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Final Report: Performance indicators used internationally to report publicly on healthcare organisations and local health systems.

October 2013

AIHI | AUSTRALIAN INSTITUTE OF HEALTH INNOVATION

First published in 2013 by the Australian Institute of Health Innovation, UNSW Medicine, University of New South Wales, Sydney, NSW 2052.

Printed and bound by University of New South Wales.

© Peter Hibbert, Natalie Hannaford, Janet Long, Jenny Plumb and Jeffrey Braithwaite 2013

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Report Title: Final Report: Performance indicators used internationally to report publicly on healthcare organisations and local health systems.

A report submitted to National Health Performance Authority (NHPA)

Citation: Hibbert, P., Hannaford, N., Long, J., Plumb, J. and Braithwaite, J. (2013) Final Report: Performance indicators used internationally to report publicly on healthcare organisations and local health systems. Australian Institute of Health Innovation, University of New South Wales.

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ACKNOWLEDGEMENTS

Financial support for this report was provided by the National Health Performance Authority (NHPA). We acknowledge and thank staff at the NHPA for their support and highly valuable input and suggestions throughout the project, particularly Dr Diane Watson, Chief Executive Officer, Executive Directors Bernie Harrison and Jessica Stewart, and Assistant Directors, Dr Julia Langton and Jason Boyd.

We appreciate the contributions of the international experts who gave their valuable time to the project. The experts who agreed to be named are listed below.

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GLOSSARY

AHRQ	Agency for Healthcare Research and Quality *(United States)*
AIHI	Australian Institute of Health Innovation *(Australia)*
CCG	Clinical Commissioning Group *(England)*
CIHI	Canadian Institute of Health Information *(Canada)*
CQUIN	Commissioning for Quality and Innovation *(England)*
DDKM	Danish Healthcare Quality Program *(Denmark)*
DHB	District Health Board *(New Zealand)*
HEAT	Health improvement, Efficiency and governance improvements, Access to services, Treatment appropriate to individuals *(Scotland)*
HSMR	Hospital Standardised Mortality Ratio
LHN	Local Health Network *(Australia)*
ML	Medicare Local (*Australia*)
MRSA	Methicillin-resistant Staphylococcus aureus
NHPA	National Health Performance Authority *(Australia)*
NHS	National Health Service *(England, Scotland)*
NICE	National Institute for Health and Care Excellence *(England)*
OECD	Organisation for Economic Co-operation and Development
PAF	Performance and Accountability Framework *(Australia)*
PATH	Performance Assessment Tool of quality improvement in Hospitals (*World Health Organisation Europe)*
PHO	Primary Health Organisations *(New Zealand)*
QOF	Quality and Outcomes Framework *(England)*
QSM	Quality and Safety Markers *(New Zealand)*
ROGS	Report on Government Services *(Australia)*
SC	Statistics Canada *(Canada)*
WHO	World Health Organisation

0. EXECUTIVE SUMMARY

0.1 Introduction

This report, produced by the Australian Institute of Health Innovation, University of New South Wales, examines performance indicators used internationally to report publicly on healthcare organisations and local health systems. The project has two main aims: identify international performance indicators that are used to report nationally consistent and locally relevant information on healthcare organisations (including those that measure integration and coordination of care within and between health sectors); and consult with international performance authorities to provide information on the sensitivity, specificity and utility of the indicators, indicators which have been discarded in other nations, and the learning experiences of other nations.

0.2 Background

The National Health Performance Authority (NHPA) (1) was established under the National Health Reform Act 2011 (2) as an independent agency to monitor and report on healthcare system performance in Australia. The NHPA commenced full operations in 2012, so compared with countries such as Canada and England which set up systems for public reporting of nationally consistent and locally relevant indicators around the turn of the century, Australia is a relative late-comer.

An initial set of 48 nationally consistent and locally relevant indicators were agreed by the Council of Australian Governments (COAG) for use in Australia to report healthcare organisations' performance. COAG's National Health Reform Performance and Accountability Framework (PAF) was developed to structure the indicators by healthcare organisation type (hospital/Local Health Network (LHN) and Medicare Local (ML)) and domains (see Appendix A). The PAF aligns to the existing COAG Review of Government Service (ROGS) framework, but also includes a criterion of being locally relevant to healthcare organisations. The PAF contains a number of indicator domains that require further development, for example Equity-Access indicators for special needs groups and Effectiveness-Sustainability of health care.

This project examined the range of health care indicators used in settings similar to Australia, with a particular focus on identifying indicators used internationally that are not included in the current PAF. The project provides an opportunity to learn from established, international health performance systems.

0.3 Methodology

0.3.1 **Aim 1: International performance indicators.**

Seven countries which use health care indicators in settings similar to Australia were selected for review – Canada (paying particular attention to Alberta), Denmark, England, the Netherlands, New Zealand, Scotland and the United States of America. An internet search of performance indicator systems in the seven comparator countries was performed. A scoping table detailing the indicators and in which countries they were reported was developed. A total of 528 indicators were identified; 388 of these were both nationally consistent and locally relevant and were the focus of this project.

The identified performance indicators were subjected to a detailed assessment. This included classifying them according to parameters including community/hospital/ population; structure/process/outcome; country of origin and organisation reporting the indicators; alignment/overlap to the PAF; lowest level of reporting and its Australian equivalent; evidence for their usage; most relevant PAF domain; and clinical specialty.

The health system performance frameworks for each country were reviewed together with their policy drivers and the indicators being used. Sources for this information included policy documents and consultation with experts. The domains within the performance frameworks were compared against each other, the Australian PAF and the ROGS.

0.3.1.1 Background Literature review

A literature review with the guiding question: "what can the academic research and grey literature tell us about the impact of performance measurement regimes on the quality of healthcare?" was undertaken.

0.3.2 Aim 2: Consultation with international performance authorities

Project team members used their extensive international networks in healthcare safety, quality and performance associations to establish contacts with equivalent NHPA bodies. Semi-structured telephone interviews with 13 international experts were conducted. Experts were from all countries included in the review, excluding Denmark, and including representation from the World Health Organisation (WHO) and the Organisation for Economic Co-operation and Development (OECD). The interviews contained a blend of indicator-specific and generic questions and a thematic analysis of responses was undertaken.

0.4 Key findings

0.4.1 Performance frameworks

A key finding was the support for, and the articulated benefits derived from, having a health care system performance framework. In most countries, and in the literature, it is recognised that a framework which aligns to the broader strategic goals and priorities of the health care system and is structured according to multiple domains is an important step in monitoring and reporting on healthcare system performance. It is also a key aspect of health reform over time.

A framework largely dictates the indicators that are subsequently chosen to be utilised. The PAF provides this foundation for developing and producing reports on the performance of hospitals and healthcare services in Australia.

The strengths of the current PAF are that it:

- Contains multiple performance domains such as effectiveness, efficiency, safety, access, and patient experience, which are relatively consistent with international experience and based on those originally proposed by the Institute of Medicine in the US (3);
- Contains performance indicator selection criteria; and

- Contains indicators with the capacity for stratified analysis of healthcare system performance for vulnerable groups.

These strengths allow the PAF to be confidently used into the future as a framework on which more indicators can be added. This would further the aim of supporting Australia's system of healthcare performance measurement to be increasingly more representative of the multiple dimensions of healthcare. Publishing key information on criteria underpinning an indicator (Recommendation 1), being explicit about the target population of published performance data (Recommendation 2), and learning from robust indicator development processes internationally (Recommendation 3) will further enhance the PAF's strengths.

0.4.2 **Indicators findings**

The search in seven countries found 388 indicators that fulfil the 'nationally consistent and locally relevant' criteria. Of these, 45 indicators are reported in more than one country. Some 140 of the 388 international indicators (36%) have some alignment with the Australian PAF indicators. However, a key difference is that the international indicators tend to be more specifically linked to a clinical condition or disease group than the PAF indicators. The range of clinical conditions covered in the international indicators is broader than those represented in the PAF.

Table 0 shows that the international search yielded 210 community, 232 hospital and 37 population level indicators; some indicators are classified as more than one of community, hospital, or population. The number of existing PAF indicators is shown in brackets in Table 0. Seven efficiency indicators were found, whilst Effectiveness – Safety and Quality yielded the most indicators, with 145 community and 145 hospital indicators.

Table 0: Number of international indicators by PAF domain and community, hospital, population. Number of PAF indicators in brackets.

Domain	Community (PAF)	Hospital (PAF)	Population (PAF)	Totals
Effectiveness – Access	34 (15)	45 (5)	0	**79**
Effectiveness – Patient experience	25 (1)	21 (1)	1	**47**
Effectiveness – Safety and Quality	145 (5)	145 (16[1])	2	**298**
Efficiency	0 (1)	7 (4)		**7**
Population health outcomes	5	9	34 (9)	**48**
Total	**210 (22)**	**232 (26)**	**37 (9)**	**N/A[2]**

[1] There are seven hospital/LHN Effectiveness-Safety and Quality indicators in the PAF (6.2.1.1 – 6.2.1.7). However 6.2.1.3 (in-hospital mortality rates) and 6.2.1.4 (unplanned hospital readmission) contain condition-specific sub-indicators which are more aligned to the level of the indicators in the international list. Therefore each sub-indicator has been counted as an indicator for comparative purposes.

The PAF has 15 Effectiveness - Access indicators in Medicare Local (or "community") and five in Hospital/LHN sections. Although relatively high numbers of international indicators were also found (34 Medicare Local, 45 Hospital/LHN), in some jurisdictions there is a tendency to reduce the emphasis on access (in line with a relative reduction in its strategic importance over time) with more focus on safety and quality type indicators.

Domains such as continuity, sustainability, and capability are not well represented by indicators in the PAF. This was also reflected internationally with these domains not often used in international frameworks, nor relevant indicators used.

The indicators found in the international search provide excellent opportunities to enhance the PAF's representativeness. The domains of Effectiveness – Safety and Quality in both the Hospital/LHN and Medicare Local sections (see Recommendation 4) and patient experience (see Recommendation 5) were both recognised as in need of bolstering. In terms of integrated care, potentially avoidable hospitalisation was recognised as important internationally and the work already done in this area by the NHPA is acknowledged and strongly supported.

0.4.3 **Findings from literature review and expert consultation**

The literature supported the use of performance indicators with their impact more likely to be on provider rather than consumer behaviour. More good-quality studies are needed. A logical, acceptable and viable conceptual framework encompassing multiple domains and with balanced representation from structure, process, and outcome indicators, is deemed important.

Experts confirmed that most of the activities of NHPA – such as having a framework for indicators, reporting publicly, using public reporting to support improvement and leverage change – were in accordance with best practice international experience. There were no simple answers according to the experts to questions such as how many indicators were optimal. Choice of indicators depended to a considerable extent on availability of data and purpose. Indicator sets should include measures of patient experience.

Experts noted that reporting systems and the utility of indicators take time to mature. Research on using indicators and the effects of reporting them was supported. Using consensus panels for choosing indicators was valuable. Performance frameworks should reflect the government's and health system's strategic goals, and may change accordingly over time. Caution is advised in using indicator data to identify high and low performing providers.

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[2] A figure in this cell is not provided because indicators can be counted more than once as applicable to community, hospital, or population.

0.5 Recommendations

Six recommendations emanate from this project. The first three relate to broad strategic and operational issues whilst the last three are more specific to the choice of indicators in performance frameworks.

0.5.1 Quality Statements

Recommendation 1: NHPA review the English Quality Statements and give consideration to adopting a similar system in Australia.

The indicators in England's NHS Outcomes Framework and the Clinical Commissioning Framework, and published on the Health and Social Care Information Centre's Indicator Portal (https://indicators.ic.nhs.uk/webview/), are accompanied by a "Quality Statement". A Quality Statement is designed to provide key information on criteria underpinning an indicator. They essentially establish the principles by which an indicator is chosen. The criteria used are:

- Relevance
- Accuracy and Reliability
- Timeliness and Punctuality
- Accessibility and Clarity
- Coherence and Comparability
- Trade-offs between Output Quality Components
- Assessment of User Needs and Perceptions
- Performance, Cost and Respondent Burden
- Confidentiality, Transparency and Security

The Quality Statements provide the public and policy makers with a level of confidence that can be ascribed to indicator data. They may point to relevant actions that could be necessary to improve the reliability and validity of indicator data.

0.5.2 Indicator publication purpose

Recommendation 2: NHPA review the structure of international online health care performance reporting systems in relation to targeting different users.

Countries which have been publishing nationally consistent and locally relevant indicators for a number of years increasingly design their websites with their users in mind. Best practice seems to distinguish between two sets of users – the public, and others, comprising healthcare providers on the one hand and governments and their policymakers on the other. In England, there is a website for the public (known as NHS Choices) and for others, the Health and Social Care Information Centre's Indicator Portal. Canada's current CIHI indicator website is designed for policymakers and healthcare providers. However, Canada recognises that a complementary website is necessary for public consumption, and this is currently in the design phase. The "public" websites tend to have user-friendly language, and less detail than the policy-focussed websites.

0.5.3 Learning from the role of the National Institute for Health and Care Excellence (NICE) in indicator development

Recommendation 3: NHPA review the NICE and CIHI processes for possible application in future indicator development and review cycles.

NICE in England has a major role in developing evidence for use in the English National Health Service (NHS) and to integrate this evidence into performance framework indicators. NICE develops guidelines and uses the evidence within the guidelines to develop national quality standards and then indicators for consideration within performance frameworks. It has responsibility to test indicators and widely consult with stakeholders before finally recommending that the indicators are released within performance frameworks. NICE staff use standardised and transparent methods for all phases of evidence and indicator development. The CIHI in Canada also has robust and transparent methods for converting evidence into indicators.

0.5.4 Balancing process and outcome indicators

Recommendation 4: NHPA should consider including more process indicators relating to effectiveness – safety and quality in both the Hospital/LHN and Medicare Local sections of the Performance and Accountability Framework (PAF).

The project found benefits in including both process and outcome indicators and for a balanced approach within a performance framework.

Within the effectiveness-safety and quality domain in the PAF, 15 of the 16 Hospital/Local Health Network (LHN) indicators[3] are outcome-based with the exception of "6.2.1.7 rate of community follow up within the first seven days of discharge from a psychiatric admission". The international list collated for this project has 81 examples of Hospital /LHN process effectiveness indicators, many of which are applicable to high volume procedures or admissions and are based on evidence-based clinical guidelines, for example:

- Patients with atrial fibrillation are treated with anti-coagulation drug therapy or an anti-platelet therapy
- Heart attack patients given aspirin at discharge
- Proportion of patients mobilised within 24 hours of hip fracture surgery
- Timely administration of antibiotics in patients with severe community acquired pneumonia

Similarly, within the effectiveness-quality domain (community), three of the five Medicare Local indicators are outcome-based. The two process indicators, "diabetic patients who have a GP annual cycle of care" and "asthma patients with a written asthma plan" are good examples of measurable actions in high volume conditions which have a significant burden of disease in Australia. The international list has 97 examples of other community-based process effectiveness indicators.

[3] Each of the five conditions relating to in-hospital mortality rates and six conditions related to unplanned hospital readmissions are considered as a separate indicator consistent with the structure of the international indicator review.

The benefits of process measures include being suitable for quality improvement as these are under some control of the clinicians. Compared to outcome measures, less risk adjustment is needed, they are generally more timely, and collection is more amenable to automatic electronic collection.

0.5.5 **Patient experience**

Recommendation 5: NHPA should enhance their current patient experience indicators with more patient reported process measures and consider patient reported outcome measures in future iterations of the PAF.

The indicators for patient experience (Hospital/LHNs - 6.2.2.1, Medicare Locals - 6.3.2.1) are not specified in detail in the PAF, however some are reported on the My Healthy Communities website. The international experts viewed patient experience as an important and necessary inclusion within a performance framework. They also pointed to a current trend away from patient satisfaction as there are issues relating to reliability as expectations of the healthcare system can be markedly different between individuals and across socioeconomic status, and there are also definitional issues. Patient reported process measures (did the right thing happen at the right time?)[4] and outcome measures (generally around patient's functional status) are becoming more common and more research is being devoted to their utility within performance frameworks. Patient reported process measures are shown in rows 344 - 351 and patient reported outcome measures are in IDs 353 - 371 in the international list.

0.5.6 **Indicators relating to special interest or vulnerable groups**

Recommendation 6: NHPA should consider reporting on healthcare system performance for special interest or vulnerable populations such as mental health and the elderly.

One indicator (6.3.3.9: "GP service utilisation by residents of Residential Aged Care Facilities") is focused specifically on a special interest or vulnerable group. Such groups may not benefit from optimal healthcare system performance because of barriers such as culture, language, gender, age, disability, discrimination, income and level of literacy. The PAF is structured to allow analysis of healthcare system performance stratified by vulnerable groups as well as by Hospitals/LHNs or Medicare Local. The NHPA has used this stratification method when reporting immunisation rates for Aboriginal and Torres Strait Islander children (4), and should consider replicating the method for other groups and indicators.

For clients with mental health issues, health system performance reporting can be enhanced by either stratifying or adding more indicators. There are five mental health indicators in the PAF, three relating to Hospitals/LHNs and two relating to Medicare Locals. Both Medicare Local indicators are in the Access domain, meaning there are currently no mental health effectiveness indicators in the community. Given its high burden of disease, and its status as a national priority, mental health may

[4] For example, the "GP explained the reasons for referral to a medical specialist" is a Patient-reported process indicator on the Health Communities website.

consequently be under-represented in the PAF. The international list shows 41 mental health indicators (30 process, 11 outcome), with 33 applicable to Hospitals/LHNs and 26 applicable to Medicare Locals.

