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VIEWPOINT

The measurement of New Zealand health care

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Abstract

The effective and economical measurement of the quality and safety of health and disability services in New Zealand is of signal importance. The Health Quality and Safety Commission has overseen the introduction of an architecture of interacting measures. These include quality and safety indicators, or QSIs, which are whole-system measures; quality and safety markers, or QSMs, which are targeted measures of quality and safety interventions comprising process and outcome measures in sets; and the New Zealand Atlas of Healthcare Variation, which illustrates the differences in the health care received in different regions and by different groups of patients within New Zealand.

Why measure, why publish?

It is essential for the Health Quality and Safety Commission (the Commission) to demonstrate both the fact of change and its effects. This imperative is recognised internationally and was famously expressed in 2008: 'We can only be sure to improve what we can actually measure.'[1] Additionally, in an age less deferential to health care professionals, the risk of reduced trust is countered by increased transparency. Further, increasing evidence suggests that appropriate publication of data may, by itself, drive improvement.[2] However, the effective and economical measurement of the quality of health and disability services is not easy.

In response to the Ministerial Review Group report ('the Horn report'), Section 59B was added to the 2000 New Zealand Public Health and Disability Act on 9 November 2010.[3] This new legislation called for the formation of the Commission, and amongst other responsibilities gave the Commission a new duty, 'to determine quality and safety indicators . . . for use in measuring the quality and safety of health and disability support services.'[4]

In the last 3 years the Commission has overseen the introduction of an architecture of interacting measures to meet this requirement. The interrelationship between these measures is complex and mutually supporting, akin to that of the pieces in a game of chess—on their own, individual measures, and even sets of measures, provide limited information: it is the overall picture that matters. Thus our measurement architecture is designed to present a dynamic and comprehensible picture of the quality and safety of our fluid, multilayered system.

There are diverse approaches to the measurement of quality and safety internationally. Each context has specific constraints, demands, and opportunities. The architecture described here incorporates valid and reliable measures pertinent and useful to the New Zealand (NZ) system. We have drawn upon the system's unique strengths—such as centralised, robust data collections and the single-payer system.

Other jurisdictions have measurement frameworks that reflect local conditions. For example, the NHS in England, which in the 2000s adopted an approach of quasi-markets with regulation and central targets, combined process measures with performance thresholds with a complex aggregation of outcome data used as a "risk spotting" tool to trigger regulatory intervention.[5] Scotland, in contrast, emphasised collaboration and quality improvement and so adopted an "information for improvement" approach.[6]

Meanwhile, in the Netherlands, the Health Care Performance Report is designed to allow the Health Minister to give an account for the performance of the Dutch Health System, in line with the 2008 Tallinn Charter of which the Netherlands is a signatory.[7] The point is that context matters.[8] While there are lessons to be learned, jurisdictions cannot just take each other's frameworks and apply them. Each measurement architecture must start with the specific, local political, economic, systemic, and cultural circumstances, and build from there.

Here we describe three sets of measures that serve different purposes. Quality and safety indicators (QSIs) are whole-system measures designed to capture a broad and deep insight into the health of NZ health care over time.[9] Quality and safety markers, or QSMs, are a targeted subset of measures to assess the use and effectiveness of the Commission's evidence-based interventions.

The New Zealand Atlas of Healthcare Variation captures differences in the health care received in different regions and by different groups of patients within the country, and informs the debate on optimal approaches to the delivery of health care services.

In this paper we provide an overview of these three sets of measures and explain their rationale.

Quality and safety indicators (QSIs)—capturing the big picture

The current set of QSIs were selected with wide sector and consumer consultation underpinned by an expert advisory group. Trying to measure everything would risk achieving nothing. Instead, we have aimed for a focussed, achievable set of meaningful measures that are valid, reliable, feasible, and economical to collect.

