvement environment. Developing the necessary processes and programmes to improve quality (ie, the improvement plan) are dependent on alliances embracing the culture and principles outlined in the Alliance Charter (<http://nsfl.health.govt.nz/dhb-planning-package/system-level-measures-framework>). The development and implementation of the improvement plan is an opportunity to align current work programmes under one banner (eg, acute demand, Diabetes Care Improvement Package, ASH).

The following issues should be considered when developing the improvement plan:

- confirm the scope of the alliance work programme including, but not limited to development of the improvement plan and achievement of the System Level Measures
- whether third party assistance on facilitation is likely to be required to jointly agree an improvement plan
- confirm alliance membership to deliver on the agreed scope of work
- identify the project team and leads
- identify resourcing contributions from local parties (eg, DHB and PHO), including who is responsible for writing the improvement plan on behalf of the participants
- construct a project plan
- identify how the improvement plan relates to current local quality/performance frameworks and metrics and agree how different performance data sets will be used to develop the improvement plan and reported to assess performance against it
- use the Measures Library, data, tools and improvement science processes
- PHOs and DHBs must provide their own performance data sets for contributory measures to inform the improvement plan development (eg, PHO immunisation data, DHB acute readmission data)
- agree the specific activities each stakeholder group (DHB and PHO at a minimum) will take, including service model changes, that will help improve performance.

6.2. Local improvement plans

The local improvement plan (which does not have to be submitted nationally) is expected to include:

- specific activities, including those by the DHB (for example emergency department, outpatient clinic and medical ward service reconfiguration) and the PHO, to meet both the improvement milestones for the System Level Measures and the end-of-the-year quantitative goals for the selected contributory measures. (Note: activity to improve performance against the National Health Targets will be included in those relevant sections of the annual plan)
- an investment logic that includes all the activities described above including DHBs' and PHOs' individual contributions (dollars or resource) to the development and implementation of the jointly agreed improvement plan; and
- a local reporting and accountability framework for all participants.

6.3. Definitions – Improvement milestones, contributory measures goals and National Health Targets

Different terms have been used to ensure there is no confusion about the difference between National Health Targets and the performance expected for System Level Measures and contributory measures. Table one explains these different terms.

Table 1: Definitions – National Health Targets, improvement milestones and contributory measure goals

National Health Targets	Improvement Milestones	Contributory Measure Goals
<ul style="list-style-type: none"> • Four DHB and two primary care targets • Reflects government priorities • Performance reported each quarter • Targets set nationally by the Ministry • Public reporting of performance against the targets • PHOs paid on Quarter 4 performance of two primary care targets 	<ul style="list-style-type: none"> • Four System Level Measures 2016/17 • Reflects value and high performance theme of Health Strategy • Progress reported quarterly and performance reported in Quarter 4 • Milestones set by district alliances • No public reporting of performance • PHOs paid on Quarter 4 performance of three System Level Measures 	<ul style="list-style-type: none"> • Number of measures and end-of-year quantitative goals defined by district alliances • Measures align with activities in alliance improvement plans • Measures contribute to achievement of the System Level Measure milestones • Progress and performance reported locally at district alliance level • District alliances may choose to incentivise • No public reporting of performance

7. Using the Framework – Improvement Science

7.1. Steps towards improvement

Confidence, skill sets and resourcing for conducting improvement activities is variable between districts. This section is made available for those who need additional guidance and/or expertise about improvement science and how to use it to develop the improvement plan. It provides a possible approach, along with potential tools that could be used, to develop an improvement plan. Districts that are more experienced in this work will find this Guide less useful and are likely to continue to use their current processes. There are also many excellent resources available for further information, a list of these can be found in Appendix One.

Using the System Level Measures Framework involves a series of steps (see Appendix Two).

1. The Ministry of Health provides national comparative data for System Level Measures to DHBs, PHOs and district alliances, including data stratified by ethnicity and deprivation level of domicile, and time trends. DHBs and PHOs at their alliances use this data to determine what issues need to be addressed – for example, variance from the national or peer group¹¹ average, high levels of inequity in the measure, or negative change over time.
2. Alliances convene multidisciplinary quality improvement teams to focus on the areas for improvement. Teams have wide representation of clinical, analytic and managerial knowledge.
 - a) For each improvement project, scope the problems using direct observation, data collection and analysis, and structured enquiry methods including interviews with clinical and administrative staff and patient engagement. The best improvement ideas often come from those directly involved in or affected by health care.