1. INTRODUCTION

1.1 Background

This report was developed by the Australian Institute of Health Innovation, University of New South Wales. It is in response to a Request for Quotation issued by the National Health Performance Authority (NHPA) in April 2013 to review and identify performance indicators used internationally to report publicly on healthcare organisations and local health systems.

The NHPA (1) was established under the National Health Reform Act 2011 (2) as an independent agency to monitor and report on healthcare performance in Australia. An initial set of 48 nationally consistent and locally relevant indicators were developed and are used to report comparable performance at the level of healthcare organisations and geographical populations. To fulfil its role, the NHPA is supported by the Council of Australian Governments' National Health Reform Performance and Accountability Framework (PAF) (5) (Appendix A), which provides the foundation for developing and producing reports on the performance of hospitals and healthcare services in Australia. Specifically, the framework enables the NHPA to produce clear and transparent reporting to inform members of the public about the performance of healthcare providers in their local area, promote continuous quality improvement by providing Local Hospital Networks (LHNs), hospitals, clinical units, Medicare Locals and health services with comparative data, as well as providing additional data for governments and governing bodies of private hospitals to ensure robust accountability and supervision of the health system (5).

1.2 Purpose of the project

As part of its Strategic Plan 2012-2015 (1), NHPA is required to undertake regular review of the PAF to ensure it remains relevant and continues to address the needs of the Australian public. Monitoring national and international best practice in performance reporting forms one component of the review and provides an opportunity to learn.

This project seeks to identify performance indicators in internationally equivalent nations that are used to report on the comparative performance of healthcare organisations and local health areas to stimulate and inform improvements in care, increase transparency and accountability and inform consumers. The project has two main aims:

1. Identify international performance indicators that are used to report nationally consistent and locally relevant information on healthcare organisations (including those that measure integration and coordination of care within and between health sectors). This includes:

- determining the impact of national reporting on performance indicators and their ability to improve care;
- identifying any overlaps between the international indicators identified and those included in the PAF.

2. Consultation with international performance authority agencies to identify and provide information on:

- the sensitivity, specificity and utility of the indicators;
- indicators that have been discarded in other nations, focussing on why this occurred; and
- the learning experiences of other nations with regards to the use of performance indicators to monitor and report on healthcare.

1.3 Key challenges for health performance management and measures

One of the main challenges involved in the development and reporting of performance indicators is ensuring that the indicators are nationally consistent and locally relevant. Can data be collected consistently at a national level and will the data obtained have local relevance? These two characteristics are essential components of performance indicators designed to monitor and report on healthcare. They ensure that comparisons can be made between organisations and that the information can be used by individual organisations to track progress over time and implement strategies to drive improvements in healthcare service delivery, often learning from their peers and high performers. The data must also be relevant to consumers of healthcare, enabling them to make informed choices about healthcare providers in their local government area. This report explores these issues via a literature review, consulting with experts, and reviewing indicators.

1.4 Structure of the report

This report outlines the methodology (Section 2), a rapid literature review on the impact of performance management on the quality of healthcare (Section 3 and Appendix C), health performance frameworks for seven countries (Section 4), comparisons of the domains in the frameworks to the Australian Performance and Accountability Framework (Section 4), findings from consultation with experts (Section 5), a collation, review, and classification of indicators in seven countries (Section 6), and a gap analysis and set of recommendations (Section 7). The detailed indicator table is attached in an accompanying Excel spreadsheet.

2. METHODOLOGY

2.1 Aim 1: Identify international performance indicators.

2.1.1 Stage 1: Identify comparable nations using performance indicators to monitor and report on healthcare

Australia performs well internationally in relation to most aspects of health and matches or leads comparable countries (6). Using data from *Australia's Health 2010* (7) and reports from the Organisation for Economic Co-operation and Development (OECD)(8), countries with comparable rates of health expenditure and life expectancy were considered for inclusion (Figure 1) (6). Six countries were initially chosen (Canada (including Alberta), Denmark, England, the Netherlands, Scotland, and the United States of America) and a seventh, New Zealand, was included, after discussions with NHPA.

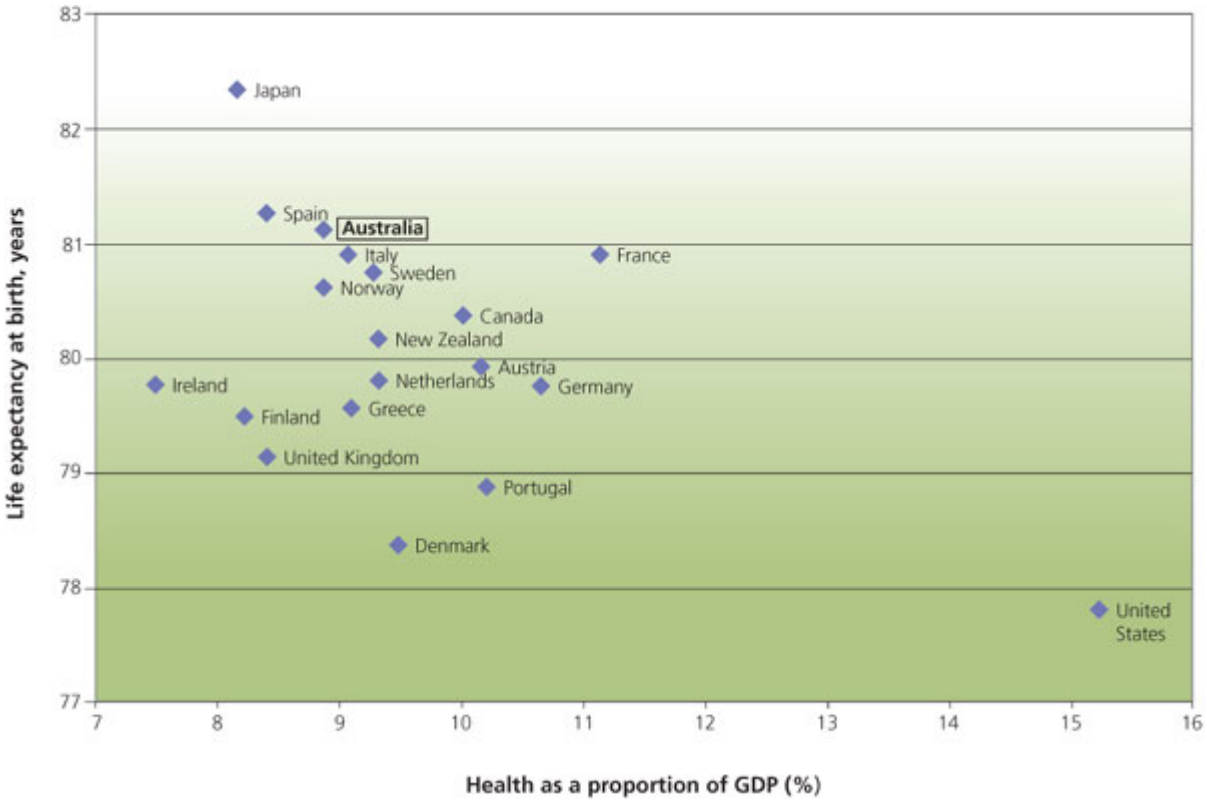


Figure 1: GDP on health and life expectancy, 2005-06. Source OECD 2008 (6).

2.1.2 Stage 2: Finding performance indicators

An initial internet search for performance indicator systems in the seven comparator countries was performed. A scoping table detailing the indicators and which countries they were reported in was developed. The purpose of the table was to (i) compile an initial list of available indicators and (ii) identify indicators reported in multiple countries, to facilitate early discussion of potential indicators to be considered for inclusion in the final list. Indicators that were not both nationally consistent and locally relevant were removed from the scoping table.

A consultative approach with key NHPA personnel was undertaken to ensure that requirements for inclusion of indicators and overall aims of the project were being achieved. Regularly scheduled teleconferences were held each fortnight to provide updates on progress, outline future plans for work and request assistance from NHPA staff as required.

2.1.3 **Stage 3: Detailed review of performance indicators**

The identified performance indicators were subjected to a detailed review. This included classifying them according to the following parameters:

- Community/Hospital/ Population;
- Structure/Process/Outcome;
- Country of origin and organisation reporting the indicators;
- Alignment/overlap to the PAF;
- Lowest level of reporting and its Australian equivalent;
- Evidence for their usage;
- Most relevant PAF domain; and
- Clinical specialty.

2.1.4 **Stage 4: Country specific frameworks**

The health system performance frameworks for each country were reviewed together with their policy drivers and the indicators being used. Sources for this information included policy documents and consultation with experts. Data sources, reporting, and methods of inclusion are described. The domains within the performance frameworks were also compared against each other, the Australian PAF and the Report on Government Services (ROGS).

2.2 Background Literature review

A literature review was undertaken. Details of the search strategy are provided below. The guiding question was: “what can the academic research and grey literature tell us about the impact of performance measurement regimes on the quality of healthcare?” Three elements were examined:

- Purpose of performance indicators: situates the performance indicator discussion in the wider debate about performance measurement and monitoring in healthcare.
- Mechanisms and barriers of performance indicator use: summarises the investigation of a theoretical link between performance measurement and quality improvement in terms of the putative facilitators of, and barriers to, this link.
- Evidence of impact of performance indicators: examines the empirical support for performance measurement affecting the quality of care in either a positive or perverse way.

Recommendations from this body of work were formulated. They synthesise the advice given in this body of literature for those wishing to maximise the potential of a measurement framework to induce quality improvement activities

2.2.1 Search strategy

Two databases were searched. One [Medline: http://www.nlm.nih.gov/bsd/pmresources.html] is considered a comprehensive source of academic journal articles related to all aspects of healthcare, and another [King's Fund library in the U.K.: http://www.kingsfund.org.uk/library] holds a broad selection of internationally published grey literature as well as academic articles. The search terms and strategy for Medline is detailed at the end of this document in the addendum to Appendix C; it was designed to capture articles which examined aspects of the relationship between performance measurement and the quality of healthcare.

The resulting references from both databases were imported into a reference management program, Endnote X5, and their abstracts screened. Any articles not meeting the following inclusion criteria were excluded. The full texts of those remaining were included in the review.

- Inclusion criteria:
- Any article whose focus is on the relationship between performance measurement and some aspect(s) of the quality of health care [these articles are labelled 'central relevance' in the search results table (Table 8)];
- OR any article whose focus is on the development or operation of a national- or regional- level performance measurement regime, *and* addresses the link between that regime and quality improvement [these articles are labelled 'useful background' in the search results table (Table 8)];
- If the article relates to a particular country, this country should be one of those included in our indicator search [US, UK, Canada, Denmark, Netherlands, New Zealand, Australia] unless it is especially relevant to the research question.

2.3 Aim 2: Consultation with international performance authorities

2.3.1 Stage 1: Identify and establish contacts with key international authorities

The AIHI project team members used their extensive international networks in healthcare safety, quality and performance associations to establish contacts with equivalent bodies to the NHPA. Meetings with these experts were scheduled.

2.3.2 Stage 2: Conduct semi-structured interviews with key international contacts from comparable nations

The AIHI team conducted interviews with experts by telephone. Contact was established with experts (n = 13 in total) from all countries included in the review, excluding Denmark, and also included representation from the World Health Organisation (WHO) and the Organisation for Economic Co-operation and Development (OECD). Experts were academic and/or policymakers in national or international healthcare system performance organisations. The interviews contained a blend of indicator-specific and generic questions (Appendix B) within the following themes:

- Performance frameworks – their purpose and target;

- Relative utility of process and outcome indicators;
- Utility of patient-reported indicators; and
- Indicators associated with integration;
- Health care provider outliers and excellence; and
- Reasons why indicators that have been discarded.

The interviews were semi-structured to allow for the differing sets of expertise related to performance indicators. The experts also confirmed that we had obtained the complete document set for their country. A thematic analysis of responses from thirteen experts is provided in Section 5. Some material from this section has been integrated in the country-specific sections.

3. FINDINGS FROM THE LITERATURE REVIEW

3.1 Summary

3.1.1 **Overview**

A rapid review of the **international grey and peer-reviewed literature** was undertaken to form background to the examination of the international performance indicator frameworks. The question which framed the review was:

What can academic research and grey literature tell us about the impact of performance measurement regimes on the quality of healthcare?

Performance indicators are defined as 'measurable elements of practice performance for which there is evidence or consensus that they can be used to assess the quality, and hence change of quality, of care provided. [...] They can relate to clinical, population health, financial and organisational performance' (9 p.3).

Overall, this review found that although there is a substantial literature dealing with the design, properties and scientific soundness of individual indicators, there is much less consideration of how indicators are actually used in practice and of the impact they may have on behaviour of health professionals, or on the quality of care.

3.1.2 **The purpose and method of performance management**

Performance indicators are claimed to "create the basis for **quality improvement** and **prioritization** in the healthcare system" (10 p.523) however, others see indicators as **political tools** with mainly symbolic and ritual value (11). Since indicators requires judgement about what constitutes 'good quality' healthcare they shape what issues are seen as important (12).

Most if not all health systems in the developed world incorporate some form of health performance measurement **to gauge the amount of activity being completed in return for investment made by funding bodies,** and more recently towards **improving patient experiences and outcomes** (13).

The quest for a single 'composite' indicator has largely been abandoned (14) in favour of multidimensional **frameworks.** Common domains are: **efficiency, effectiveness** and **equity**, augmented by quality of care measures: **patient safety, timeliness of care** and **patient-centredness**. Indicator sets commonly contain a combination of **structure, process and outcome** assessments.

A key theme in the literature is that performance indicators are not an end in themselves. The main debate around the purpose of indicators is whether they should be used for **accountability** or for **quality improvement** (12, 15-17). Internationally, there is a **split between those countries** who emphasise public reporting and accountability (e.g. NHS 'star-ratings' system of 2001-2005(18)) and those that use results for non-publicised feedback to organisations to stimulate improvement (e.g. Germany's voluntary reporting scheme (19)).

Overall, authors in this literature review recommend indicators for formative improvement rather than summative judgement: "tin openers rather than dials. By opening up a can of worms they do not give answers but prompt investigation and inquiry, and by themselves provide an incomplete and inaccurate picture" (20 p.49)

3.1.3 **The link between performance measurement and quality improvement**

It is thought that monitoring performance imposes an inherent pressure to improve practice (21) but the extent to which this is true is **disputed and under researched**. There are **four categories of barriers** to the link between performance measurement and improved quality of care: **problems intrinsic to the indicator** (e.g. lack of scientific validity/reliability), **problems with collected data** (e.g. absence of a unique patient identifier that prevents database linkages, poor standardised coding), **problems with the use and interpretation of the data** (e.g. alleged under- and over-reporting, selecting certain measures to represent a whole organisation's performance), and the **confounding influence of organisational and contextual factors** (e.g. poor culture of improvement, professional resistance to complying).

While **damage to an organisation** can result from public reporting of performance indicators without due attention to the required caveats, organisations can use these same caveats as excuses to **avoid** internal action (e.g. 'coding errors' were used to vindicate ignoring poor results at **Stafford Hospital in England** (22)).

3.1.4 **Evidence of impact on the quality of care**

The **paucity of research** examining the links between indicators and improvement may be due to the difficulty in attributing change to any one policy initiative or intervention. Much has been written about the **negative consequences of the 'command and control,' target-driven systems** of performance monitoring (17) where receiving rewards (whether financial, good reputation or earned autonomy) is made contingent upon reaching targets. It is argued that these systems **encourage perverse consequences** including: **'target myopia'** where clinical priorities can be distorted, **driving a culture of bullying** of under-performing managers and clinicians, a **stigmatisation of poorly performing organisations** and at worst, **active manipulation of the data (16, 23-25).** The way the targets were designed and enforced may be more responsible for this than the targets themselves (26).

Successful use of target-related data comes from the English NHS (26, 27). A review of **pay for performance systems** found **'insufficient evidence to support or not support'** them (28).

A review on **public reporting of performance data** to improve the quality of care concluded: 'we **cannot draw any firm conclusions'**(29) although there is some empirical evidence that it stimulates organisational improvement activity (30). There appears to be a **low rate of use of publically reported performance data by consumers** in decision-making in healthcare (31) and a **general lack of interest** in published performance data by the public and politicians (32). **Perverse consequences** of public reporting have been reported (23).

3.1.5 **Recommendations**

The importance of a **logical, acceptable and viable conceptual framework** to underpin development of a national performance indicator set is repeatedly emphasised in this literature (e.g. 16, 17). Reasons for developing such a framework are to **define the scope and dimensions of measurement**, to help **align the performance measurement system with other policy priorities and financial exigencies**, to provide a **clearly defined vision** to encourage buy-in by clinicians and consumers and, by involving potential end-users of the data in the design of the framework, **ensure its future usefulness**.

Indicators should be: balanced - a combination of **structural, process and outcome** measures, **developed nationally and locally,** be **scientifically valid and reliable**, **consistent** over time and space, be **responsive** to change over the time period of measurement, be attributable to the organisation, and be under an organisation's **influence to improve**. Indicators should be **feasible** to collect, and the **costs** should not outweigh potential **benefits**. They should be provided in a **timely fashion, and give time for users to make adjustments**; there should be a minimal chance of **perverse consequence** and they should not add unduly to the **burden of bureaucracy** (33, 34). New individual **Indicators should be piloted** and indicator sets should **be linked to existing quality improvement efforts**.

There is **little research** on how to measure outcomes which rely on **the actions of more than one organisation**. Some steps have been suggested to address attribution bias (17).

Suggestions given to mitigate **gaming or manipulation** of the data in target-driven schemes: **introduce uncertainty into indicator specification, introduce an element of randomness into service inspection and evaluation, and increase face-to-face evaluation** (23).