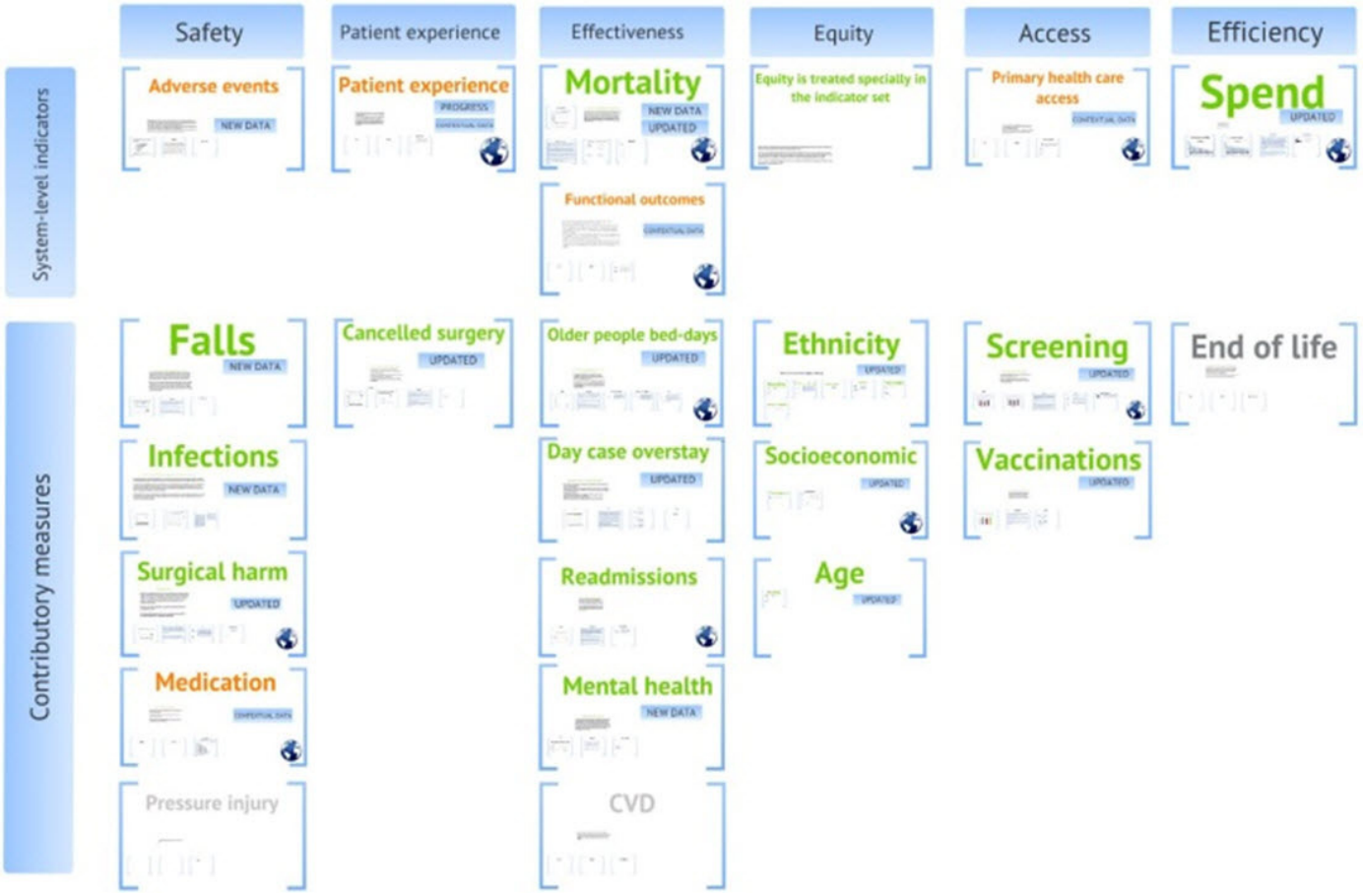
The QSIs address the six aims in the Institutes of Medicine's seminal quality manifesto *Crossing the Quality Chasm (*2001): safety, patient experience, effectiveness, equity, access, and efficiency (see figure 1).[10] Improvement over time in a QSI represents progress toward making our health system better, safer, fairer, more effective, more inclusive, or more efficient, and in improving patients' experience of our services.

Thus the QSI architecture measures progress toward the NZ Triple Aim: the simultaneous pursuit of three dimensions:[11,12]

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

Improving the quality of our system and making it safer is a journey. Although targets and thresholds may well serve as signposts along the way, the Triple Aim is ongoing and sets no target to hit or threshold to meet.

Figure 1. Health quality and safety indicators, June 2014



Source: Health Quality and Safety Commission. Health Quality and Safety Indicators June 2014, http://prezi.com/dbzsrwws2s45/health-quality-and-safety-indicators-june-2014/ – click to view enlarged image

The QSI set includes broad system level indicators, like amenable mortality, DALYs (disability adjusted life years) lost to adverse health care events, measures of patient experience (the Commission has designed a new 20-item experience survey that began running in all district health boards (DHBs) quarterly in August 2014), and measures of primary health care access. These indicators of what we have achieved are put into context by including information on health care spend to provide some assessment of value. (For further detailed information on the QSI set see the Commission's website http://www.hqsc.govt.nz/our-programmes/health-quality-evaluation/.)

Illustrative quality and safety indicators

Amenable mortality—this is a whole-of-system indicator that measures the number of deaths that could potentially be avoided given timely access to health care, by matching an updated list of condition-intervention pairs to 'premature' deaths—i.e., conditions for which recognised interventions known to reduce mortality by over 30% are matched to deaths of under-75s from those conditions. This QSI is one of the best measures we have to show the effect of healthcare on mortality, while minimizing the influence of broader causes such as poverty, inequality and infrastructure. It is more powerful than life expectancy, and though the indicator is a classic 'can opener'[13] (it raises questions without clear answers), it provides useful international comparison and information about changes in

health care mortality over time. Amenable mortality is inexpensive to construct and has obvious relevance. Despite limitations of timeliness due to delays on reporting of mortality by cause, when paired with healthcare spend (see below) it provides a useful measure of how health expenditure is providing value for money.