¹¹ Districts with similar socio-demographic characteristics.

- b) For each improvement project, create a process map or flow chart, including specific decision points where processes might fail and lead to poor outcomes. Create a driver diagram to identify root causes and opportunities for improvement (see section 8.3). A prioritisation tool such as a Pareto chart¹² can help to identify where quality improvement is likely to be most effective. This can be done by creating a frequency chart of poor outcomes or deficiencies in processes.
- c) Using contributory measures (data provided by DHBs and PHOs), undertake further variation, time trend and equity analysis to identify priorities for action. Contributory measures can be sourced from the Measures Library, or other local measures can be used. Look for population groups that have inequitable access to health care and poor health outcomes. Remember that disparities may be missed if the wrong measures are chosen or analysis is inadequate.
- d) Undertake quality improvement activities such as PDSA (plan, do, study and act)¹³ cycles to test and develop local responses to improve performance on contributory measure(s), including targets for improvement.¹⁴ Using a structured approach ensures testing is based on a theory of change, and data is collected that shows whether the test was successful or requires further adaptation. Using this approach, teams can find solutions that best fit the local context and improvement is more likely to be sustained.
- e) Routinely monitor and report contributory measure(s) and identify balancing measures (see section 8.5) that track unintended consequences or possible perverse incentives. A dashboard (see section 9.2) is a useful tool for this local performance management. Use statistical process control tools (see section 8.1) to identify whether improvement is occurring and further opportunities.
- f) Continue to discuss the opportunities for reducing disparity and improving outcomes for all populations with frontline clinicians and managers.

7.2. Local variation and equity

Although analysis of variation between districts is useful, an apparently ‘average’ result for a particular measure may be hiding local variation between population groups. This is particularly the case for areas where there is considerable ethnic or socio-economic diversity. Health equity can usually be improved and measures should be examined to see if any particular group in a population is disadvantaged in access, experience or outcome of health service.

Equity is one of the key dimensions of quality. The Health Quality & Safety Commission’s [Atlas of Healthcare Variation equity domain](#) provides approaches to undertaking this type of analysis.

8. Basic Tools for Quality Improvement

8.1. Monitoring data over time – run charts and control charts

Even if a result for a given measure is unremarkable, and there is no unwarranted variation, there may still be a positive or negative change over time. Knowing whether a change is an improvement and not just part of random variation is important. Statistical process control is a tool to tell which changes are meaningful. It can also identify extreme outlying data points that might indicate the data is incorrect.

¹² Pareto analysis shows that a relatively small number of very heavy users of services can by themselves be a large driver of many of these measures. Specific individualised interventions for these people can be the most appropriate approach to improving overall performance.

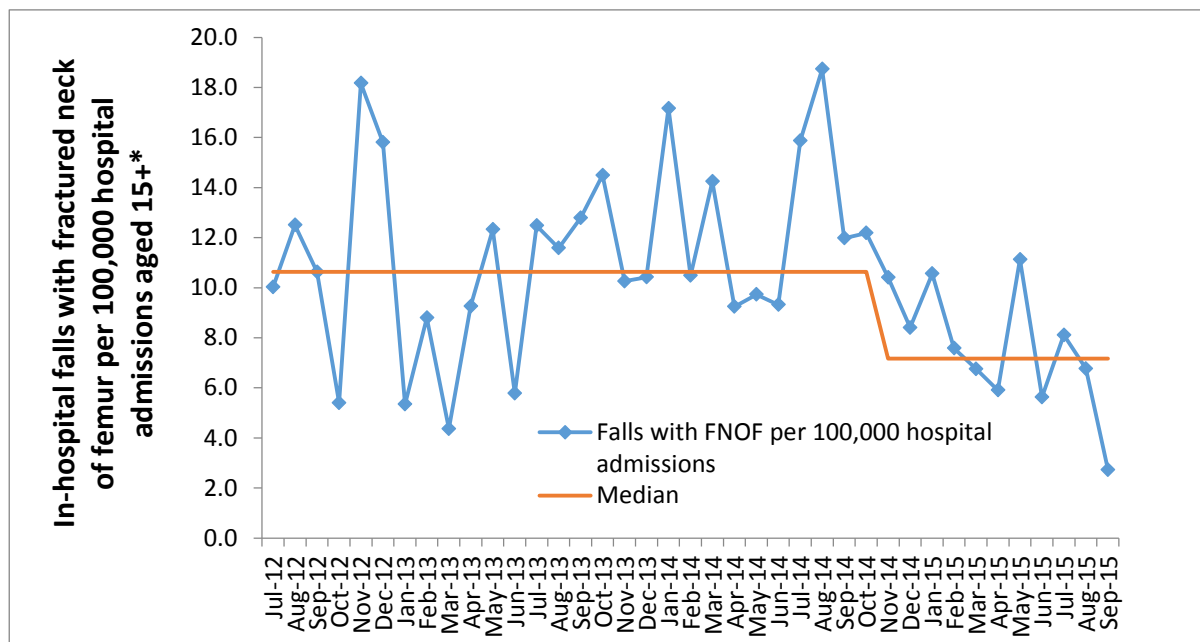
¹³ <http://www.ihi.org/sites/search/pages/results.aspx?k=pdsa>