Recommendations for public reporting mechanisms include: **tailored presentation of data** to the intended audience, raising **consumer awareness,** encourage **provider engagement**. Indicator sets require **ongoing assessment** including 'retirement' of indicators (e.g. when outmoded, or the cost of collection outweighs the benefits (35-37)).

3.1.6 **Conclusion**

This synthesis and commentary represents a snapshot of the literature to date. In the end, consideration of what the measurement systems intends, which indicators to use, careful design and thoughtful application are required.

4. COUNTRY-SPECIFIC SECTIONS

4.1 Introduction

This section outlines the health system performance frameworks countries together with their policy drivers and the indicators being used for the seven included in the review. Sources for this information included policy documents and consultation with experts. A summary of each country (Table 1) and performance frameworks (Table 2) are provided below.

Table 1: Summary of each country – demographics and health performance frameworks

	Canada	Denmark	England	Netherlands	New Zealand	Scotland	USA	Australia
Estimated Population (rank)† (38)	34,568,211 (37)	5,556,452 (11)	63,395,000 (22)*	16,807,037 (64)	4,365,113 (125)	63,395,000 (22)*	316,668,567 (3)	22,262,501 (55)
Life expectancy at birth: overall years (rank)	82 (13)	79 (48)	80* (30)	81 (21)	81 (25)	80* (30)*	79 (51)	82 (10)
Infant mortality: Deaths per 1000 live births (rank)	4.78 (182)	4.14 (197)	4.5* (189)*	3.69 (205)	4.65 (145)	4.5* (189)	5.9 (174)	4.49 (190)
GDP($US) (rank)	1.513 trillion (14)	213.6 billion (55)	2.375 trillion* (9)*	718.6 billion (24)	134.2 billion(64)	2.375 trillion* (9)*	15.94 trillion(2)	986.7 billion (19)
GDP per capita - $US (rank)	43,400(142)	38,300 (32)	37,500* (34)*	42,900 (23)	30,200 (50)	37,500* (34)*	50,700 (14)	42,400 (94)
Healthcare expenditure (%GDP) (rank)	11.3 (15)	11.4 (14)	9.6* (32)*	11.9 (7)	10.1 (30)	9.6* (32)*	17.9 (2)	8.7 (2010) (48)
Type health system	Publicly funded – Medicare provides universal coverage for all hospital and physician services	Publicly funded – out of pocket expenses dental, optometry and pharmaceuticals Voluntary private insurance available	Publically funded- NHS. Voluntary private insurance available	Universal coverage ensured - mix of public and private insurance	Publically funded	Publically funded- NHS. Voluntary private insurance available	Public and private insurance – majority private insurance	Universal coverage – Medicare. Voluntary private insurance available
Health system performance frameworks	Framework is conceptualised across four dimensions: (i) health status; (ii) non-medical determinants of health; (iii) health system performance; and	No framework as yet	NHS Outcomes Framework; Clinical Commissioning Group Outcomes Indicator Set; Quality and Outcomes Framework	Overarching framework to meet four needs (1)staying healthy; (2) getting better; (3) living independently with a chronic	Six health targets, 3 focus on patient access and 3 on prevention. Primary Health Organisation targets. Atlas of Healthcare Variation.	12 Quality Outcome indicators; HEAT targets and other measurements at local and national level	Two locally reported The Commonwealth Fund – No set framework reports across health dimensions (see below) Hospital Compare	Performance Accountability Framework (PAF) and Report on Government Services (ROGS)provide key conceptual principles

	Canada	Denmark	England	Netherlands	New Zealand	Scotland	USA	Australia
	(iv) community and health system characteristics			illness and ; (4) end of life care	Quality and Safety markers.		– no framework reports on 7 dimensions (see below)	
Dimensions/Domains reported	(a) acceptability; (b) accessibility; (c) appropriateness; (d) competence; (e) continuity; (f) effectiveness; (g) efficiency and (h) safety	Under development	NHS Outcomes – 5 domains CCG- adds to the overarching NHS Outcomes framework QAO framework – 4 domains – clinical, organisational, patient care experiences, additional services	Three overarching themes - quality of care, access to care and healthcare expenditure	Diverse themes. Atlas domains: maternity, gout, demography, cardiovascular disease, poly-pharmacy and surgical procedures.	Described as Quality Ambitions: Safe, person-centred and effective.	The commonwealth Fund – 4 domains access, prevention and treatment, costs and potentially avoidable hospital use, and health outcomes. Hospital Compare – 7 dimensions – General information, Timely and effective care, Readmissions, complications and death, Use of medical imaging, Survey of patients' experiences, Medicare payment, Number of Medicare patients	PAF – safety, effectiveness, appropriateness, quality, access, efficiency, equity, competence, capability, continuity, responsiveness, sustainability. ROGS – effectiveness, appropriateness, quality, access, efficiency, equity
No indicators reported	SC- 101 indicators CHRP – 21 indicators Healthy Canadians – 70 indicators	197 but majority in Danish.		125 indicators – National only 65 local indicators (difficulty translating)	34 national indicators	18 national indicators	The Commonwealth Fund – 43 indicators. Hospital Compare – 87 indicators	Indicators for Local Hospital Networks – 17 indicators Indicators for Medicare Locals

	Canada	Denmark	England	Netherlands	New Zealand	Scotland	USA	Australia
								– 31 indicators
Data Sources	SC CIHI	RKKP, individual registries and databases, Sundhed.dk			Health Quality and Safety Commission / Atlas of healthcare variation; Primary Health Organisation Performance Programme	ISD, Scottish Government	Main sources of data include Centre for Medicare and Medicaid, The Joint Commission, Center for Disease Control and other Medicare data and data from within Hospital Referral Regions	Multiple data sources as identified in the data Plan 2-13-2016. Table A: Australian Institute of Health and Welfare national data holdings Table B. National Partnership Agreement Data submissions Table C: Australian Bureau of Statistics data Table D: Other collections

- † Rank refers to CIA World Factbook **(38)** country compared to the world rankings.
- *Figures provided are for United Kingdom, not just England

Table 2: health Performance framework domains by country and organisation

	Australia – PAF (5)	Australia – ROGS (in (5))	England – High Quality Care for All (13)	England – Liberating the NHS (39)	Canada (40)	Netherlands- Dimensions of healthcare performance (41)	Netherlands – Healthcare needs (41)	USA – Agency for Healthcare Research and Quality (42)	USA – Commonwealth Fund (43)	OECD (44)
Safety										
Effectiveness										
Appropriateness										
Quality										
Outcomes of care / health improvement				3 domains relate to outcomes			4 domains relate to outcomes			
Patient-centred / experience										
Timely										
Access										
Efficient										
Cost										
Capacity										
Equity										
Acceptability										

Competence / Capability										
Continuity										
Responsiveness										
Sustainability										
Avoidable hospital use										

There are no frameworks for Denmark, New Zealand, and Scotland.

4.2 Canada

4.2.1 **Background**

Canada is a westernised, multicultural nation with an estimated population of 35 million (38). It is the world's second largest country by area, consisting of ten Provinces (Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland and Labrador, Nova Scotia, Ontario, Prince Edward Island, Quebec and Saskatchewan) and three Territories (Northwest Territories, Nunavut and Yukon) (45).

Canada ranks 19th in per capita income globally (38). Internationally it ranks amongst the highest measurements for education, government transparency, civil liberties, quality of life, and economic freedom (45) and boasts one of the highest life expectancies (82 years overall), ranked 4th according to the World Health Organization in 2011, along with Australia (38) it also has one of the lowest infant mortalities of industrialised nations (38).

4.2.2 **Healthcare system**

The Canadian health system is publically funded and known as "Medicare" (46, 47). The Federal Government sets guidelines for the health system, however it is administered at a local level by provinces and territories, providing universal coverage for all citizens for necessary hospital and physician services on the basis of need as opposed to the ability to pay (47). The Federal government is responsible for setting and administering national principles under the *Canada Health Act*, providing financial support to the provinces and territories and funding and delivering primary and supplementary services to certain groups of people such as First Nation people, members of the Canadian Forces, veterans, inmates of federal penitentiaries and some refugees (47).

The provinces and territories administer and deliver health services in accordance with the national principles set out in the *Canada Health Act*. The principles include public administration, comprehensiveness, universality, accessibility and portability (47). Services are provided on a prepaid basis, with no charge at the point of care (47).

Canada's total healthcare expenditures as a percentage of Gross Domestic Product (GDP) grew to an estimated 11.3% in 2010. This places it 15th in international terms (38).

4.2.3 **Health system performance**

Health system performance in Canada commenced as a component of the Canadian Health Information Roadmap Initiative Indicator Framework, co-led by the Canadian Institute of Health Information and Statistics Canada (48, 49). The initiative was commenced in 2000 following a review by the World Health Organization, which ranked Canada 30th in overall health system performance (50). The framework (Figure 2) has two main goals; to determine (1) the health of Canadians and (2) how well the health system performs and operates on the principles of providing reporting that is secure, that respects Canadians' privacy, and is also consistent, relevant, flexible, integrated, user-friendly and accessible (48, 49). The indicator framework is conceptualised in terms of the provision of high quality comparative information across four dimensions: (i) health status; (ii) non-medical

determinants of health; (iii) health system performance; and (iv) community and health system characteristics (48, 50).

There are eight domains of health system performance:

(a) acceptability;

(b) accessibility;

(c) appropriateness;

(d) competence;

(e) continuity;

(f) effectiveness;

(g) efficiency and

(h) safety (48).

Some performance indicators under community and health system characteristics capture contextual information on the community, the health system and resources. The performance system is an integrated network of health information initiatives and structures which are driven by the Canadian Health Information System and is capable of collecting data at many levels including regionally, provincially and nationally (48).

Since its inception, the framework has been implemented and continually developed as a result of a dedicated collaborative group including the Canadian Institute for Health Information (CIHI), Statistics Canada (SC), Health Canada (HC) and representatives from many other principal groups, ministries and stakeholders at national, regional and local levels (48). Since commencing 15 years ago, there has been substantial progress in measuring and monitoring the performance of the health system and the health of Canadians (49).

4.2.4 **Summary performance indicators**

There are 101 performance indicators listed on the Statistics Canada (SC) website, presented in four domains (51). In addition to the indicators listed on the SC page, the CIHI also has indicators listed under the Canadian Hospital Reporting Project (CHRP). Whilst some of the indicators are the same as those listed by SC, there are some additional hospital performance indicators (21 in total) (52).

Additionally, the Government of Canada has a candidate list of 70 indicators that were approved for use by Federal, Provincial and Territorial Ministers of Health in 2004 (53). These indicators are used as a basis to provide data for the Healthy Canadians report (53), published every two years, and provide a Federal overview of health system performance and the health of Canadians in general, with much self-reported data contained within the publications. Of the 70 candidate indicators listed, 52 were reported on in the 2010 Healthy Canadians report (53).

It is difficult to gauge how many indicators are in use, because only certain indicators are selected for inclusion in the annual reports and there appears to be various degrees of overlap. For example the Health Indicators 2013 report (49) provides results for 88 indicators, 13 of which were additional

indicators chosen to be included to measure performance by socioeconomic status at provincial and national levels (49).

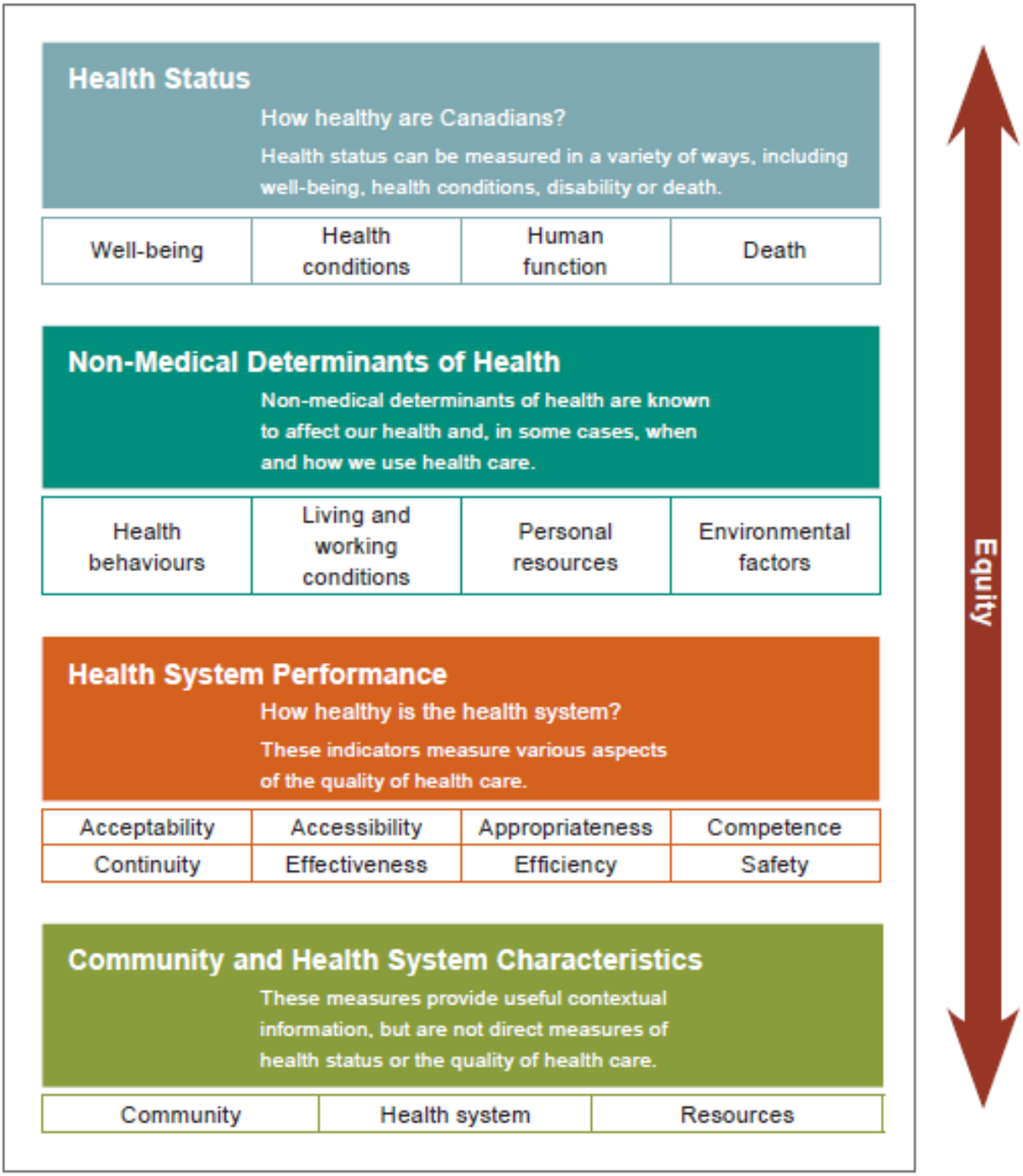


Figure 2: Canadian Health Indicator Framework

In addition to indicators in use in Canada, we reviewed indicators from Alberta, one of the larger provinces within Canada. Alberta Health Services (AHS) provides healthcare to almost 4 million

Albertans every day across five zones – North, Edmonton, Central, Calgary and South. It comprises an extensive range of services that includes 100 acute care hospitals, five stand-alone psychiatric facilities, 8,230 acute care beds, 22,533 continuing care beds/spaces and 202 community palliative and hospice beds, 2,327 addiction and mental health beds plus equity partnership in 41 primary care networks (54).

The AHS focuses on three key goals, part of strategic direction: Quality, Access and Sustainability. Their success at meeting the three goals is measured by the health and wellness of Albertans, their ability to access the system, and the AHSs ability to meet these goals in a sustainable manner. The priorities align with the AHS Health Plan 2012-2015. Data are collected from Alberta Health Services, Alberta Health, Health Quality Council of Alberta, and Statistics Canada (55).

4.2.5 **Reporting**

Reporting on health system performance occurs via multiple channels. In addition to annual and bi-annual publications such as *Health Indicators* (49) and *Healthy Canadians* (53), both SC and the CIHI provide interactive online applications for viewing health system performance results and provide access to a multitude of downloadable reports, media releases and publications, e.g. *Healthcare in Canada 2012: A Focus on Wait Times* (56) and *Fewer people could be hospitalized for injuries resulting from suicidal and self-harming behaviour if social disparities reduced* (57).

CIHI addresses reporting needs by acknowledging different audiences and tailoring reporting for their requirements. Figure 3 provides a schematic.