We have greater confidence in amenable mortality than in hospital standardised mortality ratios (HSMRs). HSMRs compare hospitals by comparing the number of people who die in them, 'correcting the figures . . . for factors outside the hospitals' control—severity of disease, age, sex, route of admission (emergency or elective) and comorbidities'.[14] Their attraction is in relative ease, convenience and cheapness of construction, and apparently clear meaning, importance and moral weight. However, controversy over the measure has polarised clinicians and statisticians in the UK.

There are misgivings over the adequacy of attempts to adjust the indicator for case mix and for bias arising from institutional coding practices and lack of depth in coding. Thus there is considerable doubt over the ability of HSMRs to provide truly meaningful information.[15] In the UK, reservations over these issues have led to mistrust by clinicians of judgments formed on the basis of HSMR ratings. Though not suitable to be a single definitive or summary measure of quality, or to rank hospitals, or calculate so called 'avoidable' deaths, we will nevertheless include a refined version of the measure (the version used encompasses all deaths in and out of hospital within 30 days from admission, for example). The intention is the HSMR be understood and interpreted in its proper and most rewarding capacity — to track changes in trends over time as one within a suite of indicators that support a quality improvement framework.

Spend: health care cost per capita/GDP (using purchasing power parity dollars to allow international comparisons)—in absolute terms NZ's current health care cost per capita is comparatively low, just above the OECD average. Only some recession-hit countries, former Soviet Bloc countries recently acceded to the European Union, and a few low- and middle-income economies in the OECD list spend less per head on health care.

Given the health outcomes achieved in NZ this points to a very efficient system. However, as a proportion of GDP, our health care expenditure is relatively high at 10.3%, and has risen faster than the OECD average every year since 1999. Money spent on healthcare is unavailable for other determinants of health—addressing, for example, two of the three factors Asher has called the 'triple jeopardy' for the health of NZ children: poverty, poor access to primary care, and cold, damp, overcrowded housing.[16]

Thus, while our health care is relatively inexpensive, NZ is less able than many countries to easily increase what it spends. International experience shows that more expenditure does not necessarily result in better outcomes but, equally, low spend does not necessarily equal greater efficiency.[17]

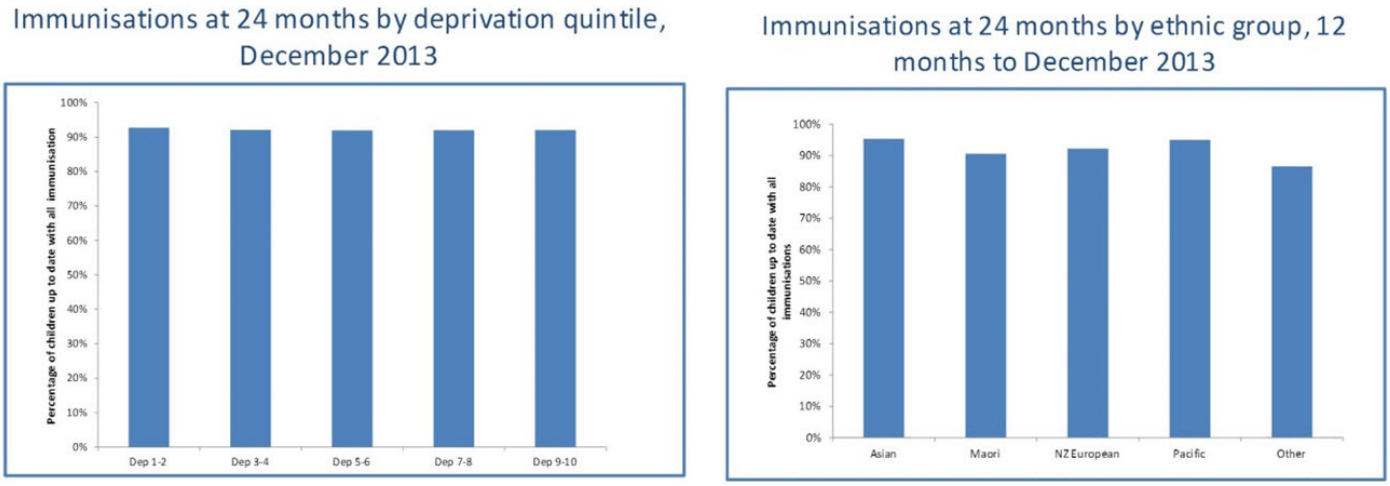
Occupied acute bed days for people aged 75 and over who had two or more emergency admissions in a financial year per 1000 population—this contributory indicator is demonstrated in England and Scotland[18] and is constructed from routine National Minimum Dataset (hospital events) data. It measures the effectiveness of the integration of primary, acute, and community-based care. Poorly integrated care results in people, notably older people, not receiving the care they need when they need it, and where they need it—in the community. Consequently, they may fall through the gaps until the most urgent, intensive and expensive care—an acute admission to hospital—follows. UK estimates suggest that England-wide elimination of wasteful variation in this measure could release as much as NZ$4bn (£2bn: equivalent to 2.5% of the NHS budget) back into the NHS.[18] Further, once admitted, this group is most at risk of in-hospital falls and hospital-acquired infections—major focus areas for the Commission—so the potential savings in financial and human terms are considerable.