¹⁴ <http://www.ihi.org/resources/Pages/HowtoImprove/default.aspx>

The simplest form of this analysis is known as a *run chart*.¹⁵ For small scale local improvements, the run chart can be sufficient. Trends in data can be identified by plotting data for each time period against the median value for the whole period.

There is a trend when there are six or more consecutive points one side above or below the median line. This identifies a statistically significant sustained change in performance. Once a shift is observed, the median line can be moved to reflect the post-shift median. Figure 1 looks at the rate of in-hospital falls over time. It shows a run chart with a statistically significant sustained change in performance. Ideally this would reflect a new process or activity as a result of a quality improvement initiative.

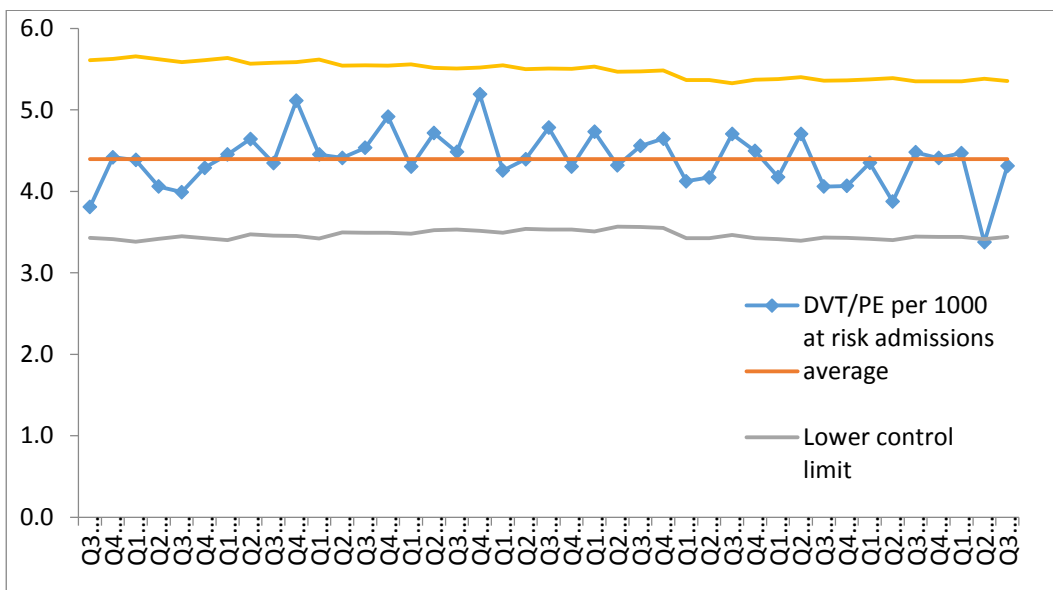
Figure 1: In-hospital falls with fractured neck of femur per 100,000 hospital admissions aged 15+



A *control chart* (Figure 2) is a more sophisticated version of a run chart. It sets the average (mean) level and shows control limits, set three standard deviations away from the mean. Points outside of the control limits are described as outliers – they have a difference from the average so great that this cannot be due to chance alone (ie, statistically significant). There are also rules concerning shifts; in this case eight points one side or other of the mean is a sustained shift up or down.

¹⁵ <http://qualitysafety.bmj.com/content/20/1/46.full.pdf+html>

Figure 2: Post-operative DVT/PE per 1,000 at-risk admissions with fractured neck of femur per 100,000 hospital admissions



Further information about statistical process control is available at http://www.npaihb.org/images/training_docs/NARCH/2010/Amin%20Control%20Charts%20101%20Quality%20Management%20in%20Health%20Care%202001.pdf
 Excel templates for statistical process charts are available from <http://www.vertex42.com/ExcelTemplates/control-chart.html>.