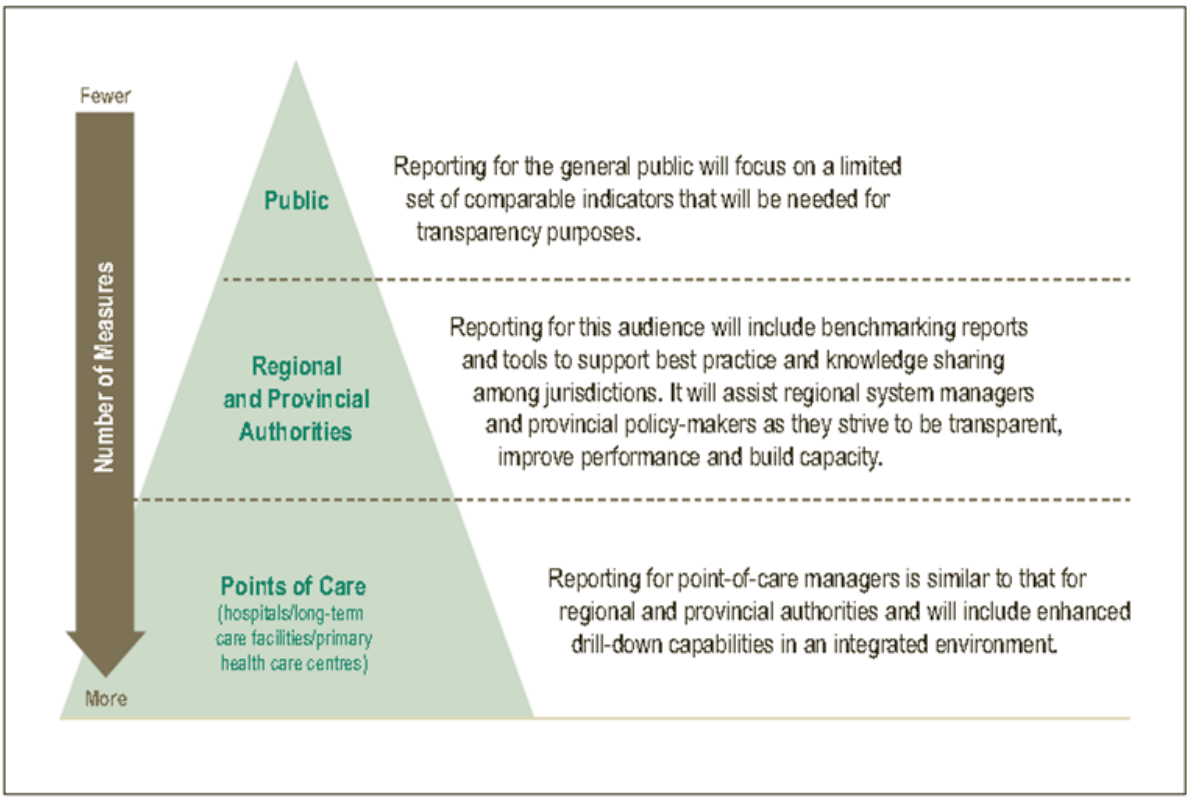


Figure 3: Tailored Health System Performance Reporting in Canada.

4.3 Denmark

4.3.1 **Background**

Denmark has a population of 5.5 million with immigrants and their offspring making up about half a million people (58). Although it is only 43,094 km^2 in area, it has a coastline 7,314 km long, including 406 islands. Greenland and the Faroe Islands are part of the kingdom of Denmark but have largely independent rule (58). Denmark is a parliamentary democracy with three levels of administration: state, regions and municipalities (59). The Danes enjoy a high standard of living with GDP per capita estimated at $US 41,388 (60). Danish health and education are free under the Scandinavian "Welfare State" system but to fund it, taxes are high (58).

Life expectancy in Denmark is 77 years for males and 82 for females (61) with an average of 79 years ranking it 48th in the world **(38)**. While it is average across the OECD countries it is less than the other Scandinavian countries of Sweden and Norway (62). During the 1990s life expectancy reached a plateau which only started to increase again in the 2000s. While the exact causes are unknown, lifestyle and other preventable factors are considered significant especially for men (62, 63). Infant mortality is very low compared to other industrialised nations (64).

4.3.2 **Healthcare system**

The Danish healthcare system is publicly funded with most health services provided free of charge to residents (59). Significant out of pocket fees are required for optometry, dental and pharmaceuticals. There is also voluntary private health insurance available. The healthcare budget was 9.7% of annual GDP in 2011 and expenditure is slightly higher than the EU average.

Denmark is moving from a decentralised to a more centralised system with a restructure and merging of municipalities (275 to 98) and regions (14 to 5), and fewer, larger and more specialised hospitals. Administration and governance is divided between the state (overall regulatory and supervisory functions, finance, quality monitoring and future planning), regions (own and operate hospitals) and municipalities (preventative health, health promotion, rehabilitation and care of disabled people, and alcohol and drug users). The state's regulatory functions include national and regional guidelines, licensing systems for health professionals and national quality monitoring systems. Patient rights have been strengthened in recent years through a number of legislative changes ensuring patient choice of hospital, wait time guarantees and a formal complaints process. Denmark has also recently increased the level of activity-based funding.

General practitioners are fairly evenly distributed across Denmark. Specialist practitioners are concentrated in the larger metropolitan centres.

4.3.3 **Health system performance**

The Danish Institute for Quality and Accreditation in Healthcare manages the Danish Healthcare Quality Program (DDKM) and is a national accreditation and standards based program that monitors quality of care in the primary and secondary sectors. These standards are overseen by the International Society for Quality in Healthcare (ISQua) (65). Clinical guidelines where available are "mandatory". While there are no financial incentives or formal sanctions linked to compliance of these standards, the National Board of Health is able to take action on poorly performing regions and the regions on poorly performing hospitals.

Recent foci have been cardiac and cancer pathways that are nationally consistent and which encourage integration and cooperation of disparate services. Concern over lower health measures than Sweden and Norway have led to an emphasis on moderating risk factors such as obesity, alcohol intake and smoking (59). As with other developed nations, Denmark is experiencing an increase in long-term, chronic and age-related conditions as the population ages and disparities in health based on socio-economic status remain problematic.

The Danish National Indicator Project (DNIP) merged with the Clinical Quality Development Programme (RKKP) in 2010 (66) and for the most part the name DNIP is no longer applied to these indicators. The DNIP manual outlines the thinking behind these clinical indicators and planned future indicators. The specific aims of the project are: (i) to improve prevention, diagnostics, treatment, and rehabilitation; (ii) to provide documentation for setting priorities; and (iii) to create an information resource for patients and consumers. Performance indicators are collected and reported through a range of separate national registers and databases. The RKKP oversees these databases and their website contains a full listing of the various registries and associations collecting the information. Reports from these data sets are produced by and available on, the publicly accessible site: www.sundhed.dk. The RKKP Steering Committee is tasked with producing an overarching framework to integrate these databases but there does not appear to be one currently available. A plan to better integrate health services has yet to be developed and has been recommended by the Health Division of the OECD (67).

4.3.4 **Summary indicators**

- Acute stroke (18 indicators) (Danish Stroke Register) 2012 Report
- Hip fractures (6) (Danish Hip Arthroplasty Register) 2012 Report
- Schizophrenia (adults) (8) (National Schizophrenia Database) 2012 Report
- Acute upper Gastrointestinal bleed (10) (Acute Surgery database) 2012 Report
- Lung cancer (19) (Danish Lung Cancer Group) 2012 Report
- Diabetes (6) (Danish Adult Diabetes Database) 2012 Report
- Chronic obstructive pulmonary disease (11) (Danish Registry of Chronic Obstructive Pulmonary Disease)
- Depression (adults) (12) (Danish Depression database)
- Intensive care (10) (Danish Intensive database) 2011 Report
- Breast cancer (12) (Danish Breast Cancer Cooperatives Group) 2011 Report

- Attention Deficit Hyperactivity Disorder (8) (ADHD Database) Reports for 2012 pending
- Gastric and oesophageal cancer (6) (Danish Esophagus, Cardia and Ventrikelcarcinoma Database) 2012 Report
- Bariatric surgery (8) (Danish Bariatric Surgery Registry) 2012 Report
- Hysterectomy (non-malignancy related) (10) (Danish Hysterectomy Database) 2011 Report
- Colorectal cancer (10) (Danish Colorectal cancer Database) 2011 Report
- Birth (8) (Danish Quality Database for Births) 2012 Report
- Cervical cancer screening (9) (Danish Quality Database for Cervical Cancer Screening) 2012 Report
- Mammography screening (11)(Danish Quality Database for Mammography Screening) 2012 Report
- Neuro-oncology (7) (Danish Neuro-oncology Group) 2012 Report
- Palliative care (5) (Danish Palliative Database) 2012 Report
- Cardiac rehabilitation (11) (Danish Cardiac Rehabilitation Database) Starting 9/13

4.3.5 **Data sources**

For the clinically based indicators there is mandatory participation for all hospitals and relevant clinical departments and units treating patients with the listed conditions (68). When the data have been collected, analyses, interpretation and evaluation of the results take place. The interpretation takes place nationally, regionally and locally within the different units. Clinicians and leaders receive monthly feedback on these data.

Every six months a structured audit process is initiated by audit groups of clinicians at national, regional, and local levels in order to explain the risk-adjusted results and to prepare implementation of improvements. After the audit process is complete, the data are released publicly, including comments on the results from the audit groups. Reports on many of the indicators are available on the sundhed.dk website which is the public website that reports on waiting times and quality indicators for hospitals and community services to inform the recent patient rights reforms for choice of hospital.

4.3.6 **Comparison to Australian Performance Indicators**

The Danish indicator set has indicators not used in Australia for adult depression (12 indicators), and management of COPD patients (11 indicators). Denmark also has planned future indicators for child and adolescent schizophrenia and low back pain which are not currently seen in the PAF.

4.4 England

4.4.1 **Background**

England has an estimated population of 53 million accounting for 84% of the United Kingdom's (UK) total population (69). Today England is governed directly by the Parliament of the UK, although other countries of the UK (Scotland, Wales, and Northern Ireland) have devolved governments (69).

The UK has the 34th highest income per capita in the world (38). The total overall life expectancy is 80 years; ranking it 30th, compared with Australia, which has a ranking of four (38).

4.4.2 **Healthcare system**

The National Health Service (NHS) is the publicly funded healthcare system of England and was formed in 1947 under the National Health Service Act 1946 (70). It is the largest and the oldest single-payer healthcare system in the world. The NHS provides healthcare to anyone normally legally residing in England and any other part of the UK, with almost all services free at the point of use (70), including primary care, in-patient care, long-term healthcare, ophthalmology, and dentistry. Additionally, private healthcare operates in parallel with the NHS and is paid for largely by private insurance and used by almost 8% of the population, generally as an add-on to NHS services (70).

The NHS is largely funded from general taxation (including a proportion from National Insurance payments). The UK government department responsible for the NHS is the Department of Health, headed by the Secretary of State for Health, with most of the expenditure (£98.7 billion in 2008-9) being spent on the NHS (71).

The NHS has an agreed formal constitution which sets out the legal rights and responsibilities of the NHS, its staff, and users of the service and makes additional non-binding pledges regarding many key aspects of its operations (72). The current primary legislation is the National Health Service Act 2010 and the Care for Me 2012, which came into effect in April 2013, giving GP-led groups, known as Clinical Commissioning Groups (CCG) responsibility for commissioning most local NHS services.

The following types of NHS trusts and foundation trusts provide NHS services in specific areas (73):

- NHS acute trusts administer hospitals, treatment centres and specialist care in around 1,600 NHS hospitals (some trusts run between two and eight different hospital sites)
- NHS ambulance services trusts
- NHS care trusts, providing both health and social care services
- NHS mental health trusts, specialising in managing and treating mental illness, including by the use of involuntary commitment powers

England's total healthcare expenditure as a percentage of Gross Domestic Product (GDP) grew to an estimated 9.3% in 2011 (74). It is now being revised under budgetary austerity measures.

4.4.3 **Health system performance**

There are three health system performance frameworks currently used in England – the NHS Outcomes Framework, Clinical Commissioning Group Outcomes Indicator Set, and Quality and Outcomes Framework. These are summarised below.

4.4.3.1 **NHS Outcomes Framework**

A framework for understanding quality in the NHS was developed in Lord Darzi's report - the NHS Next Stage Review High Quality Care for All" published in 2008 (13). This report used the definition that high quality care comprises three domains: effectiveness, patient experience and safety.

With a change of government in 2010, a White Paper (Liberating the NHS)(75) was released which outlined the Coalition Government's intention to move the NHS away from focusing on process targets to measuring health outcomes. In December 2010, the first NHS Outcomes Framework was published and has been updated yearly. Its purpose is threefold (39):

- to provide a national level overview of how well the NHS is performing;
- to provide an accountability mechanism between the Secretary of State for Health and the NHS Commissioning Board for the effective spend of some £95bn of public money; and
- to act as a catalyst for driving up quality throughout the NHS by encouraging a change in culture and behaviour.

Five domains, derived from Lord Darzi's three part definition (13), were developed within the Framework(39):

- Domain 1: Preventing people from dying prematurely;
- Domain 2: Enhancing quality of life for people with long-term conditions;
- Domain 3:Helping people to recover from episodes of ill health or following injury;
- Domain 4: Ensuring that people have a positive experience of care; and
- Domain 5: Treating and caring for people in a safe environment; and protecting them from avoidable harm.

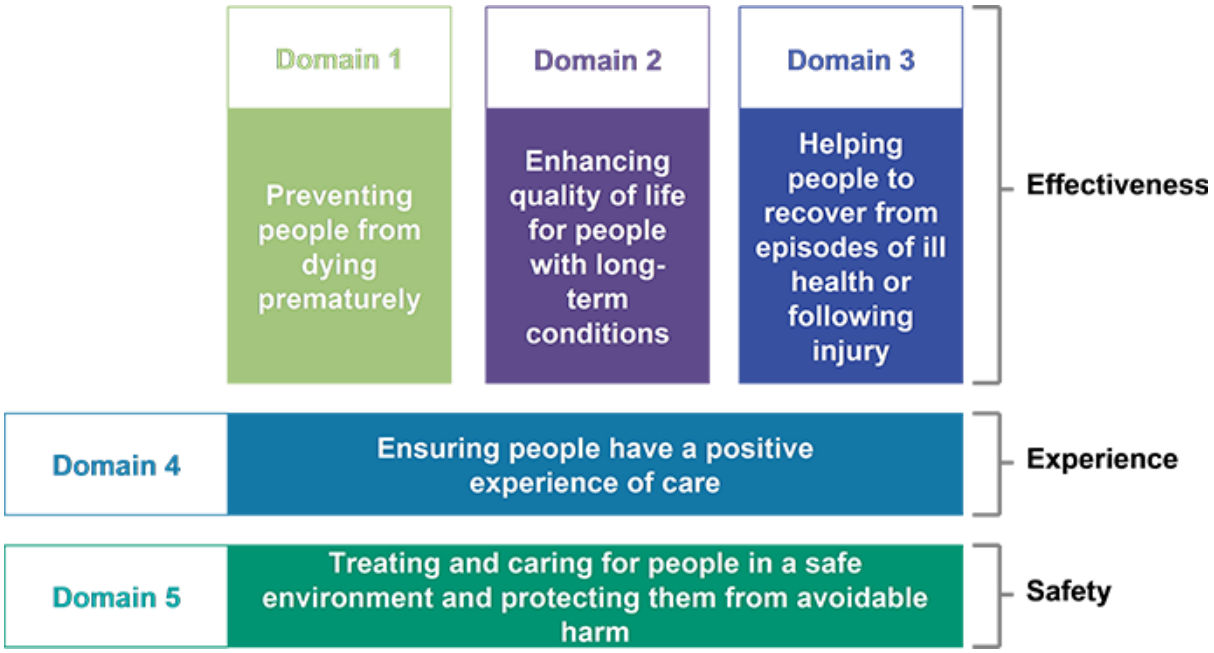


Figure 4: Relationship between NHS Next Stage Review High Quality Care for All and NHS Outcomes Framework

For each domain, there are a small number of overarching indicators. These are followed by a number of improvement areas with the intention to focus on improving health and reducing health inequalities.

The NHS Outcomes Framework sits alongside similar frameworks for public health and adult social care. The intention is to align the three frameworks with the aim of encouraging collaboration and integration through an increased and more systematic use of shared and complementary indicators. For example, Public health and NHS Outcomes Frameworks share many indicators on premature mortality (39).

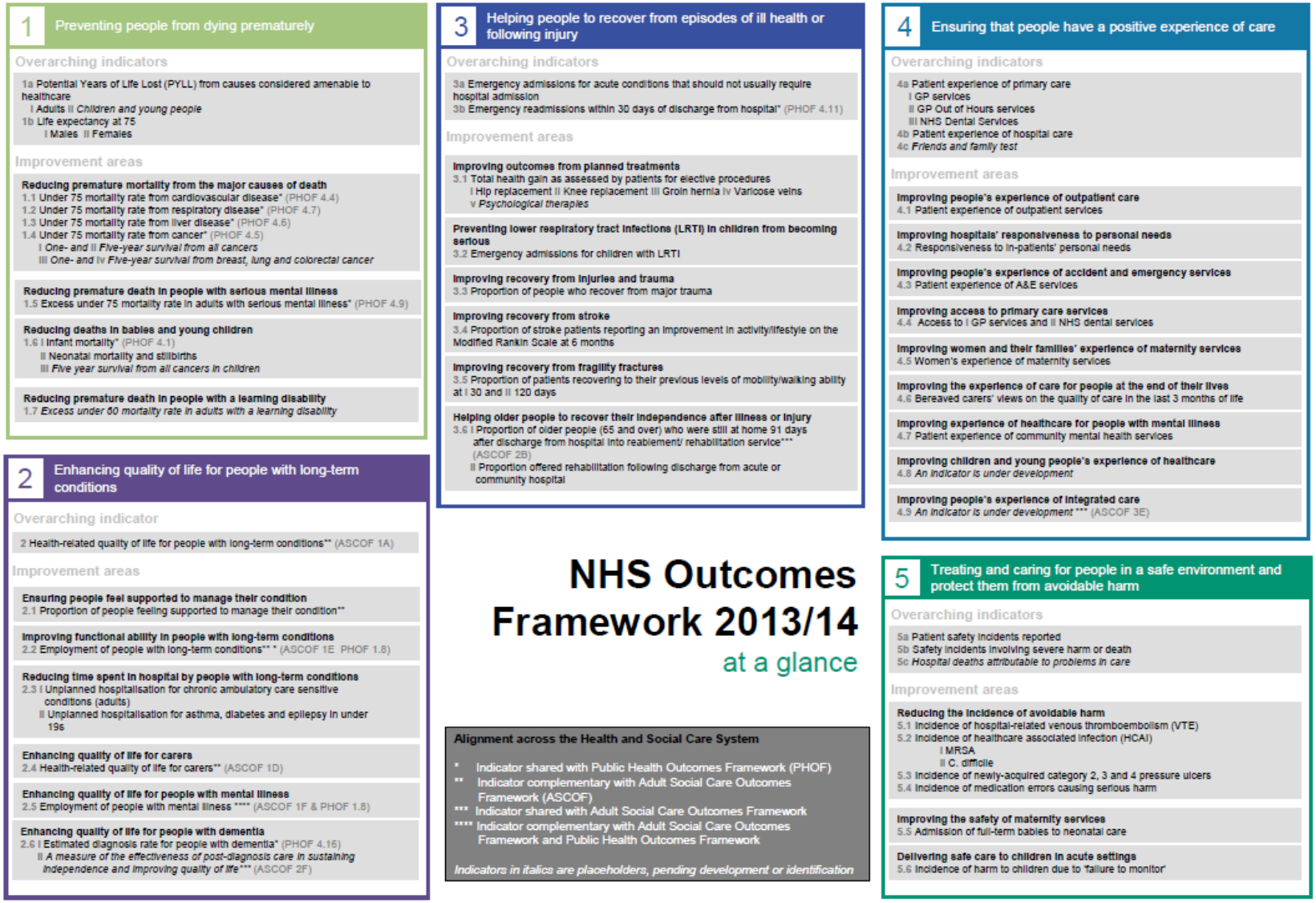


Figure 5: The NHS Outcomes Framework

4.4.3.2 **Clinical Commissioning Group Outcomes Indicator Set**

Clinical Commissioning Groups (CCGs) are NHS organisations set up by the Health and Social Care Act 2012 to organise the delivery of NHS services in England. They are replacing Primary Care Trusts as local purchasers of health services.