The good news: NZ has relatively low levels of occupied bed days for this indicator, compared, for example, with England: NZ average for 2010/11: 1260 (minimum: 823; maximum: 1657), v England average for 2010/11: 2020 (min: 854; max: 5550).[19] Nevertheless, there is still more variation between regions than there should be. If the entire country achieved the rate seen in the best areas, the potential savings are conservatively estimated at NZ$20 million.[19,20]

Immunisations—This QSI measures the number of 2-year-old NZ children who have received the complete set of age-appropriate vaccinations on the National Immunisation Schedule: measles, mumps, rubella, diphtheria, tetanus, whooping cough, polio, hepatitis B, pneumococcus and *Haemophilus*. Combining two aims, this indicator sheds light on the effectiveness of public health programmes and the level of access to primary care services. Thanks to the National Immunisation Register and national initiatives, immunisation rates in NZ have risen markedly in the last several years, from 67% in 2007, to around 80% in 2009 (still well below the 2009 Australian rate of 92.2%), to the current rate in December 2013 of about 92% (Australia's 2014 rate is 92.6%).[21–23]

The immunisations QSI demonstrates how equity is not a measure that sits apart from other indicators of health in the country. QSIs are stratified to show variations between different socioeconomic and ethnic groups. In 2007 the national immunisation rate for Māori children was just 63%.[24] Pleasingly, in December 2013, that had increased to 91%. Disparities in immunisation coverage have reduced to the point where there is now little if any socioeconomic and ethnic variation across the country (see Figure 2).

Figure 2. Immunisations at 24 months of age, by deprivation quintile and ethnic group, 12 months to December 2013



Source: Health Quality and Safety Commission. Health Quality and Safety Indicators June 2014. http://prezi.com/dbzsrwws2s45/health-quality-and-safety-indicators-june-2014/ – click to view enlarged image

Primary health care access—this measure is still in development. New Zealand has relatively high rates of prompt access to GPs (second equal behind Switzerland, the UK and France). However, the proportion of patients reporting difficulties accessing out-of-hours primary care is 46% (this is disconcertingly high, though the median for the 11 OECD countries compared is 52%).

The difference between below-average and above-average income groups reporting difficulty accessing out of hours care is 22 percentage points. This is the largest income gap in the Commonwealth Fund's comparison chart. Further, 23% of those on below-average income who had a medical problem did not visit a doctor because of the cost. This is second only to the US at 39%, more than double the median, and compares very poorly with Australia at 14%, Canada at 7%, and the UK at 1%.[25]

This is only one indicator of equity, but one that has changed little since 2001. Other researchers have found financial barriers to needed primary care exist for a substantial subgroup of New Zealanders,[26] and it is not satisfactory to have an agency like the Commonwealth Fund saying (with at least some justification): 'The United States and New Zealand are last and second-to-last, respectively, on the equity domain.'[25]

QSMs—specific measures for specific interventions

The Commission's programmes include evidence-based interventions to assist New Zealand's DHBs to address specific forms of preventable patient harm. For each of these interventions the Commission has devised a set of quality and safety markers (QSMs) to measure their implementation and impact. There are currently five sets of QSMs comprising 23 individual measures.

Implementing QSMs has numerous challenges. The markers must engage clinicians, minimise perverse incentives, and minimise misinterpretation—those who gather, interpret and act on the data must be in no doubt as to their purpose and value. QSMs derive their shape from Avedis Donabedian's 1966 model of the organisation of health care provision: structure; process; outcome.[27]

When an evidence-based improvement practice (that is, a process) is introduced, measuring its uptake provides straightforward information: case mix is irrelevant and more is unequivocally better. However, measuring process alone runs the risk of generating gaming behaviour to meet thresholds for uptake, and also of failure to recognise nonetheless important improvement that might miss the target level.[28,29]

On the other hand, outcomes are typically difficult and expensive to measure and even when easily measurable are subject to confounding (notably by differences in case mix) and to questions of causality.

QSMs therefore combine one or more process measures (and/or occasionally a structural measure) with a relevant outcome measure. The aim is not to measure overall outcome, but rather to choose one element that can provide an indication of the effectiveness of the intervention. In this way QSMs measure the success or otherwise of the introduction of the intervention to improve process, and then show the associated reduction of the selected aspect of harm, or improvement in the selected element of quality of health care.