8.2. Drilling down

Drilling down is the process of undertaking targeted analyses of particular conditions, populations, pathways or outcomes to find out what is causing the high-level result. An example of how drilling down has worked in a DHB is set out in Appendix Three.

8.3. Driver diagrams

The driver diagram is a tool for quality improvement.¹⁶ Having an end goal, and primary and secondary drivers, identifies what needs to be addressed and how to address it. A driver diagram should identify a range of interventions which may drive improvements.

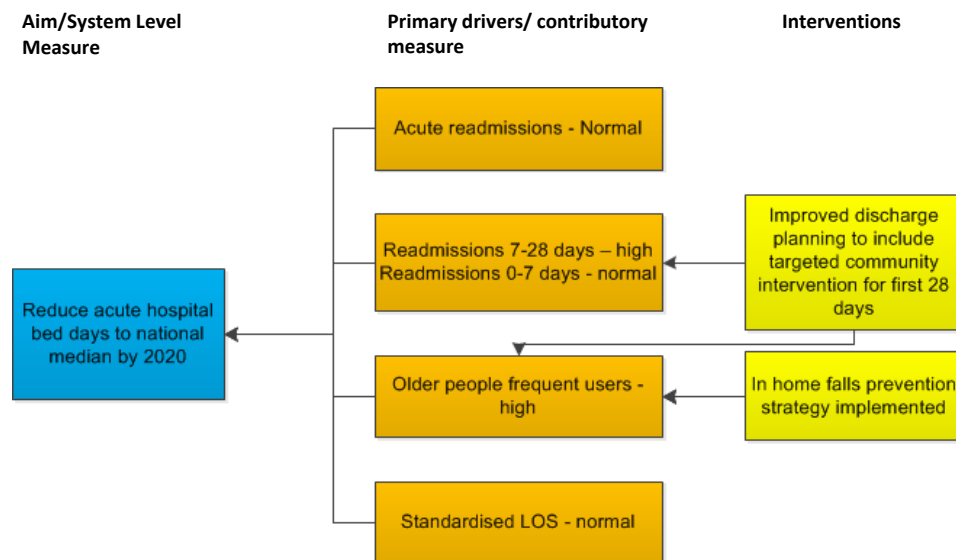
For example, for the acute hospital bed days measure, the goal might be to reduce the high number of occupied bed days associated with acute admissions to a rate similar to the national average in the next four years. A multidisciplinary team thinks about possible underlying causes (drivers) and asks ward staff, administrators and managers what they think the issues are. Contributory measures show the potential immediate drivers: longer length of stay, more acute admissions, more readmissions or more older people entering the system.

Through additional local analysis these measures can help identify what is causing high acute hospital bed days (Figure 3). For example, a high readmission rate between 7 and 28 days, combined with a large number of older people entering the hospital as an emergency on a recurrent basis, may point to a gap in

¹⁶ http://www.apiweb.org/QP_whats-your-theory_201507.pdf

community based services. This might lead the alliance team to introduce or strengthen home and community based services (for example, measures to prevent falls in older people’s homes) as a quality improvement project.

Figure 3: Driver diagram – High acute hospital bed days



Note that this example would not identify if Māori had a rate of acute bed day use that was different from non-Māori. Analysis by population groups would reveal this and help to understand and explore further drivers to improve the System Level Measure.