CCGs are clinically led groups that include all of the GP groups in their geographical area. The aim is to give GPs and other clinicians the power to influence commissioning decisions for their patients. CCGs are overseen by NHS England, (including its Regional Offices and Area Teams). These structures manage primary care commissioning, including holding the NHS Contracts for GP practices.

CCGs operate by commissioning (or buying) healthcare services including:

- Elective hospital care
- Rehabilitation care
- Urgent and emergency care
- Most community health services
- Mental health and learning disability services

The consultation document "Liberating the NHS: Commissioning for Patients" proposed that the NHS Commissioning Board (now NHS England), supported by the National Institute for Health and Clinical Excellence (NICE), would develop a Commissioning Outcomes Framework. This would hold CCGs to account for providing information for the public on both the quality of services and the health outcomes achieved through commissioning (76).

This document has now been renamed the CCG Outcomes Indicator Set, to avoid confusion with the NHS Outcomes Framework, in addition to making it clear that the indicators refer to outcomes of services commissioned by CCGs. The purpose however remains the same – to provide clear, comparative information for CCGs and local government authorities about the quality of health services and associated health outcomes (76).

All of the CCG outcome indicators have been chosen on the basis that they contribute to the overarching aims of the five domains in the NHS Outcomes Framework. The Indicator Set will not in itself set thresholds or levels of ambition for CCGs, it is intended as a tool for CCGs to drive local improvement and set priorities. It is also intended to provide clear, comparative information for patients and the public about the quality of health services commissioned by CCGs and the associated health outcomes (77).

Where possible, direct measurement of health outcomes by indicators is used. However, where necessary, proxies for outcomes are used that measure healthcare processes that are linked to health outcomes and that can be substantially influenced by clinical commissioning groups as part of their commissioning activities (77).

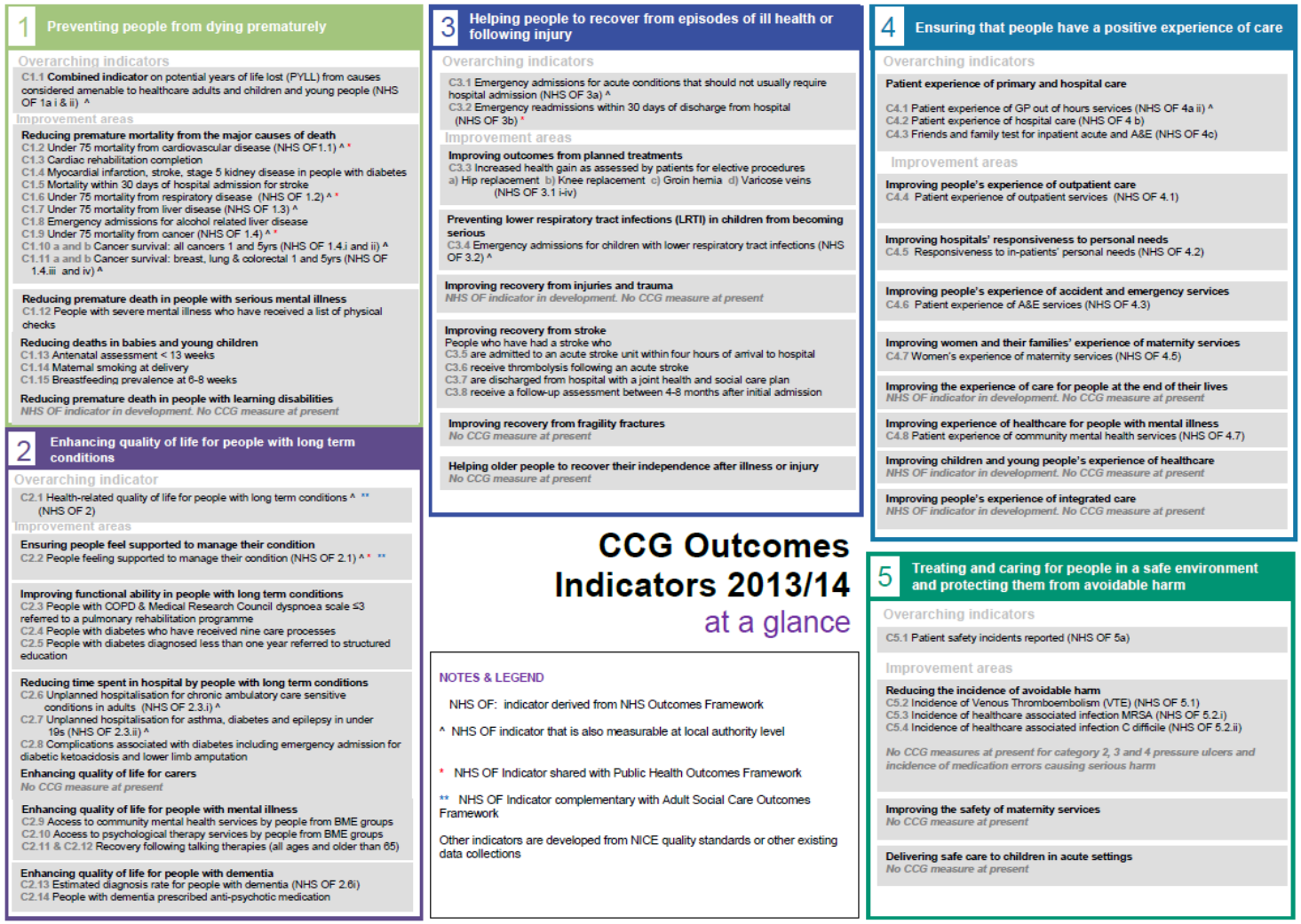


Figure 6: The CCG Outcomes Indicators 2013/14

4.4.3.3 **Quality and Outcomes Framework**

The Quality and Outcomes Framework (QOF) (http://www.hscic.gov.uk/catalogue/PUB08135) is a voluntary annual reward and incentive programme for all GP surgeries in England. The QOF was introduced as part of the new General Medical Services (GMS) contract on 1 April 2004. Participation rates are very high, with most Personal Medical Services (PMS) practices taking part. Practices score points on the basis of achievement against each indicator, up to a maximum of 1,000 points. Results of GP practices' achievement against the QOF are published each year.

The QOF is not about performance management *per se*, but incentivising and rewarding good practice. In 2011/12, over 8,000 GP practices were included in the published results, representing almost 100% of registered patients in England.

The QOF has four main components, also known as domains. Each domain consists of a set of measures of achievement, known as indicators, against which practices score points according to their level of achievement.

- Clinical domain: 87 indicators across 20 clinical areas (e.g. coronary heart disease, heart failure, hypertension).
- Organisational domain: 45 indicators across six organisational areas - records and information; information for patients; education and training; practice management and medicines management.
- Patient care experience domain: one indicator relating to length of consultations.
- Additional services domain: nine indicators across four service areas (cervical screening, child health surveillance, maternity services and contraceptive services)

The following principles apply to the Quality and Outcomes Framework (QOF) (78):

1. Indicators should, where possible, be based on the best available evidence;

2. The number of indicators in each clinical condition should be kept to the minimum number compatible with an accurate assessment of patient care;

3. Data should never be collected purely for audit purposes;

4. Only data which are useful in patient care should be collected. The basis of the consultation should not be distorted by an over-emphasis on data collection. An appropriate balance has to be struck between excess data collection and inadequate sampling; and

5. Data should never be collected twice (i.e. data required for audit purposes should be data routinely collected for patient care and obtained from existing practice clinical systems).

The clinical indicators are organised by disease category which are selected based on the following criteria:

1. The responsibility for ongoing management rests principally with the general practitioner and the primary care team.

2. There is good evidence of the health benefits likely to result from improved primary care – in particular if there is an accepted national clinical guideline

3. The disease area is a priority in a number of the four nations ie England, Wales, Scotland and Northern Ireland.

Where evidence-based national guidance has not been included, this has usually either been to limit the size and complexity of the framework, or because it would be particularly hard for practices to record the relevant information in a reliable way.

4.4.4 **Reporting**

The Information Centre for Health and Social Care 'Indicator Portal' (http://www.hscic.gov.uk/indicatorportal) publishes most of the NHS Outcomes Framework and Clinical Commissioning Group (CCG) and all of the GP Quality and Outcomes Framework indicators. The Indicator Portal also publishes the Summary Hospital-level Mortality Indicator data (SHMI). The SHMI is the new hospital-level indicator which uses a standard and transparent methodology for reporting mortality at hospital trust level across the NHS in England.

In addition, other nationally consistent and locally relevant indicators are published on other areas of the Information Centre's website including:

- http://www.hscic.gov.uk/searchcatalogue?productid=10700&q=%22National+diabetes+audit%22&sort=Relevance&size=10&page=1#top;
- https://www.gov.uk/government/publications/statistical-release-breastfeeding-initiation-and-prevalence-at-6-to-8-weeks-quarter-1-2010-11;
- http://www.hscic.gov.uk/article/2021/Website-Search?productid=10889&q=national+quality+board&sort=Relevance&size=10&page=1&area=both#top).

Other important sites for reporting indicators are:

- the Royal College of Physicians (Royal College of Physicians: http://www.rcplondon.ac.uk/projects/stroke-programme-national-audit-results-east-england#hosp_level_results_EM);
- National Patient Safety Agency (http://www.nrls.npsa.nhs.uk/resources/collections/quarterly-data-summaries/); and
- NHS England (http://www.gp-patient.co.uk/results/latest_weighted/practice/);
- NHS Choice (http://www.nhs.uk/Pages/homepage.aspx) (for consumers); and
- Care Quality Commission (http://www.cqc.org.uk/public/reports-surveys-and-reviews) (mainly for consumers).

4.4.5 **Data sources**

The number of data sources used is widespread and includes:

- Administrative datasets:
    - For hospitals (HES: http://www.hscic.gov.uk/hes); and
    - General Practices (GPES: http://www.hscic.gov.uk/gpes);

- Surveys:
    - National Diabetes Audit: http://www.hscic.gov.uk/nda;
    - Stroke Improvement National Audit Programme (SINAP): http://www.rcplondon.ac.uk/projects/stroke-improvement-national-audit-programme-sinap;
    - GP patient survey: http://www.gp-patient.co.uk/;
    - National Inpatient Survey: http://www.cqc.org.uk/public/reports-surveys-and-reviews/surveys/inpatient-survey-2012
- National statistics eg death: http://www.statistics.gov.uk/hub/population/deaths/mortality-rates
- Incident data: http://www.nrls.npsa.nhs.uk/report-a-patient-safety-incident/about-reporting-patient-safety-incidents/

4.4.6 Method for Inclusion or exclusion of indicators

The National Institute for Health and Care Excellence (NICE) has a key role in indicator development in England. NICE is responsible for managing the process to develop the clinical and public health indicators for the QOF and the CCG indicator sets. This involves prioritising areas for new indicator development, developing and selecting indicators, advising on thresholds and ensuring broad consultation with individuals and stakeholder groups (79). NICE also recommends whether existing indicators should continue to be part of the frameworks. For example, where an activity being measured has become part of standard clinical practice, there is no longer a need to provide a financial incentive in the QOF.

NICE has developed comprehensive process guides (80, 81), which set out in detail the processes involved in managing the development of indicators. This ensures that indicators are developed in an open, transparent and timely way, with input from individuals and stakeholder organisations.

4.4.6.1 Quality Standards

NICE's quality standards are a concise set of prioritised statements designed to drive measurable quality improvements within a particular area of health or care. NICE quality standards are derived from high quality guidance such as that from NICE or other sources accredited by NICE. Quality standards are developed independently by NICE, in collaboration with healthcare professionals and public health and social care practitioners, their partners and service users. Information on priority areas, people's experience of using services, safety issues, equality and cost impact are also considered during the development process (82). Quality standards will be a key source for ongoing Clinical Commissioning Group Outcome and Quality and Outcomes Framework (QOF) Indicators (82).

4.4.6.2 Indicators by type within the clinical domain

The QOF program team at NICE has produced a classification of the types of indicator in the clinical domain of the QOF (83). The five categories of QOF clinical indicator, defined by NICE, are:

- Health outcome (O) – the indicator directly measures a health outcome (such as mortality, morbidity, health-related quality of life). There is one outcome indicator – Epilepsy: epilepsy seizure-free in the past 12 months.
- Intermediate outcome (IO) – the indicator measures an intermediate health outcome. Refers to indicators relating to BP target; cholesterol target; HbA1C target; lithium levels.
- Process measure directly linked to health outcomes (PD) – the indicator measures an action (process) that is directly linked to a therapeutic intervention that is known to improve health outcomes. This is defined as delivery of a drug therapy or non-drug interventions and may include referral to specialist service where intervention will be delivered (for example, smoking cessation).
- Process measure indirectly linked to outcomes (PI) – this includes both pure process measures (e.g., BP measurement) and process measures that may indirectly lead to an improvement in health outcomes (e.g. the use of a diagnostic test, clinical review).
- Register (R) - the indicator is a clinical register.

4.5 The Netherlands

4.5.1 **Background**

In 2013, The Netherlands had an estimated population of almost 17 million and has the 10th highest population in Europe and the 64th highest population in the world (38). It is a constituent country of the Kingdom of the Netherlands and consists of 12 provinces (Drenthe, Flevoland, Friesland, Gelderland, Groningen, Limburg, North Braburst, North Holland, Overijssel, South Hollnad, Utrecht and Zeeland) in North West Europe and three islands in the Caribbean (Bonaire, Sint Eustatius and Saba) (84).

The Netherlands has a developed economy with the 23rd highest income in the world (38) and is in the world's top 20 in terms of total gross domestic product (85). It has an overall life expectancy of 81 years, ranking 21 in overall world life expectancy, compared to Australia with a ranking of ten (38).

4.5.2 **Healthcare system**

In 2006, the Dutch healthcare system underwent major reform, bringing with it new regulatory mechanisms and structures which resulted in a single compulsory insurance scheme where multiple private health insurers now compete for insured persons (85). Whilst the government is responsible for controlling the quality, accessibility and affordability of healthcare, the government's role has now fundamentally changed, with much of the responsibility transferred to insurers, providers and patients, with the government protecting the process from a distance (85). The Dutch health system is based on principles of durability, solidarity, choice, quality and efficiency and patient demand is seen as the key driver of quality healthcare (86).

The system operates according to three layers, (1) long term care for chronic conditions, (2) basic and essential medical care such as GP visits, short term hospital stays and specialist appointments and (3) supplementary care like dental and allied health, with each organised differently (86). Care for long term conditions is provided regardless of a person's ability to pay and is funded by income related salary deductions and regulated by the Exceptional Medical Expenses Act (AWBZ), first introduced in 1968 (86). Prior to the reforms in 2006 the second layer was funded by both social and private health insurance schemes, with social insurance only compulsory for those below a certain income level (86). Since the reforms social insurance has become compulsory for all persons and no longer regulated solely by the government; instead private insurers are responsible for providing basic insurance packages to all Dutch citizens (86). In addition extra government finance schemes ensure that universality of care is maintained, regardless of income, as well as providing a safety net for illegal immigrants (86). Funding for supplementary care such as dental, cosmetic or allied healthcare remains voluntary and must be purchased as part of an insurance package and or negotiated as part of an employment package (86). The Netherlands total healthcare expenditure as a percentage of GDP was 12% in 2011 (86, 87). This is high in OECD terms.

4.5.3 **Health system performance**

Initial planning for the development of a performance indicator framework for the Dutch healthcare system commenced in 2002. Representatives of the Ministry of Health (MoH), Welfare and Sport and academics convened to develop the conceptual framework and content of a proposed framework after reviewing the strategic goals of the healthcare system, information needs of policy makers and studying existing theory and international experiences (88).

The resulting framework divides healthcare into four specific healthcare needs: (1) staying healthy; (2) getting better; (3) living independently with a chronic illness and; (4) end of life care (Figure 7) (89). The framework contains 125 indicators used to measure performance against the three major themes identified by the MoH, quality, accessibility and affordability of care and the data is then used to compare performance in other years and countries, with policy and procedure and where possible between healthcare providers (41).