An easily measurable outcome is chosen that would be expected to move (more or less) in parallel with the overall outcome we are trying to improve. For example, rates of fractured neck of femur, though only one category of harm from falls, provide a highly illustrative outcome with large enough numbers that can be measured relatively easily.

Not all institutions can ensure they are filled with Hood and Bevan's saints or honest triers[29]—those who will either voluntarily draw attention to shortcomings or at least not attempt to disguise them. Use of a measure of outcome in combination with a measure of process connects the measurement of practice to what our health care is actually trying to achieve—better outcomes. This disincentivises gaming and shows what is really happening with the actual problem—there would be little point in misreporting levels of a process measure when the measure of the outcome we're trying to influence suggests nothing has yet improved. Another feature of the QSMs is that they are reported against the

baseline of each institution. This allows the emphasis to be on improvement rather than on the absolute rate.

Aggregated, QSMs monitor progress in our quality improvement projects and give a picture at a national level of progress toward our core goal: care that is safer, better and more affordable (see Figure 3).

Figure 3. How outcome contextualises process

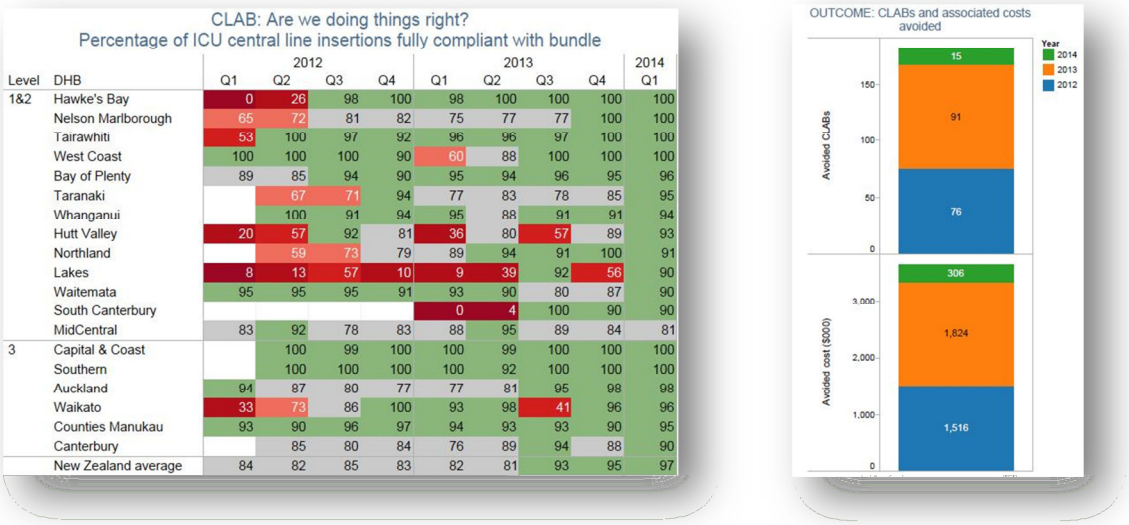
Process \ Outcome	+	-
+	The desired result—target is met for process and improvement is shown in outcome. The intervention seems to be working, but are there confounders?	"Hitting the target and missing the point": process has improved but there is no sign of the desired outcome arising. More thought needed to understand what is happening.
-	Outcome improved but not process—this could represent regression to the mean for the outcome measure but should prompt the question: is something else happening? More work needed.	No improvement in process or outcome. More work needed. (No excuse not to change.)

Illustrative quality and safety marker

The central line associated bacteraemia (CLAB) QSM—One process measure is the percentage of intravenous catheter insertions in hospital where the recommended insertion bundle of best practices is used.[30–32] The other process measure is the percentage of insertions where the line maintenance bundle of best practices is used correctly. The outcome measures are the number of CLAB cases reported against central venous line days, and the associated costs. DHBs voluntarily collect process and outcome data and report them centrally monthly. The QSM measures national adoption over time of recognised processes, and then demonstrates benefit over time in terms of reduced harm and dollars saved (see Figure 4).

http://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2015/vol-128-no-1413/6515

Figure 4. Public reporting of process and outcome measures for central line associated bacteraemia (CLAB) intervention



CLAB: Are we doing things right?
Percentage of ICU central line insertions fully compliant with bundle