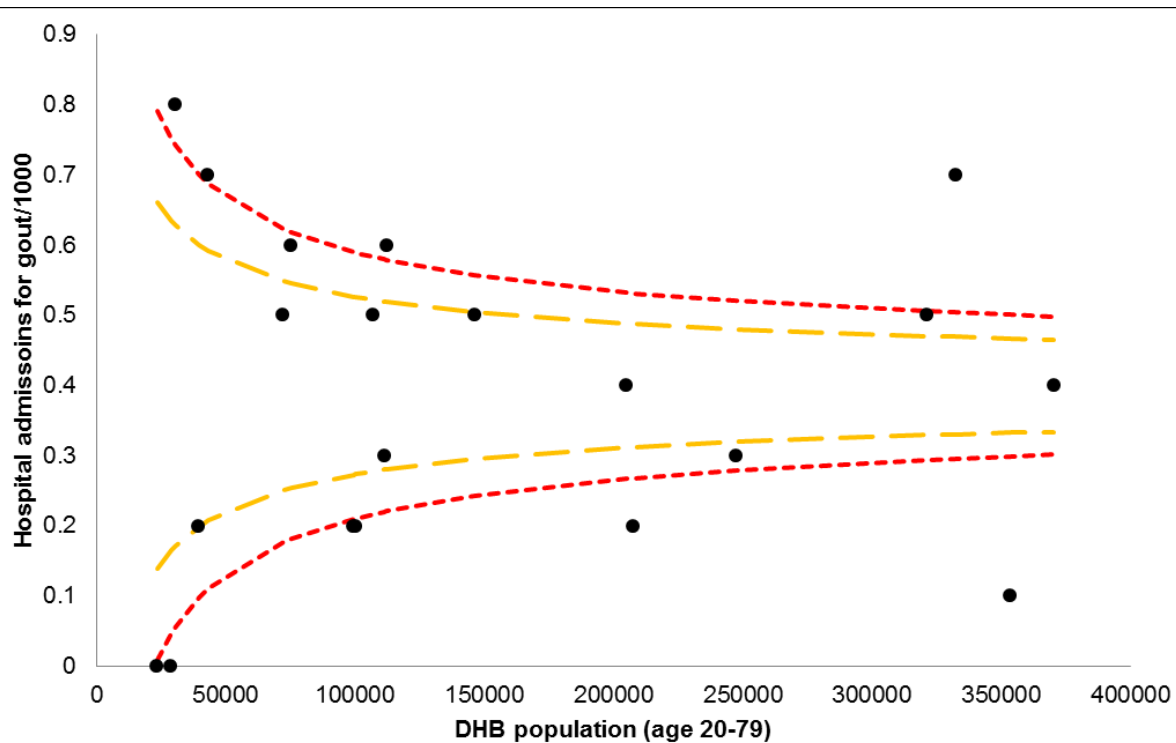
In fact, acute hospital bed days for Maori are about double the rate for non-Maori. Contributory measures can be analysed to see if the variation exists at this level. Other causes not captured by these contributory measures need to be considered. For instance, are admission rates higher in Māori, or are Māori sicker than non-Māori by the time they get to hospital? Are Māori treated differently when admitted? Is it a problem with communication and health literacy? Or cultural competency? It is important to get a full understanding of the problems and potential solutions, and the community and health care users should be asked for their views and suggestions.

8.4. Funnel plots

Funnel plots look at the rate of something and work out how much variation is expected at two or three standard deviations, given the size of the population (greater variation is expected in smaller populations). By plotting rate against population size, funnel plots show whether variation is statistically meaningful. Funnel plots are increasingly used in health services. They can be seen in analysis of clinical registries and clinical audits, as well as in national reporting programmes.

The example in Figure 4 shows the rate of gout hospitalisations against the size of DHB populations (aged 20–79). It places two lines above and below the national average, at two and three standard deviations respectively. This shows how much variation from the average you might expect from DHBs with a given population size. A funnel plot is another representation of a bar chart, showing confidence intervals around the national mean. Each dot represents a DHB. High or low results (ie, outside the ‘funnel’) may need further examination to understand their causes.

Figure 4: Hospital admissions for gout/1,000 population



See: http://handbook.cochrane.org/chapter_10/10_4_1_funnel_plots.htm for more information about funnel plots. An easy-to-use funnel plot generating tool for excel is available from http://www.kurtosis.co.uk/technique/funnel_plot.htm.

8.5. Balancing measures

Balancing measures track whether a perverse effect has occurred. For example, length of stay and readmissions may work as balancing measures to each other because reduced length of stay may be achieved by inappropriately early discharge. This early discharge might then increase readmissions; whereas, readmissions may be reduced by keeping patients in hospital for too long. The best way to identify balancing measures is to ask those delivering and using services for their views, and by analysing data.

9. Other Quality Improvement Initiatives

9.1. Local reporting

A King’s Fund review reported that boards of high-performing hospitals are more likely to be familiar with measures of quality used, be familiar with their hospital’s external ratings of performance on quality, and regularly review a quality dashboard (Alimo-Metcalfe, King’s Fund, 2012). For these reasons, it is recommended quality improvement activity is reported to the alliance on a monthly basis. The use of quality dashboards or other graphical formats makes it easy to streamline reporting by taking snapshots, and providing the most recent updates of relevant measures.

9.2. Dashboards

Improvement dashboards combine ongoing monitoring, quality and improvement activities, reporting and quality accounts with measures used to judge the performance of the whole health system. Dashboards should be tailored to the specific audience (eg, alliance level versus local clinical peer review forum).