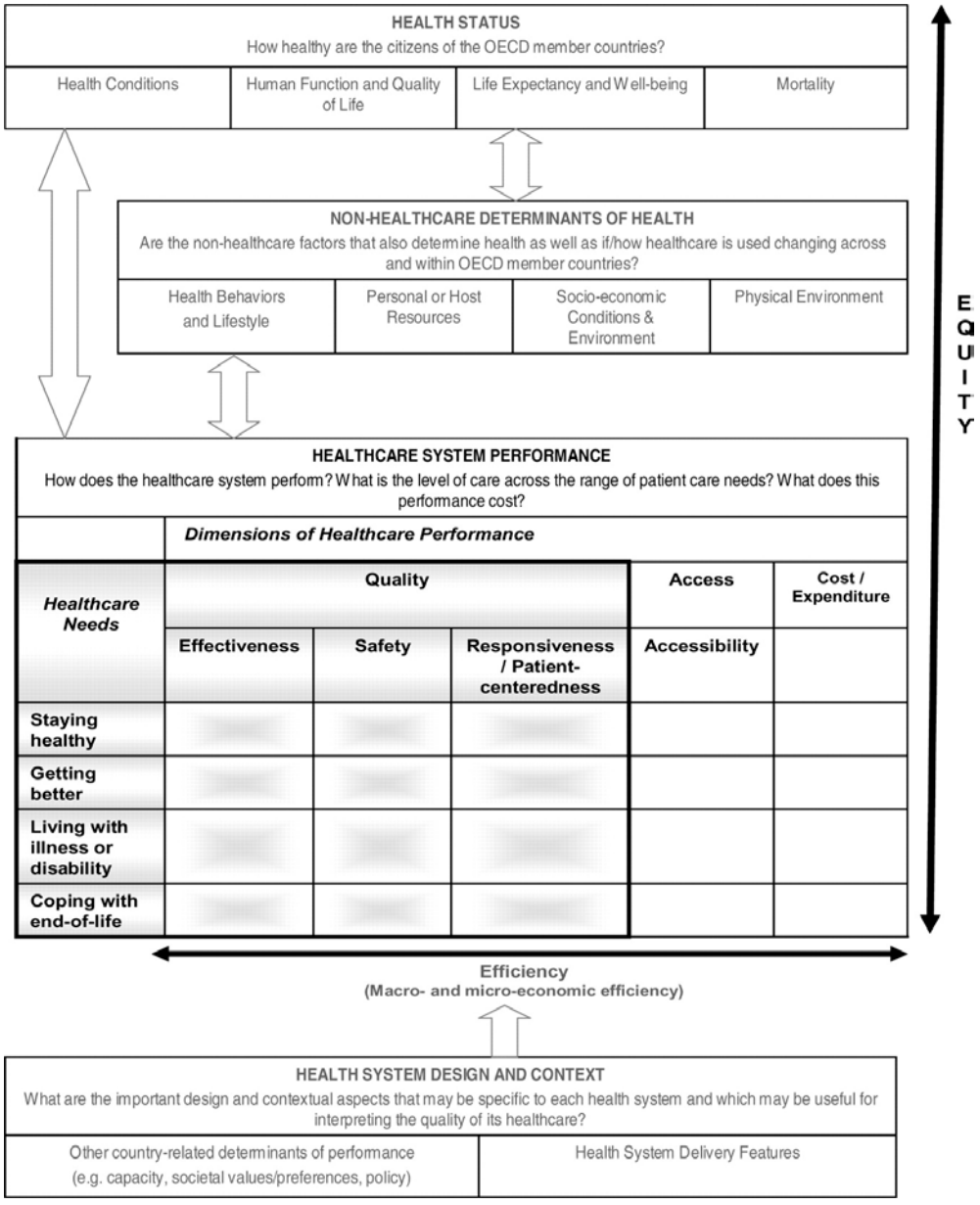


Figure 7: The Netherlands Health Performance Framework

4.5.4 Summary performance indicators

There are 125 performance indicators listed in the most recent Dutch Healthcare Performance report, published in 2010 (41). The indicators are contained within three overarching themes: quality of care, access to care and healthcare expenditure and efficiency, with indicators within each category, sub categorised into appropriate headings, e.g. effectiveness of prevention, timeliness of urgent care (41).

Indicators are chosen based on their ability to provide a signal for the domain concerned (41). Selection of indicators is based on two specific criteria: (1) the intrinsic relationship between the indicator and a specific care aspect being investigated and; (2) the availability of data, with each indicator leading to a key finding (41).

4.5.5 Reporting

The MoH commissions the National Institute for Public Health and the Environment to report on the performance of the healthcare system, with a comprehensive report detailing results for all 125 indicators published every 2 years, with the latest report being released in 2010 (41). As of 2011 the information is updated via a website two times a year and from 2014, the report will be published every four years (41). However, the indicators are only reported at the national level, they are not reported locally. Indicators reported locally (regional level) occur via the Dutch Hospital Database, however translation of this information was difficult and has severely limited the amount of information that can be obtained with regards to local reporting of indicators in the Netherlands.

4.5.5.1 Consumer reporting

The Netherlands has two dedicated websites that provide consumers of healthcare with information about the quality of a service and provide ratings for their service (90). These are:

Independer - www.independer.nl started in 1999 and has about seven million users per year and 250,000 registered clients. The website offers independent advice and market wide product comparisons in two major sectors: finances and healthcare. Within healthcare, the site covers information on hospitals, specialist clinics, revalidation centres and primary healthcare practices in the Netherlands. For consumers interested in quality performance of a healthcare service, information is measured by the independent research institute MediQuest, who can rate services up to four stars for best performances, however the user cannot determine what medical treatment these performance rates apply to (i.e. heart surgery or hip surgery wait times).

Kiesbeter - www.kiesbeter.nl or “Choose Better” was launched and is financed by the Ministry of Health, Welfare and Sports in the Netherlands in 2009. On a daily basis, 12 000 - 17 000 users visit the site. The site consists of four main sections: Patient information, medical information, healthcare insurance and healthcare providers:

- Patient information includes a list of and links to patient organisations in the Netherlands. Also other information such as privacy issues can be found here;

- The medical information consists of a very detailed description of medical conditions with clear diagrams and images, including a simple definition and explanation, possible causes, the grade of severity, prevention possibilities and information on when it is necessary to consult a doctor. It is very user-friendly and uses simple language;
- The healthcare insurance section shows data on current policies such as comparing scope of insurance coverage;
- The healthcare providers section allows comparison of hospitals and specialist clinics and provides general information on primary healthcare providers.

Quality reports are collected directly from hospitals and services and can be rated a maximum of three stars. Indicators for quality include numbers of operated patients, cancelled operations, wound infections, emergency operations and mortality rates. Quality information can also be applied to segments of medical services, such as those for disabled persons, or at home and nursing and care. In these cases experience reports filled in by patients and personnel serve as another interesting source of user information.

4.6 New Zealand

4.6.1 **Background**

New Zealand has an estimated population of 4.3 million (91), and the 24th highest income per capita in the world according to the International Monetary Fund (92). Its life expectancy is 81 years overall and this is ranked 25th in the world (38).

4.6.2 **Healthcare system**

The Minister of Health develops policy for the health and disability sector and provides leadership. The Minister is supported by the Ministry of Health and its business units, and advised by the Ministry, the National Health Board, Health Workforce New Zealand, the National Health Committee, and other ministerial advisory committees (93).

Most of the day-to-day business of the system, and around three quarters of the funding, is administered by twenty district health boards (DHBs). DHBs plan, manage, provide and purchase health services for the population of their district. This includes funding for primary care, hospital services, public health services, aged care services, and services provided by other non-government health providers including Māori and Pacific providers. Public hospitals are owned and funded by DHBs (94) and Accident services are funded by the Accident Compensation Corporation (ACC).

The Ministry sets the overall strategic direction for the DHBs and monitors performance. Each DHB is governed by a board of up to 11 members, with up to four of those members appointed directly by the Minister of Health, who also appoints the board chairs and deputy chairs.

Primary health organisations (PHOs) are funded by DHBs to support the provision of essential primary healthcare services through general practices to patients who are enrolled with the PHO (95). As at December 2011, there were 31 PHOs that vary widely in size and structure although most are not-for-profit organisations (95).

PHOs provide services either directly or through its provider members. These services are designed to improve and maintain the health of the enrolled PHO population, as well as providing services in the community to restore people's health when they are unwell. The aim is to ensure GP services are better linked with other primary health services (such as allied health services) to ensure a seamless continuum of care, in particular to better manage long term conditions (95). Almost all New Zealanders are enrolled in a PHO, as there are financial incentives for patients to enrol.

New Zealand's total healthcare expenditure as a percentage of Gross Domestic Product (GDP) grew to an estimated 10.1% in 2011 (96). This is above the OECD average.

4.6.3 **Health system performance**

There are four health system performance mechanisms currently used in New Zealand relevant to the NHPA. These are outlined below.

4.6.3.1 **Health Targets**

Health targets are a set of national performance measures designed to improve the performance of health services that reflect significant public and government priorities. They provide a focus for action for DHBs and are focussed on accountability not quality improvement (97).

There are six health targets. Three focus on patient access, and three focus on prevention. Health targets are reviewed annually to ensure they align with government health priorities (97).

The six targets are:

- Shorter stays in emergency departments: 95% of patients will be admitted, discharged, or transferred from an emergency department within six hours.
- Improved access to elective surgery: The volume of elective surgery will be increased by at least 4000 discharges per year.
- Shorter waits for cancer treatment: All patients, ready-for-treatment, wait less than four weeks for radiotherapy or chemotherapy.
- Increased immunisation: 90% of eight months olds will have their primary course of immunisation (six weeks, three months and five months immunisation events) on time by July 2014 and 95% by December 2014.
- Better help for smokers to quit: 95% of hospitalised patients who smoke and are seen by a health practitioner in public hospitals and 90% of enrolled patients who smoke and are seen by a health practitioner in general practice are offered brief advice and support to quit smoking.
- More heart and diabetes checks: 90% of the eligible population will have had their cardiovascular risk assessed in the last five years.

Targets are published by DHB every quarter: http://www.health.govt.nz/new-zealand-health-system/health-targets/how-my-dhb-performing/how-my-dhb-performing-2012-13/health-targets-2012-13-quarter-four-results-summary

4.6.3.2 **PHO Performance Programme**

The PHO Performance Programme was designed by primary care representatives, DHBs and the Ministry of Health to improve the health of enrolled populations and reduce inequalities in health outcomes through supporting clinical governance and rewarding quality improvement within PHOs. Improvements in performance against a range of nationally consistent indicators result in incentive payments to PHOs (98).

The results are published by DHB every quarter: (http://www.dhbsharedservices.health.nz/Site/Current-Issues/Performance-Results-Mar-2013.aspx)

The indicators are:

- Breast cancer screening coverage
- Cervical cancer screening coverage
- Ischaemic cardiovascular disease detection
- Cardiovascular risk assessment
- Diabetes detection
- Diabetes follow up after detection
- 65 years + influenza vaccinations
- Age appropriate vaccinations for 2 year olds
- Age appropriate vaccinations for 8 month olds
- Smoking status recorded
- Smoking brief advice and cessation support

4.6.4 **Quality and Safety Markers**

The Health Quality & Safety Commission commenced a national patient safety campaign ***Open for better care*** in 2013 (99). Quality and safety markers (QSMs) will be used to evaluate the success of the campaign and determine whether the desired changes in practice and reductions in harm and cost have occurred (99).

The QSMs are sets of related indicators concentrating on the four areas of harm covered by the campaign(99):

- Falls: 90% of older patients are given a falls risk assessment
- Healthcare associated infections:
    - Hand hygiene: 90% compliance with procedures for inserting central line catheters;
    - Central line associated bacteraemia: 70% compliance with good hand hygiene practice
- Surgery: All three parts of the WHO surgical safety checklist used in 90% of operations
- Medication: no measures developed.

The links to DHB level results are as follows:

- http://www.hqsc.govt.nz/our-programmes/health-quality-evaluation/projects/quality-and-safety-markers/falls/
- http://www.hqsc.govt.nz/our-programmes/health-quality-evaluation/projects/quality-and-safety-markers/hand-hygiene/
- http://www.hqsc.govt.nz/our-programmes/health-quality-evaluation/projects/quality-and-safety-markers/clab/
- http://www.hqsc.govt.nz/our-programmes/health-quality-evaluation/projects/quality-and-safety-markers/perioperative-harm/

4.6.5 **Atlas of Healthcare Variation**

The Atlas of Healthcare Variation (100) shows variation in the healthcare received by people in different geographical regions. Similar atlases have been developed by other countries with the most well-known being the Dartmouth Atlas (101). The New Zealand Atlas aims to stimulate debate by highlighting variation, rather than making judgements about why variation exists or whether it is appropriate, leading to improvements in healthcare services.

The Atlas is organised by domains, which cover specific clinical areas:

- Maternity: variation in medical procedures and complications associated with birth.
- Demography: life expectancy and other basic demographic data around age structure, ethnicity and deprivation.
- Cardiovascular Disease: the use of secondary prevention medicines in New Zealand residents hospitalised with an ischaemic cardiovascular disease event between 2000 and 2010.
- Gout: variation in the prevalence and treatment of gout, the most common form of inflammatory arthritis.
- Polypharmacy in older people: rates of dispensing of medicines in people aged 65 and over.
- Surgical procedures: surgical intervention rates for tonsillectomy and ventilation tube (grommet) insertion.

4.7 Scotland

4.7.1 Background

Scotland occupies the northern third of the island of Great Britain and includes over 790 islands. It has a population of 5.3 million and while Edinburgh is the capital, Glasgow is the largest city (102). Scotland has limited self-government and representation in the UK parliament.

The Scots enjoy a high standard of living with GDP per capita estimated at $US 42,124, around the same level as Australia (103). Healthcare is free for Scottish residents and is administered by NHS Scotland which operates alongside a range of private healthcare services (104).

Life expectancy in Scotland is 79 years for males and 82 for females (61) which is below the average in the UK and slightly lower than the European Union countries (105). Contributing to these statistics are higher than average alcohol-related deaths (106). The proportion of the population in the over 75 years age group is expected to increase by 25% in the next 10 years posing significant service delivery challenges (107). Infant mortality is low compared to other industrialised nations at 4.0 per 1000 live births (108).

4.7.2 Healthcare system

The Scottish NHS is publicly funded with most health services provided free of charge to residents. Private healthcare providers also offer services for fee and there is voluntary private health insurance available. The overall UK healthcare budget was 9.3% of annual GDP in 2011 and expenditure is slightly lower than the EU average (109). Over 2014-2015 Scottish public expenditure will fall in real terms due to economic global pressures (107).

NHS Scotland currently employs approximately 160,000 staff who work across 14 regional NHS Boards, seven Special NHS Boards and a public health body, Healthcare Improvement Scotland which provides specialist services and support for the regional boards. Scottish General Practices have recently transitioned to a new electronic medical record system that has been implemented across health boards (110).

4.7.3 Health system performance

Scotland has a Quality Measurement Framework to structure and coordinate the range of measurements that are taken across the NHS Scotland. The Framework has three levels:

- Twelve Quality Outcome Indicators (QOIs) are used for national reporting on longer-term progress towards the Quality Ambitions and the Quality Outcomes. These are intended as indicators of quality, and do not have associated targets.
- HEAT targets describe the specific and short-term priority areas for focused action in support of the Quality Outcomes. HEAT stands for Health improvement for the people of Scotland, Efficiency and governance improvements, Access to services, and Treatment appropriate to individuals

- All other indicators and measures required for quality improvement and performance management and reporting, either by national program or locally.



(111)

4.7.4 **Summary indicators**

Quality Outcome Indicators have been developed to ensure focus and progress towards the Quality Outcomes:

- Healthcare experience
- Emergency admission rate/bed days
- End of Life care
- Healthcare Associated Infection (HAI)
- Appropriate birth weight for Gestational Age (AGA)
- Hospital Standardised Mortality Ratio
- Premature mortality rate

Outcomes currently under development are:

- Employee engagement
- Personal outcomes
- Resource use indicator
- Resource use
- Safe care

HEAT Targets (112) are grouped by priorities: Health improvement (H), Efficiency and governance improvements (E), Access to services (A), Treatment appropriate to individuals (T).

4.7.5 **Data sources**

ISD Scotland oversees the collection and publication of indicator data. Data comes from a variety of sources including the Scottish Morbidity Records data sets, e.g. SMR01 General / Acute Inpatient and Day Case dataset and SMR02 Maternity inpatients / day cases data set, National Records of Scotland, Scottish National Point Prevalence Survey and Inpatient and GP patient Experience Surveys.

4.7.6 **Reporting**

Quality Outcome Indicators are reported on quarterly, annually or biennially. There is a summary of the reporting timetable and data sources.

4.7.7 **Comparison to Australian Performance Indicators**

The following Scottish HEAT Standards indicators are not currently included in the Australian standards:

- 12 week maximum wait from GP referral to first outpatient appointment
- 26 weeks maximum wait time for specialist children's mental health services
- Ambulance response times: 75 per cent of Category A calls within 8 minutes
- Proportion of acute stroke patients admitted to acute stroke unit within four hours of arrival at hospital
- Proportion of people diagnosed and treated in the first stage of breast, colorectal and lung cancer
- Effectiveness of post-diagnosis care for people with dementia (all new diagnoses receive >12 months support)
- Number of people waiting more than 14 days to be discharged from hospital to more appropriate care setting
- People ages 2-19 who were overweight who were told by a health provider they were overweight
- Proportion of 3 and 4 year old children who have received 2 applications of fluoride varnish
- Children ages 2-17 for whom a health provider ever gave advice about the amount and kind of exercise, sports, or physically active hobbies they should pursue
- Estimated diagnosis rate for people with dementia
- Solvency of healthcare institutions

- Percentage of work hours lost (absenteeism)

4.8 United States of America

4.8.1 **Background**

The United States of America (USA) has a population of approximately 317 million people (38). It is a federal republic and is the fourth largest country in total area, consisting of 50 states and one federal district (Washington DC) (113).