Level	DHB	2012 Q1	2012 Q2	2012 Q3	2012 Q4	2013 Q1	2013 Q2	2013 Q3	2013 Q4	2014 Q1
1&2	Hawke's Bay	0	26	98	100	98	100	100	100	100
	Nelson Marlborough	65	72	81	82	75	77	77	100	100
	Tairawhiti	53	100	97	92	96	96	97	100	100
	West Coast	100	100	100	90	60	88	100	100	100
	Bay of Plenty	89	85	94	90	95	94	96	95	96
	Taranaki		67	71	94	77	83	78	85	95
	Whanganui		100	91	94	95	88	91	91	94
	Hutt Valley	20	57	92	81	36	80	57	89	93
	Northland		59	73	79	89	94	91	100	91
	Lakes	8	13	57	10	9	39	92	56	90
	Waitemata	95	95	95	91	93	90	80	87	90
	South Canterbury					0	4	100	90	90
	MidCentral	83	92	78	83	88	95	89	84	81
3	Capital & Coast		100	99	100	100	99	100	100	100
	Southern		100	100	100	100	92	100	100	100
	Auckland	94	87	80	77	77	81	95	98	98
	Waikato	33	73	86	100	93	98	41	96	96
	Counties Manukau	93	90	96	97	94	93	93	90	95
	Canterbury		85	80	84	76	89	94	88	90
	New Zealand average	84	82	85	83	82	81	93	95	97

Source: Health Quality and Safety Commission. QSMs January – March 2014. http://www.hqsc.govt.nz/our-programmes/health-quality-evaluation/projects/quality-and-safety-markers/qsms-january-march-2014/

Harvesting not collecting

The burden and cost of data collection is a key criterion for QSI and QSM selection because, in the words of Bevan and Hamblin, 'Using resources for performance management, rather than delivery, of health care can only be justified if the former has an influence on the latter.'[33] New Zealand has rich, unified, routine data sources and the ability to link datasets, thanks to a single payer system, the Ministry of Health and in some substantial part to work in the mid-2000s of the Commission's predecessors: EpiQual (the National Health Epidemiology and Quality Assurance Advisory Committee) and QIC (Quality Improvement Committee). This reduces the burden of collection. Where possible, QSM measures are selected so data can be harvested from these routine, extant sources rather than collected de novo. Out of 23 measures only 3 required specific collection—two process measures for falls and the process measure for surgical checklist use.

Publication

A growing body of evidence supports the view that thoughtful, careful and consultative publication of performance measures is both in the interests of transparency and has powerful effects on performance improvement.[2,34-44] There are compelling arguments to focus on performance at relatively aggregated levels rather than at the level of individual practitioners. The Commission also takes considerable care to consult with providers before publishing data (to allow them to question or verify their reliability) and to provide interpretative and contextual information with the published measures and indicators.

http://www.nzma.org.nz/journal/read-the-journal/all-issues/2010-2019/2015/vol-128-no-1413/6515

The New Zealand Atlas of Healthcare Variation

Regional variation in the provision of health care has been measured in the US since 1996 when Professor John E 'Jack' Wennberg published the first iteration of the seminal Dartmouth Atlas of Health Care.[45] By 2011 the *BMJ* felt able to write, 'It is not wholly fanciful to compare the Dartmouth Atlas of Health Care with *On the Origin of Species* . . . Darwin's book showed our descent from apes. The atlas exploded the belief that medicine is based firmly on science.'[46]

The New Zealand Atlas of Healthcare Variation, first published in 2012, is one of few in the world (the Dartmouth atlas has expanded dramatically, the NHS atlas was published in 2010, and Germany, Spain, Australia and several Scandinavian countries have atlases). It shows variation by region in health care provision in a number of important domains. (Currently 15: asthma, ambulatory sensitive hospitalisations (limited release), cardiovascular disease, demography, diabetes, falls, gout, maternity, mental health key performance indicators, opioids, polypharmacy in older people, suicide (limited release), surgery—grommets and tonsillectomy in children, trauma, and well child.)

If medicine is not based firmly on science, then on what? Wennberg showed that much US health care is, in fact, driven by supply, and that the provision of some kinds of care varies up to ten-fold by area for no reason related to demography, resource or case mix. Wennberg described three categories of care: effective care, when an unequivocal choice of treatment is provided; preference sensitive care, where two or more equivalent, effective treatments are chosen from by physician and patient together; and supply sensitive care, where, rather than need, infrastructure and capacity determines how much treatment is provided.[47] The Dartmouth Atlas has consistently demonstrated this relationship in the US—in regions where there are more intensive care unit beds, more patients will be cared for in the ICU; more specialists result in more visits to specialists; and the more computed tomography (CT) scanners available, the more CT scans patients receive.[47]

Variation can be warranted, when it reflects differences between patients—in the mix of conditions with which they present, in their values and preferences and needs. Unwarranted variation does not reflect such differences, but instead reflects other drivers. The one thing that is obvious—once differences in case mix and the values and preferences of patients have been eliminated, the extremes of a ten-fold variation in the rate of providing a service cannot both be correct.