Dashboards can be used to report quality to alliances and can be shared regionally and nationally for benchmarking purposes.

Local data can be presented in a graphical way in a quality dashboard. Local datasets that provide real-time information and can be monitored daily, weekly or monthly are likely to be the best data source for some contributory measures.

A dashboard allows providers to visualise key measures for the system, and clinical teams to monitor, analyse and improve quality. Dashboards are increasingly being used by DHBs to monitor their own performance, identify 'special cause' variation, find improvement opportunities and maintain quality.

The data presented in the dashboard should show run and control charts with measurement of change over time.

Appendix One: Resources for Improvement Science

<http://www.ihi.org/resources/Pages/default.aspx>

Martin LA, Nelson EC, Lloyd RC, Nolan TW. 2007. *Whole System Measures*. IHI Innovation Series whitepaper. Cambridge, Massachusetts: IHI.

<http://www.cincinnatichildrens.org/about/quality-measures/system-level-measures/default/>

<http://improvementmethodology.govt.nz/home>

<http://www.hqsc.govt.nz/>

<http://www.hqontario.ca/Quality-Improvement>

http://isrn.net/about/improvement_science.asp

<http://www.health.org.uk/sites/default/files/ImprovementScience.pdf>

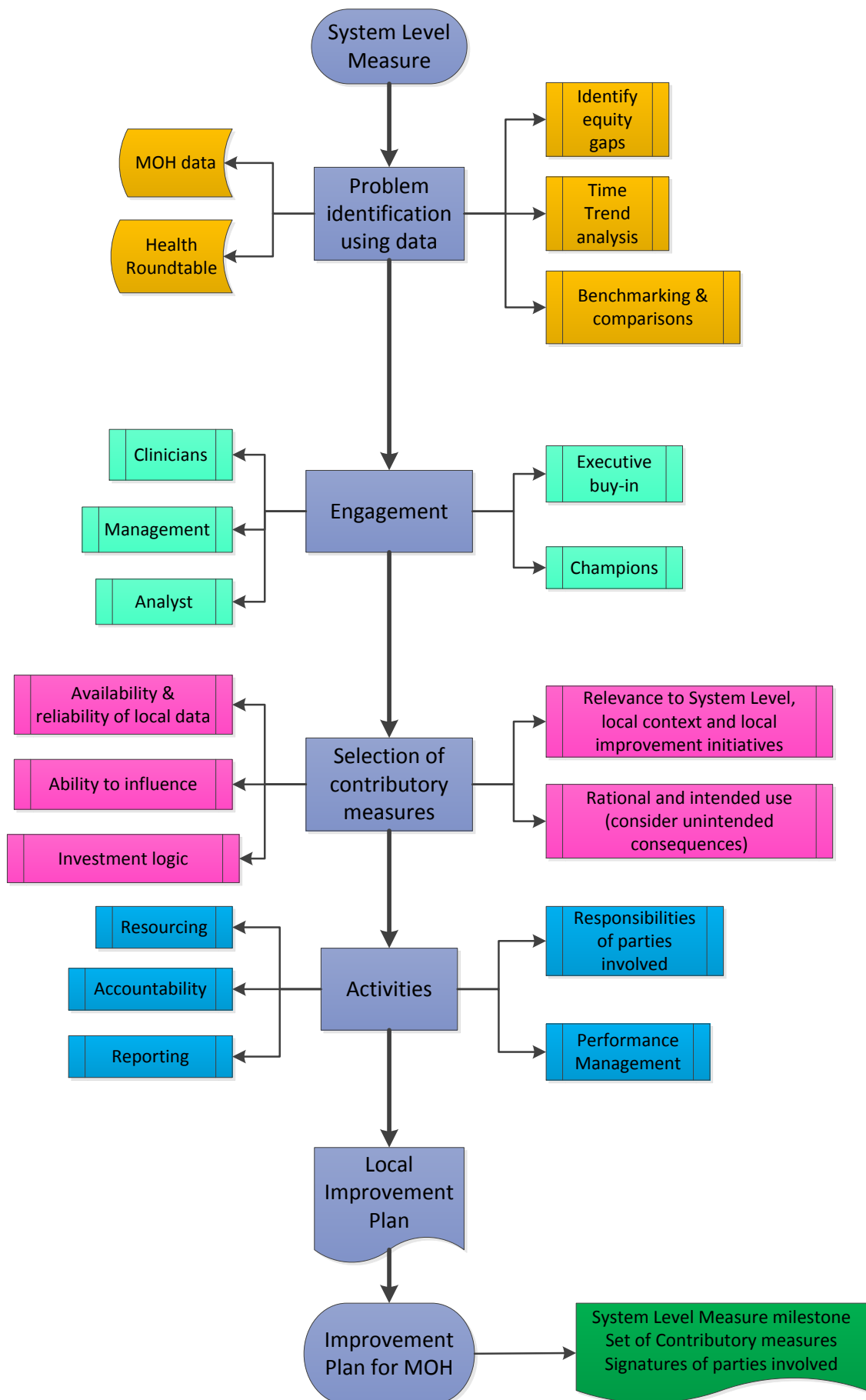
<http://koawatea.co.nz/wp-content/uploads/2016/03/6ICEGE-PAPERS-apac15final00121.pdf>