The USA has the World's largest national economy with an estimated Gross Domestic Product (GDP) of $15.9 trillion in 2013 and the per capita GPD is the world's 14th highest (38). In 2011, the World Health Organization recorded overall life expectancy as 79 years, ranking it 51st overall (38). Increasing obesity in the United States has contributed to lowering its life expectancy. Obesity rates in the USA are the highest in the world and approximately one third of the adult population is obese (38). Infant mortality occurs at a rate of 6 per 1000 live births (38).

4.8.2 **Healthcare system**

The US Healthcare system provides both public and private insurance options. The US system is unique in the dominance of private over public healthcare provision (114). Healthcare is provided by multiple organisations, with the majority of healthcare facilities owned by private organisations; 62% of the hospitals are considered non-profit, 20% are government owned and 18% are for-profit (115).

4.8.3 **Public Insurance**

Public insurance is provided three ways. Medicare is a federal program that provides basic insurance for persons aged over 65 years, as well as some disabled individuals and is financed by federal income taxes, a payroll tax shared by employers and employees and individual enrollee premiums (114). It provides coverage for hospital services, physician services and prescription benefits, however there are some gaps in coverage (dental, optical, hearing, disease prevention) resulting in many seniors having to supplement Medicare with private insurance (114).

The second option - Medicaid is designed to cover low income earners and persons with a disability and is governed by federal law to cover low income pregnant women, children, the elderly and disabled and parents. Childless adults are not covered and many persons earn too much to qualify, but States have the option of expanding eligibility (114). The states are responsible for administering Medicaid, which is funded jointly between the Federal and State governments through taxes (114). The other public insurance options are the State Children's Health Insurance Program, which was commenced in 1997 to cover those children whose families do not qualify for Medicaid but earn too much to purchase private insurance and the final option available is the Veterans Administration (VA) which funds healthcare for veterans of the military in government owned VA hospital and clinics funded by the taxpayer and offering extremely affordable or free healthcare to veterans (114).

4.8.4 **Private Insurance**

Employer sponsored insurance is the main way in which Americans receive health insurance, with employers funding insurance as part of an employment benefits package (114). Insurance is administered by both for profit and not for profit organisations. The benefits can vary widely and premiums are generally shared between the employer and employee, with the employer paying the majority (114).

Private insurance is also available for those that are self-employed or retired and can also cover those persons who are not covered by their employer. Unlike employer sponsored insurance, individual coverage can be denied based on pre-existing conditions and benefits can vary widely (114).

The state of play is changing with the new federal statute signed by President Obama in March 2010. The Patient Protection and Affordable Care Act (PPACA),together with the Health Care and Education Reconciliation Act, represents the most significant regulatory overhaul of the the United States healthcare system since the introduction of Medicare and Medicaid in 1965 (116). This statute aims to increase the quality and affordability of health insurance, lower the uninsured rate by expanding public and private insurance coverage and reduce the costs of healthcare for individuals and the government (116).

4.8.5 **Health system performance**

In the US, there are three distinct entities that report on healthcare performance. One reports nationally - The US Department of Health and Human Services' Agency for Healthcare Research and Quality (AHRQ) and two report locally - The Commonwealth Fund and Hospital Compare: The Official US Government site for Medicare.

The US Department of Health and Human Services – Agency for Healthcare Research and Quality (AHRQ) measures health system performance across four dimensions of quality of care: effectiveness, patient safety, timeliness and patient-centredness and provides a comprehensive overview of the quality of care provided in the US (117). It reports results at national level.

The Commonwealth Fund was founded in 1918 by Anna Harkness with the mandate that it should "do something for the welfare of mankind." This thinking means the Commonwealth Fund has striven to be a catalyst for change by identifying promising practices and contributing to solutions to help the US become a high performing healthcare system (118).

The Commonwealth Fund is responsible for the first-ever Scorecard on Local Health System Performance in 2012 (43), providing U.S. communities with comparative data to assess the performance of their healthcare systems, establish priorities for improvement, and set achievement targets. It tracks 43 indicators spanning four dimensions of health system performance: access, prevention and treatment, costs and potentially avoidable hospital use, and health outcomes, providing baseline data on which to determine the impact of new healthcare reforms introduced in 2010. This report underscores the importance of looking locally—beyond national and state averages—for opportunities to improve care experiences, improve population health, and achieve

more-affordable healthcare systems that deliver high-quality care and lower costs and compares performance of the 306 local healthcare areas, known as hospital referral regions, in the United States (43).

Hospital Compare is the Official US Government Site for Medicare and is part of the Centres for Medicare & Medicaid Services' (CMS') Hospital Quality Initiative. The Hospital Quality Initiative uses a variety of tools to help stimulate and support improvements in the quality of care delivered by Medicare hospitals, with the intention of improving hospitals' quality of care through the distribution of objective, easy to understand data on hospital performance, and quality information from consumer perspectives. The measures posted on Hospital Compare represent wide agreement from CMS, the hospital industry and public sector stakeholders such as The Joint Commission (TJC), the National Quality Forum (NQF), and the Agency for Healthcare Research and Quality (AHRQ), and hospital industry leaders.

4.8.6 **Summary performance indicators**

The Commonwealth Fund measures performance on 43 indicators that cover four dimensions of healthcare quality: access, prevention and treatment, costs and potentially avoidable hospital use, and health outcomes (43).

A summary of the numbers of indicators included in each dimension is as follows (43):

- **Access:** includes insurance coverage for adults and children and three indicators of access and affordability of care.
- **Prevention and treatment** includes 19 indicators that measure the quality of ambulatory care, hospital care, long-term care, post–acute care, and end-of-life care.
- **Potentially avoidable hospital** use and cost: includes six indicators of hospital care that might have been prevented or reduced with appropriate care, follow-up care, and efficient use of resources, as well as three measures of the spending on medical care by Medicare and private insurance.
- **Healthy lives** includes 10 indicators that assess the degree to which people are able to enjoy long and healthy lives.

Hospital Compare measures performance on 87 indicators across seven domains or measurement categories:

- **General information** – six indicators
- **Timely and effective care** – 36 indicators across seven clinical domains or conditions – acute myocardial infarctions, emergency department throughput, heart failure, pneumonia, preventive care, surgical care improvement project (SCIP) and children's asthma care (CAC).
- **Readmissions, complications and death** – 27 indicators across four domains – 30 day death and readmission rate, surgical complications, hospital acquired conditions and healthcare associated infections.
- **Use of medical imaging** – six indicators

- **Survey of patients' experiences** – 10 indicators
- **Medicare payment** – one indicator
- **Number of Medicare patients** – one indicator

4.8.7 Reporting

The Commonwealth Fund: in addition to the publication of annual local scorecard reports on performance, an interactive website provides detailed data on performance at regional level http://datacenter.commonwealthfund.org/#ind=1/sc=1

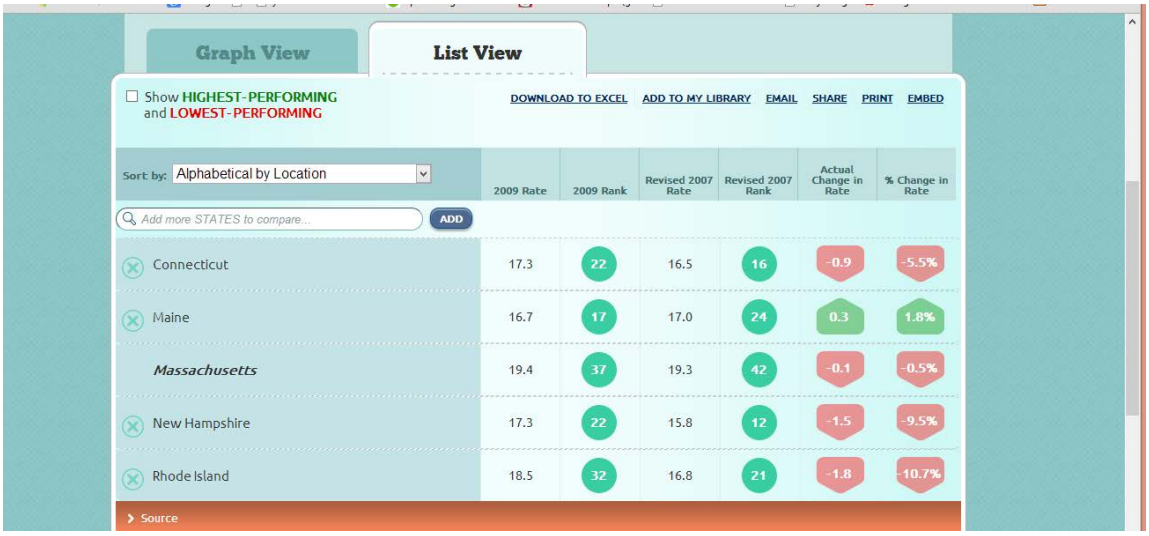


Figure 8: Commonwealth Fund reporting website

4.8.8 Data sources

The Commonwealth Fund obtains much of its data from the Healthcare Referral Regions (HRR). These are areas that represent regional markets for tertiary medical care. This concept was developed by the Dartmouth Atlas of Health Care project and has been widely used in health service research and policy analysis.

The Hospital Compare website obtains data from a variety of sources as indicated in Table 3.

Table 3: Hospital Compare Indicators by data sources

Measure Set	Data Sources
Hospital characteristics and inspection information	Data submitted by hospitals through the CMS Certification And Survey Provider Enhanced Reporting (CASPER) system
Structural measures (e.g., registry measures)	An online data entry tool made available to hospitals and their vendors
Timely and effective care: heart attack, heart failure, pneumonia, surgical care	Data submitted by hospitals to the QIO Clinical Data Warehouse through the CMS Abstraction and Reporting Tool (CART)- Opens in a new window or vendors
Timely and effective care: asthma care	The Joint Commission
Readmissions, complications, & deaths: 30-day mortality and readmission measures	Medicare enrolment and claims data
Readmissions, complications, & deaths: Surgical complications and deaths	Medicare enrolment and claims data
Readmissions, complications, & deaths: Hospital-acquired conditions	Medicare enrolment and claims data
Readmissions, complications, & deaths: Healthcare-associated infections	The Centers for Disease Control and Prevention (CDC) collects data from hospitals via the National Healthcare Safety Network (NHSN) tool.
Outpatient imaging efficiency measures	Medicare enrolment and claims data
Patients' survey	Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey conducted by hospitals
Number of Medicare patients	Medicare enrolment and claims data
Spending per hospital patient with Medicare	Medicare enrolment and claims data

5. CONSULTATIONS WITH INTERNATIONAL EXPERTS

5.1 Introduction

Thirteen international experts were consulted by telephone. Experts were from the countries in the study, and also included representation from the World Health Organisation (WHO) and the Organisation for Economic Co-operation and Development (OECD). Experts were academic and/or policymakers in national or international healthcare system performance organisations and those agreeing to be named are listed in the acknowledgements.

The interviews contained a blend of indicator-specific and generic questions (Appendix B) within the following themes:

- Performance frameworks – their purpose and target;
- Relative utility of process and outcome indicators;
- Utility of patient-reported indicators; and
- Indicators associated with integration;
- Health care provider outliers and excellence; and
- Reasons why indicators that have been discarded.

The interviews were semi-structured to allow for the differing sets of expertise related to performance indicators. The experts also confirmed that we had obtained the complete document set for their country. A thematic analysis of responses from thirteen experts is provided below. Some material from this section has been integrated in the country-specific sections.

5.2 The purpose of performance frameworks and indicators

Most experts believed that developing frameworks whose purpose is to balance accountability ("the dial") with quality improvement ("the tin opener") was difficult, and that clearly articulating the purpose of the framework was necessary. Doing this will ultimately dictate which indicators are chosen. One expert felt that the same definitions can be applied to a program of work and be used to achieve both quality improvement and accountability aims. For example, data captured to drive quality improvement can be collected every month by healthcare workers (e.g. pressure ulcer prevalence collected by nurses) and acted upon locally using methods such as plan-do-study-act cycles. From an accountability perspective, a point prevalence audit using the same definitions, but a more formal approach, possibly using external parties, and a larger sample size can also be achieved and used to hold healthcare providers and services accountable for their performance.

In The Netherlands, in addition to aiding consumer information, healthcare accountability, and quality improvement, another purpose of performance indicators is for insurers to contracting selecting on price and quality. This function is part of a three-layered market that operates in The Netherlands between patients and insurers, insurers and healthcare organisations, and patients and healthcare organisations.

Experts suggested that England was the only country where the purpose of reporting indicators was to detect emerging failures of healthcare providers. This is in the background of the 2008-2009 Mid-

Staffordshire Hospital crisis (119) and other less prominent failures, and in a country with a universal healthcare system which the public has a particularly large stake in ensuring that a health service does not fail.

In England, there has been a major change in the purpose and structures of the frameworks associated with the change in government from Labor to Conservative in 2010. Pre-2010, there was a relatively straightforward "line-of-sight" structure from the Secretary of State (the Health Minister), to the CEOs of hospitals and community healthcare organisations. The framework was aligned as a command and control structure to provide direct performance management and included goals and targets such as MRSA and *C. difficile* infections, and emergency waiting times. Post 2010, there has been less focus on process and more on outcomes. The Darzi framework for quality (13) (see Section 4.4.3), published in 2008, with three domains - safety, effectiveness and patient experience - is still utilized, however a five-domain framework with a greater focus on outcomes has been grafted onto this. The policy logic of the new framework is that healthcare providers are the local decision makers and are best placed to make decisions on how to achieve good outcomes. The commissioning system in England (see section 4.4.3.2), whereby local commissioning organisations have a legal duty to seek continuous quality improvement, is seen as integral to the new framework design. The commissioner's levers are tariff incentives i.e. payments for appropriate "bundles" of care, choosing between services (elective care is the most transportable), and "naming and sharing" with the latter likely to be the most effective.

In New Zealand there are separate frameworks for separate purposes. The New Zealand Ministry of Health publishes a limited number of indicators (five for hospitals, and three for GPs) that are used for accountability purposes. In addition, a management intervention framework that outlines an escalating series of interventions to address poor performance is also associated with these indicators. In the past, District Health Boards (equivalent of LHNs) and CEOs have been dismissed on the basis of poor indicator results; Interestingly, one highly regarded hospital consistently scores poorly on these indicators (published as league tables) and is thought to occur because the hospital doesn't agree with the reliability and validity of the indicators or the performance management process and therefore does not invest to a sufficient degree in the data collection process.

The New Zealand Health Safety and Quality Commission publishes four process measures that directly relate to quality improvement programs (patient safety campaigns) that they are sponsoring and promoting. The measures are falls risk assessment, compliance with inserting a central line, hand hygiene compliance, and completion of all phases of the surgical checklist. They also intend to publish medication safety indicators but recognize that it is notoriously difficult to capture data that are both valid and reliable. The other interesting development in NZ is a shift to looking at healthcare variation – the NZ equivalent of the Dartmouth atlas. This data set is primarily used by clinicians and has been applied as a starting point to commence local investigations into potential poor performance.

5.3 Are indicators more effective at changing provider or consumer behaviour?

Most experts agreed that publishing indicators is more effective in changing behaviour of healthcare workers and management by acting on professional or corporate pride or reputation rather than

improving information to healthcare consumers and creating choice. However it was noted in a number of countries that different styles of information are being created for public and professional audiences. On the "consumer" websites, indicators are presented with info-graphics as opposed to the more formal and structured presentation on the provider-focussed sites. In The Netherlands www.kiesbeter.nl or "Choose Better" is designed for public use and includes information on health services and quality information, mainly from accreditation type inspections. In England, NHS Choices (http://www.nhs.uk/Pages/HomePage.aspx) provides a platform to publish indicators for consumers. Canada are taking a similar approach – they make no effort to "dumb down" the presentation of indicators on their "official" websites (Canadian Institute for Health Information (CIHI), Statistics Canada (SC)) and are in the process of creating a separate consumer-focussed website.

5.4 Process and Outcome measures

One expert felt that, regardless of the goal of a performance framework, over time, the emphasis should ideally shift from process to outcome measures. They used the example of the number of falls in hospitals, whereby initially an indicator such as falls risk assessment completion may have been collected. This is reasonably easy to measure but in itself does not necessarily demonstrate positive action to reduce risk or harm. This was a common indicator in an early English pay for performance scheme (CQUIN) (120) and it merely incentivized a paperwork exercise rather than provide a clear plan of action to prevent falls. Over time other process indicators that are more challenging were collected, for example prescription of benzodiazepines in older populations in hospital. As data collection systems became more mature and societal and policy demands escalated, the collection of outcome measures such as "hip fractures as a result of a fall in hospital" commenced.

Around the turn of the century when Canada's national data collection systems were emerging, the main healthcare issues were related to access. These are more suited to process measures. In more recent times, with an ageing population and the increased prevalence of chronic disease, there has been a shift in policy attention towards sustainability and therefore outcome measures, such as avoidable mortality, are more appropriate.

A number of experts pointed to the merits of "paired reporting" i.e. a clinically related pair of a process and an outcome measure. An example of a pair in the indicator set that we have collated is "Proportion of people with diabetes who have received nine care processes" and "The rate of myocardial infarction, stroke and stage 5 chronic kidney disease in people with diabetes."