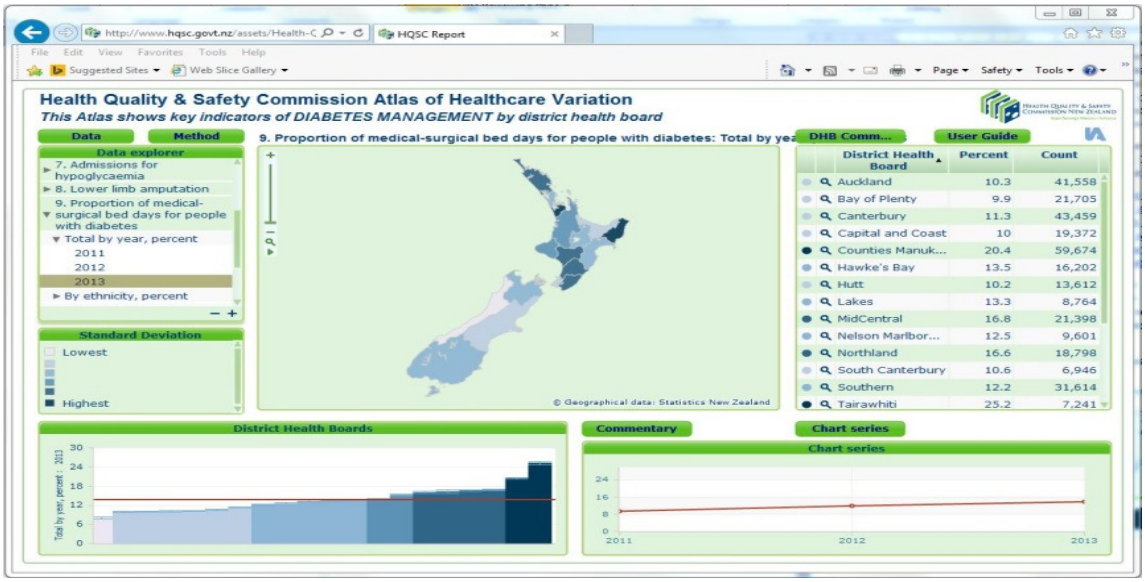
New Zealand's own Atlas of Healthcare Variation shows, for example, the numbers of medical and surgical bed days occupied by people with diabetes varies up to three-fold for no clear reason. In one DHB in 2013, a quarter of total medical and surgical bed days was devoted to people with diabetes (25.2%); in another the figure was 8.1%.[48] The national population prevalence of diabetes is 5.6%. Can this variation be explained by differences in patient preference or need? If not, what is an appropriate rate of bed occupancy for diabetes sufferers in a DHB with a given prevalence?

Atlas data and the questions they raise are fascinating for many reasons, but in the end, reducing unwarranted variation in favour of a greater national consensus on the appropriate management of common conditions will lead to better, more evidence-based care, provided more consistently at better value for money. The diabetes data are derived from considerable numbers of patients and thus differences represent considerable costs. Further, the number of people with diabetes in New Zealand is expected to double in the next 20 years—what can be done now to reduce variation, minimise waste, and maximise well-targeted care for this group in the future?

The New Zealand Atlas has unique strengths in that it uses, in the main, national data collections such as National Minimum Dataset figures from the Ministry of Health, and, for example, the Pharmaceutical Collection for polypharmacy and antipsychotic use. The information is presented in a browser in a dashboard comprised of an interactive map of New Zealand, with bar chart and results

table, accompanying statistical analysis and methodology, double map displays to explore correlations between measures (with automatic regression analysis), and feedback from DHBs (see Figure 5).

Figure 5. Example domain of NZ Atlas of Healthcare Variation (Diabetes, proportion of medical-surgical bed days single map)



Source: Health Quality and Safety Commission. NZ Atlas of Healthcare Variation. http://www.hqsc.govt.nz/assets/Health-Quality-Evaluation/Atlas/diabetesSF/atlas.html

Another example of significant variation the Atlas shows us is the rate of antipsychotic use in people aged 65 years and over. The mean here for quarter 4 in 2011 is 24 per 1000. However, in one part of the country, 32 out of 1000 older people received this medication, and in another, 18—a variation of nearly two-fold unexplained by difference in disease rates. Even at low dose, atypical antipsychotics can have significant side effects, there is uncertainty over their efficacy, and evidence of a potential for abuse.[49,50] Why is this variation occurring? What role do patient expectations and community experience play? Does use of these medicines need reviewing in some regions? Thus the Atlas presents questions it is incumbent upon health care professionals and providers to answer.[51]

If you build it, they will come

It is perhaps because of the combination of the gravity of the issue of variation they show, with no explanation for its occurrence or defined objective for improvement, that atlases are sometimes ignored and have gathered their discontents. They are not performance measurement but quality improvement tools, and responding to the information they provide is optional. Appleby et al[52], Mulley[53] and Schang et al[54] have discussed the lack or failure of NHS provider action in addressing issues of variation that the UK atlas raises. How do we make the information useful rather than interesting? How do we make the leap from learning to practice?