Doolan-Noble FB, Lyndon M, Hau S, Hill A, Gray J, Gauld R. 2015. *Developing and implementing a framework for System Level Measures: Lessons from New Zealand*.

http://www.apiweb.org/QP_whats-your-theory_201507.pdf

<http://qualitysafety.bmj.com/content/20/1/46.full.pdf+html>

Appendix Two: Process of Developing an Improvement Plan



Appendix Three: A How-To Guide: Lessons from Compiling a System Level Measure Drill-Down at Counties Manukau Health

Suggestions before you get started

Before you start the 'drill-down' process, consider and plan for the factors that have been identified as assisting and inhibiting development of System Level Measures.¹⁷

Assisting factors

1. Leadership at a strategic, clinical and project level.
2. A clear rationale for using the framework.
3. Data a key facilitator of the drill-downs, as it stimulates conversation and debates.
4. District alliance strategic values are reflected in the contributory measures chosen.
5. Clear ownership of the System Level Measures and associated drill-downs.
6. Engagement of stakeholders who can contribute to the System Level Measures.
7. Dedicated project team (does not have to be large!).

Inhibiting factors

1. Inability to reach consensus on which, and how many, measures to use.
2. Striving for perfection, as opposed to keeping a pragmatic approach.
3. Duplication of measures within an organisation.
4. Challenges around initial buy-in from stakeholders.
5. Large quantity of work required for successful development.

System Level Measures team

At Counties Manukau Health (CM Health), we found the following roles are required for each System Level Measure drill-down. There are roles that will be involved in each drill-down, and roles required depending on which System Level Measure is being drilled down. In many cases these roles can be performed by the same person.

1. System Level Measure champions – senior leaders who champion the System Level Measures, and lead the discussions at the executive level.
2. System Level Measure coordinator(s) – facilitate the drill-downs by managing the flow of communication and data that is required to complete a drill-down. They also contribute to and edit the narrative within the drill-down, and present the findings.
3. Data analyst – has access to the data warehouse, and extracts, analyses and presents this data in the drill-down. They also contribute to and edit the narrative within the drill-down.

¹⁷ Doolan-Noble FB, Lyndon M, Hau S, Hill A, Gray J, Gauld R. 2015. *Developing and implementing a framework for System Level Measures: Lessons from New Zealand*. (Manuscript submitted for publication).

4. Quality improvement advisor – an expert at analysing data and interpreting special-cause variations, to assist with the correct interpretation of data.

These roles resonate with the advice of the Institute of Healthcare Improvement (IHI). IHI stated that, to maximise the intended benefits of using the whole of system measures, many people need to be involved. Their white paper described four individual roles required for collecting and assembling the monthly drill-downs and dashboard, as noted by the IHI.¹⁸

1. Senior leader quality metrics champion – a senior leader in your organisation who sets goals, monitors progress and champions system-wide improvement initiatives.
2. Quality metrics leader – facilitates the drill-downs, learns from senior leaders and promotes the adoption of the learnings from comparable health systems.
3. Technical quality metrics key contact – has technical expertise to oversee the collection of data, ensures the quality of data used, and analyses and interprets the results for stakeholders.
4. Data coordinator – extracts data and submits it monthly to be used in the drill-down.

Components of a System Level Measure drill-down:

A drill-down is a report containing the data which displays your organisation's performance for the selected System Level Measure. It is accompanied by a narrative which explains this data, the contributory measures, and comments on trends and special cause variations as they exist. A drill-down will use other sources to provide comparative performances and improvement initiatives of the selected System Level Measure.

As it stands in March 2016, there are generally eight components to every drill-down at CM Health.

1. Executive summary:

- Introduces the System Level Measure
- Outlines the System Level Measure's importance and significance
- Notes the most important findings
- Names people who have compiled the drill-down.

2. Definitions and methodology:

- States the definition used for the System Level Measure
- States other comparable or significant versions of the definition
- States the method used for calculating the System Level Measure
- States other comparable or significant versions of the methods
- Notes any inclusions or exclusions.

¹⁸ Martin LA, Nelson EC, Lloyd RC, Nolan TW. 2007. *Whole System Measures*. IHI Innovation Series white paper. Cambridge, Massachusetts: Institute of Healthcare Improvement.

Sources: In the case of national System Level Measures, this information will be provided by the Ministry of Health.

3. System Level Measure performance:

- Graphs and/or tables demonstrate longitudinal performance
- Narrative describes performance
- Notes any significant variations or special causes
- Attempts to explain performance, especially in cases of significant variation.

Sources: In the case of the national System Level Measures, the data in dot point one will be supplied by the Ministry of Health.

4. Contributory measure performances:

- Graphs and/or tables demonstrating longitudinal performance for each contributory measure. The contributory measures will be different depending on the System Level Measure. Contributory measures may include specific clinical conditions, measures of post-discharge and transitions of care, social determinants, or counter measures (eg, length of stay and acute hospital readmission). However, an equity lens across demographic groups should always be reported
- Narrative describes performance, causes for any variance, and the contributory measure's relationship to the System Level Measure.

Sources: In the case of the national System Level Measures, the Measures Library will contain the contributory measures for each System Level Measure. The alliances will use the Measures Library to choose the contributory measures appropriate to their local context.

5. National and international comparisons of System Level and contributory measures' performance:

- Data/graphs/tables are presented that demonstrate the performance of other comparable organisations (including other DHBs) for the System Level or contributory measures described in previous sections 3 and 4
- Narratives accompany each data set.

Sources: Literature should be searched. Ministry of Health or Health Roundtable are helpful comparative aids.

6. Initiatives that address the System Level and contributory measures:

- Past, present or future initiatives that address the System Level or contributory measures are described.

Sources: Experts in your organisation should be aware of initiatives that improve or affect the System Level and contributory measures. Your organisation's website may be helpful, as well as its annual strategy documents.

7. National and international initiatives to address the System Level and contributory measures:

- Past, present or future initiatives that address the System Level or contributory measures from comparable organisations are described.

Sources: Literature will be helpful, as well as comparative organisational websites. Use contacts that you or your colleagues have in other organisations. Collaboration with other DHBs, PHOs and organisations such as the Health Quality and Safety Commission is encouraged.

How to compile a successful System Level Measure drill-down

As part of an evaluation into the System Level Measure drill-down process, a Master of Public Health student interviewed eight individuals who were part of the development and/or implementation of System Level Measure drill-downs at CM Health. The purpose of the interviews was to define a 'successful' System Level Measure drill-down and a 'less successful' System Level Measure drill-down.¹⁹ Analysis of eight transcripts suggested the following, which may be helpful to consider when compiling your organisation's drill-downs.

A 'successful' System Level Measure drill-down has:

1. quality data, which is reliable and readily available
2. a clearly defined and agreed-upon definition of the System Level Measure, as well as the contributory measures
3. taken a collaborative approach to compile the drill-down, which includes having a proactive expert team on the given measure, a governance group to consult with, strong leadership championing the drill-down, and coordinators facilitating the drill-down process
4. an in-depth analysis of the data, including a 'deep-dive' into the data set (to an NHI level if required), and uses literature on the topic to enhance the analysis
5. identified outcomes which could be areas of improvement, the discontinuation of ineffective initiatives, the stimulation of conversations surrounding this topic, or act as a new source of reporting, and/or
6. has the ability to evolve, so the drill-down continues to reflect the organisational strategy and priorities.

¹⁹ Cullinane F. 2016. *Evaluating System Level Performance Measures in Healthcare Organisations*. Unpublished Master's thesis. University of Auckland.

A 'less successful' System Level Measure drill-down has:

1. poor quality data which is unreliable, low in quantity and poorly presented
2. disagreements over, confusion of and limitations pertaining to the definitions and methodologies used
3. excluded appropriate stakeholders whose expertise or feedback would have enhanced the drill-down
4. a superficial analysis which has too many contributory measures, not enough contributory measures, poor analysis or is not reported at a system-level, and/or
5. no action points, as the measure cannot be improved, cannot be acted upon, is plagued by politics or requires extensive timeframes.