In the unique, small, and intimate context of New Zealand health care, achievable, targeted interventions can affect practice and patterns of care across whole districts, even the whole country. Atlases challenge the healthcare community to address important questions and perhaps provide

objectives for improvement through the development of consensus. Awareness of variation fluctuates dramatically around the country both conceptually and in relation to its occurrence between regions.

Our first task, therefore, is to raise awareness of the Atlas and improve the sector's understanding of different types of variation. The Commission has produced a set of targeted resources to help physicians and primary health organisations (PHOs) unpack the wealth of information the Atlas provides, and start sorting through its implications for their own particular regions. One of these resources is *Variation and improving services: case studies and key questions*, a report produced by Sapere Research Group, which works through analyses of variation in polypharmacy and in grommet operations and what can be done at the PHO level to address variation in these areas. The Commission has also produced literature reviews, and guides to analysis and interpretation of the variation the Atlas shows in order to address the widely differing contexts of different PHOs.[55–57]

(http://www.hqsc.govt.nz/our-programmes/health-quality-evaluation/publications-and-resources/publication/1558/).

A recent addition to the Atlas, and a worldwide innovation in variation work in the process of roll-out, is Find My Patients, developed under the auspices of the Atlas steering group, headed by Nigel Millar, chief medical officer at Canterbury DHB. On the Atlas page for a given domain appears a button marked "Find My Patients", which explains to the user how to access pre-defined queries in their patient management system (PMS). In this way the user can move from looking at an atlas describing variation nationally to running a query that generates a list of their patients who may contribute to that variation and benefit from review.

In New Zealand, for example, on average, 2 in 5 people with gout regularly received the first-choice, long-term urate-lowering therapy, allopurinol. Regular allopurinol use was in fact inversely related to indicators of poorly controlled gout—nonsteroidal anti-inflammatory drug use, colchicine use, and hospital admission. Although gout affects up to one-third of Māori and Pacific males over 65 years, variation between ethnic groups shows Pacific peoples receive the least allopurinol.[58]

GPs who see from the Atlas that their district is less likely to provide a given treatment for gout can click Find My Patients to run a query in their PMS identifying specific patients in their practice who might be contributing to this variation and who may profit from review of their treatment. So, patients who may benefit from a treatment can be offered it, simple failure in the delivery of optimal care is addressed, and national variation can conform more closely to patient need and preference.

Find My Patients is fully functional in approximately 90% of New Zealand GP PMS, including MedTech (Evolution and 32) and MyPractice. It is being actively promoted via PHOs.

Conclusion

Just as in the game of chess, it is the relative positioning and interrelationship between measures that defines the overall position. We have described a three-tier system of measurement, based upon international state of the art exemplars, that is tailored to the unique constraints and opportunities of the New Zealand context.

QSIs address national outcomes or processes that are internationally comparable, clearly important and well understood. The country's performance can be monitored and improved over time. QSMs are smaller, more focussed measures, used to monitor and drive improvement in targeted programmes and projects over defined periods of time. Together, these measures form an overarching architecture that provides a dynamic, practical and affordable picture of the quality and safety of healthcare in New Zealand. The Atlas demonstrates variation in the provision of health care services over the country, and poses questions about the ideal rates of key health care services.

Replacing idiosyncratic, provider-driven variation with variation that reflects differences between patients, such that people receive treatments that are effective and address their real needs and preferences, is perhaps the single most important requisite to the provision of effective and affordable health care.

Competing interests: Nil.

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CT pulmonary angiography and pulmonary embolism following 5809 primary joint arthroplasties

Charlotte Allen, Richard Seinge, Rod Maxwell, Dilraj Thind

Controversy surrounds prevention, detection and clinical relevance of pulmonary embolism (PE) following arthroplasty in orthopaedic patients. In this study we aimed to review the rates of computer tomography pulmonary angiography (CTPA), PE and fatal PE following total joint replacement. The overall PE rate was 112/5809 (1.93%): 38/3473 (1.1%) and 74/2336 (3.5%) following total hip arthroplasty (THA) and total knee arthroplasty (TKA), respectively. Two deaths from PE occurred, both after TKA, a procedural mortality rate of 0.086%; the overall mortality rate was 0.034%. The rate of CTPA requests increased for the initial 7 years as did the rate of PE, in the last 2 years both rates fell.

The measurement of New Zealand health care ((viewpoint article))

Richard Hamblin, Gillian Bohm, Catherine Gerard, Carl Shuker, Janice Wilson, Alan F Merry

The Health Quality and Safety Commission has constructed an architecture of measurement designed to check up on the health of the New Zealand health care system. It is crucial to measure the quality and safety of our health care because ‘we can only be sure to improve what we can actually measure.’ This architecture is comprised of three sets of measures that inter-relate like the pieces in a game of chess. The first set are known as QSIs, or quality and safety indicators, which capture the big picture in areas of concern in our health care, like safety, effectiveness, equity and the patient experience.