One expert commented that process measures must be unambiguously associated (i.e. via high level evidence) with a good outcome. Outcomes are clearly the end goal but they may take years to change and it must be acknowledged that there are factors beyond the control of the healthcare organisation that can affect outcomes.

5.5 Information collected

The issue of what *is collectable* versus what *should be collected* was raised repeatedly by experts. Information that is contained in current information systems such as routinely collected hospital

DRGs is prioritized in most health systems, whilst indicators that may be more important but are more difficult to collect are generally not. An example in the safety domain is MRSA infection data, which are still routinely collected but affect a relatively low numbers of patients. Data on safety issues such as falls, pressure ulcers, suicide, and delayed or failed diagnosis are generally not easy to assemble, but collectively result in harm to more patients. The advent of electronic records may make the task of extracting these more inaccessible indicators less problematic.

Experts were reluctant to comment on the optimal number of indicators that should be used. One expert noted that politicians generally prefer fewer numbers (eg <20 or <50). However, all agreed that to be broadly representative, numerous range of indicators are necessary, reflecting the diversity of health services and specialities in hospital and the community and to achieve coverage across several quality domains.

All experts recognised the phenomena of measurement fixation (24), where publishing particular indicators skewed investment and improvement efforts to those which are published, whilst other clinical areas may be less emphasized. Investment and quality improvement programs are more likely to be undertaken in clinical areas where indicators are measured which may not necessarily be aligned to the health system's strategic goals.

The journey of Alberta is particularly instructive. Alberta is a Province in Canada with a population of 3.6 million. Alberta has published for four years (first reported 2009) a list comprising 57 indicators. They intend on largely discarding most of the indicators, replacing them with a set of 24 mainly outcome indicators. They found that the initial set of indicators were skewing and dictating strategic planning, rather than supporting strategic investment. Unrealistic targets against the indicators were creating political problems as they could not be achieved without significant investment.

Alberta has now created a framework based on their government strategic goals http://www.albertahealthservices.ca/8545.asp. They have two levels of indicators – strategic and tactical. The strategic indicators mostly equate to outcomes and will be published; the tactical indicators tend to be process measures and are where investment, programs, or quality improvement initiatives should be directed to achieve strategic goals. The tactical indicators are not published. For example one province-wide strategic goal is to reduce cancer mortality; the strategic indicator is the percentage of people with early diagnosis of cancer; the tactical goal is screening rates in all populations, including vulnerable populations.

Alberta has overseen a shift away from targets such as emergency department wait times which can be gamed and tend to attract a disparate level of resources to those associated with more sustainable measures such as incentivizing demand management. The example of emergency department wait times as an indicator which creates distortions in strategic planning was mentioned repeatedly by experts.

5.6 Hospital Standardised Mortality Ratios (HSMR)

One expert (Lilford) has written extensively on the flawed methodological issues with HSMRs and strongly cautions against their use (121). His colleagues have derived mathematical models that

demonstrate that the signal noise for an outcome measure such as preventable death: non-preventable death needs to approach 30% for the measure to be effective (122). Other related points that he made were:

- Mortality associated with DRGs may be valid as outcome measures;
- Infections with reasonably sound definitions provide solid end point as outcome measures;
- The majority of indicators should be process rather than outcomes because they are more actionable and less weighting and adjustment is necessary (123).

5.7 Representativeness and discarding indicators

The first principle for assessing indicators is that they need to be assessed over a number of years as it takes time for data sets and collection processes to mature. Often the publishing of indicators incentivises healthcare organisations to improve the quality of their datasets, for example ensuring co-morbidities are reliably recorded. It then takes time to assess the utility of an indicator, and perceptions of this may change over time.

Clinicians tend to prefer those indicators that are highly specific to their medical area (such as elective surgery waiting times for orthopaedics), whilst consumers are more inclined to review aggregated indicators (for example elective surgery waiting times). There is a trade-off between the level of specialisation in a performance framework and the increased number of indicators necessary to attain this specialisation. As each healthcare provider is likely to have a different proportion of clinical services, issues with weighting may arise in aggregating indicators.

One expert cautioned against too much consultation when developing indicators. Their experience had been that the process took too long and the indicators reflected the opinions of clinicians rather than being based on high levels of evidence. They thought that they spent much time discussing indicators that were not feasible to collect using current data systems.

England and Canada do the most extensive research and development work to develop indicators. In England, NICE has a key role in indicator development in England (see Section 4.4.6). In Canada, Consensus Conferences (http://www.cihi.ca/CIHI-ext-portal/internet/EN/tabbedcontent/health+system+performance/indicators/health/cihi010654) have details of the indicators that have been removed from the framework in recent years including:

- Self-esteem
- Depression
- Smoking Initiation
- Decision Latitude at Work
- Social Support
- May Not Require Hospitalization
- Expected Compared to Actual Stay
- Hip Fracture Hospitalization

There are multiple reasons for removal. These include data quality concerns, limited data availability or geographic coverage.

Other points raised by experts include:

- Use of indicators for consumers or insurers or commissioners of services can be limited if the indicators show little variation between healthcare organisations. Although there is some assurance if basic levels of safety are being achieved, competition requires differences.
- The Canadians are developing an evaluation framework for existing indicators comprising 13-16 criteria. There has been little work undertaken on this previously.

5.8 Patient experience

All experts thought that indicators of patient experience were necessary for the framework to be broadly representative. Their importance is illustrated by the Mid-Staffordshire crisis. The Francis Inquiry into Mid-Staffordshire found that: "Staff and patient surveys continually gave signs of dissatisfaction with the way the Trust was run, and yet no effective action was taken, and the Board lacked an awareness of the reality of the care being provided to patients" (22).

One expert held that patient reported indicators comprise at least four types:

- Patient satisfaction: these are the most traditional types of questions which ask patients to rate the healthcare received and its components, for example excellent, good or fair. This highly sensitive to patient's socio-economic status and expectations;
- Patient-reported diagnosis: whether a patient has been diagnosed with a particular disease. This information is used for prevalence and incidence measures;
- Patient-reported process measures: these are the equivalent of patient-reported appropriateness measures i.e. did the right process occur at the right time? It can be a clinical process such as a drug being administered or a healthcare worker introducing themselves; these are becoming more common.
- Patient-reported outcome measures: these are outcomes or functional status reported by patients. More research is being directed towards their potential utility.

These four types are represented in the list of international indicators collated by this project. The accompanying spreadsheet has details.

5.9 Integration

In terms of indicators related to integration of care, one that is reported at the national level in NZ, but not locally, is bed days taken by older people admitted as emergencies. This indicator detects elements of being admitted because patients are unable to seek adequate primary care or unable to be discharged back into the community or both. Other care integration indicators are palliative care patients being admitted and the availability of post-discharge follow up for mental health. Other candidates noted (in England) were emergency re-admissions and the time taken from discharge to community care and aged care. Canadian experts believe that mental health hospital indicators are reasonable indicators of integration; as are ambulatory care admissions.

Alberta Health Services are starting to use a measure of chronic heart failure or chronic obstructive airways disease – whether patients had contact with primary care services in the 30-days post-discharge from hospital. They also consider 30-day re-admission related to mental health and cardiac care to be measures of health integration; 30-day re-admission for surgical care is considered as a partial measure of integration and a partial measure of the quality of surgical care. Another indicator that they are considering is the percentage of surgical procedures undertaken in outpatients.

5.10 Starting points for indicator development

The Canadians have several starting points to identify new indicators. The most common is the Consensus Conference. Three have been held in the last ten years most recently in 2009 (https://secure.cihi.ca/free_products/82-230-XWE_e.PDF) and they are jointly held by CIHI and SC.

Other starting points include assessing the framework for representativeness and gaps in particular clinical areas. Currently these include mental health, equity, end of life care, some chronic disease, and continuity and integration.

The starting point for Alberta relates directly to the strategic goals of the health service. Criteria for indicators are:

- Alignment to the strategic plan
- Not needing further data integration projects
- Attribution – health services could significantly influence them
- They could cascade to lower levels that are more process driven.

An earlier section of this report briefly outlined the process used by NICE in England to develop indicators. More extensive information is found on the NICE website: http://www.nice.org.uk/aboutnice/howwework/how_we_work.jsp

5.11 Identifying high and low performing organisations

Often regulators or governments are reluctant to identify good performers because of the risk of identifying a good performer, only then to have a scandal or significant negative publicity subsequently erupt regarding that organisation. Governments are more likely to identify high performing organisations on a project or service basis rather than on a whole-institution basis. The CIHI have been attempting to identify high performers with the main criteria being three consecutive years significantly above both peer group and national averages in indicator performance in a number of categories.

Another view expressed by a number of experts was that caution is required when identifying low or high performers because the within-organisation variation is likely to be higher than the between-organisation variation. Hospitals can be highly heterogeneous in their performance which may be dependent on personnel, systems and the perceived culture at ward, specialty, and department level. Measuring performance at organisation level is likely to mask these differences.

5.12 Conclusion

Experts consulted here had much wisdom to share which we have distilled in this section. Their views were largely synergistic with the literature, summarised earlier, and they usefully frame and provide context for, the indicators set provided. In essence, to a considerable extent the literature, experts and indicators provide triangulated information on the importance and utility of public reporting using performance indicators.

6. SUMMARY OF INDICATORS

This section shows a summary of the 388 indicators derived from our international search that fulfil the criteria of nationally consistent and locally relevant. The primary data source for the indicators is shown in Table 4. A total of 45 indicators are reported in more than one country (see accompanying spreadsheet). Table 5 shows the number of indicators by Australian domain and whether they are community, hospital or population level indicators. Please note that the total number of indicators is more than 388 because some indicators are classified as more than one of community, hospital, or population. Table 6 shows the number of indicators by structure, process and outcome. The number of existing PAF indicators is shown in brackets in Tables 5 and 6 where applicable.

Some 140 of the 388 international indicators (36%) have some alignment with the PAF and most of the PAF indicators have some degree of alignment with the international indicators. However, the key difference is that the international indicators tend to be much more specifically linked to a clinical condition or disease group than the PAF indicators. The range of clinical conditions covered in the international indicators is broader than in the PAF (see accompanying spreadsheet).

Table 4: Indicators by country of origin, primary source

Country – primary source for an indicator	N
England	101
Canada	85
USA	82
Denmark	62
New Zealand	28
Scotland	18
Netherlands	13
Total	**388**

Table 5: Number of international indicators by Australian domain and community, hospital, population

Domain	Community (PAF)	Hospital (PAF)	Population (PAF)	Total
Effectiveness - Access	34 (15)	45 (5)	0	79
Effectiveness - Patient experience	25 (1)	21 (1)	1	47
Effectiveness- Safety and Quality	145 (5)	145 (16[5])	2	298
Efficiency	0 (1)	7 (4)	0	7

[5] There are seven hospital/LHN Effectiveness-Safety and Quality indicators in the PAF (6.2.1.1 – 6.2.1.7). However 6.2.1.3 (in-hospital mortality rates) and 6.2.1.4 (unplanned hospital readmission) contain condition-specific sub-indicators which are more aligned to the level at which indicators in the international list are reported. Therefore each sub-indicator has been counted as one indicator for comparative purposes.

Population health outcomes	5	9	34 (9)	48
Total	**210 (22)**	**232 (26)**	**37 (9)**	**N/A[6]**

Table 6: Number of international indicators by Australian domain and community, hospital, population

	Community (PAF)	**Hospital (PAF)**	**Population (PAF)**	**Total**
Structure	0 (1)	4 (1)	1	5
Process	126 (3)	144 (9)	1	271
Outcome	84 (18)	84 (16[7])	35 (9)	203
Total	**210 (22)**	**232 (26)**	**37 (9)**	N/A[8]

The PAF has 15 Effectiveness - Access indicators in the Medicare Local (or "community") and five in Hospital/LHN sections. Although, relatively high numbers of international indicators were also found (34 Medical Local, 45 Hospital/LHN), in some jurisdictions there is a tendency to reduce the emphasis on access (in line with a relative reduction in its strategic importance over time) with more focus on safety and quality type indicators.

Domains such as continuity, sustainability, and capability are not well represented by indicators in the PAF. This was also reflected internationally with these domains not often used in international frameworks nor indicators used.

One of the findings of the indicator search was the low number of efficiency indicators found (7). Two other sources for these indicators are:

- Accountability Framework for NHS Trust Boards. http://www.ntda.nhs.uk/blog/2013/05/03/delivering-high-quality-care-for-patients-the-accountabilty-framework-2/ This was released in May 2013.
- The South Africa has also done some work in this regard: http://www.u4.no/publications/using-financial-performance-indicators-to-promote-transparency-and-accountability-in-health-systems/ uses the following indicators to enhance accountability and transparency of funding:
  - Number of services per day per nurse

[6] A figure in this cell is not provided because indicators can be counted more than once as applicable to community, hospital, or population.

[7] There are seven hospital/LHN Effectiveness-Safety and Quality indicators in the PAF (6.2.1.1 – 6.2.1.7). However 6.2.1.3 (in-hospital mortality rates) and 6.2.1.4 (unplanned hospital readmission) contain condition-specific sub-indicators which are more aligned to the level of the indicators in the international list. Therefore each sub-indicator has been counted as an indicator for comparative purposes.

[8] A figure in this cell is not provided because indicators can be counted more than once as applicable to community, hospital, or population.

- Cost per patient visit and bed day
- Cost of staff
- Cost of drugs
- Cost of maintenance
- User fee revenue per discharge

The indicators found in the international search provide excellent opportunities to enhance the PAF's representativeness. The domains of effectiveness – safety and quality in both the Hospital/LHN and Medicare Local sections and patient experience were both recognised as in need of bolstering (see Recommendations 4 and 5). In terms of integrated care, potentially avoidable hospitalisation was recognised as important internationally and the work already done in this area by the NHPA is acknowledged and strongly supported.

6.1 Full set of indicators

In the accompanying spreadsheet, the indicators are organised by PAF domain and then by clinical speciality/disease where possible. By ordering in this way, the reader can consider similar indicators as a group, understand what they each are trying to achieve, and compare and contrast the various options that may be considered for a particular domain and clinical speciality.

Within a domain and disease group (eg ***Effectiveness of care: diabetes***), indicators have been ordered logically:

- Process indicators regarding testing or assessment, then
- Process indicators regarding treatment, then
- Immediate outcome indicators such as level of HbA1c or blood pressure, and then
- Broader outcome indicators such as strokes in people with diabetes.

All four types of indicators are generally not represented in most domain/disease groups. Clearly the different types of indicators have strengths and weaknesses. Chiefly, these are in terms of attribution, need to risk adjust, ability to action and ease of collection. By grouping these characteristics this level of information can be more easily assessed.

Column	Column Label	Description/Purpose
A	Key words / concepts	Key words that allows searching on indicators for similar concepts. For example, indicators related to cancer are found in the domains of access, quality and population outcomes, so by searching using Column A these can all be viewed.
B	Indicator	The name of the indicator. For indicators that are collected in several countries the wording may be different but if the meaning is the same or very similar these are integrated into one row. This can be a judgement call, and especially in the population outcomes domain, there may be, quite similar (separate) indicators.
C	Country	Column C and M show the country where the indicator is currently used.

Column	Column Label	Description/Purpose
		We had to make a decision which country was shown in column C for those indicators with multiple countries - they are ordered by countries with the most comprehensive and comparable information to Australia and understandable – so the order is: Canada, England, Scotland, New Zealand, USA, (Alberta), Netherlands, and Denmark. Column N shows the URLs of the indicators for the other countries where it is collected (other than the Column C country).
D	Organisation reporting/source	The organisation where the indicator is reported.
E	URL - reported	Column E and F, respectively where possible, show the URLs where the data of the indicator were reported, and their definitions. In some cases, the data and definitions are shown on the same webpage and the definition may not be very comprehensive. In Denmark, given translation issues, these are often blank.
F	URL - definitions	
G	Lowest level reported	Column G and H respectively show the lowest level that the indicator is reported at the home country and its equivalent (usually LHN or ML) in Australia. Column I shows whether the indicator is a community or hospital (or population) indicator based on the Australian structure. An example is many indicators in New Zealand are recorded at District Health Board level (equivalent to our LHN), but for an Australian context they are more applicable at ML or community levels such as the rate of older people prescribed certain medications. A considerable degree of judgement was required for this classification and many indicators are applicable to more than one category.
H	Equivalent lowest level of Australian public reporting (ie Hospital, LHN, ML, State)	
I	Healthcare service - Hospital [H], Community [C], Population [P]	
J	Relevant Australian Domain	The Australian PAF domain into which the indicator is classified and/or most closely aligned (where applicable).
K	Clinically relevant classification	Clinical terms associated with the indicator.
L	Indicator type- Process [Pr], Outcome [O], Structure [S]	Whether the indicator is structure, process, or outcome.
M	Total number years reported and year first reported	When an indicator was first reported and the number of years reported. This information can be difficult to find and is subsequently not available for all indicators.
N	Similar indicators reported in other countries	See Column C
O	Summary of technically similar indicators within other countries	See Column C
P	PAF indicator aligned with	The PAF indicator to which the indicator may be related. We have used reasonably inclusive criteria so the match does not have to be exact.
Q	Evidence for use/impact of	The evidence of use of the indicator. Often this is blank or not very comprehensive with England and Canada usually providing most details.

Column	Column Label	Description/Purpose
	indicator	Usually we have provided URLs.
R	Unique row ID	An ordered number list. Its purpose is to ensure that the list back can be re-ordered to the original if it is sorted or modified in any way.

7. GAP ANALYSIS / RECOMMENDATIONS

Six recommendations emanate from this project and are for consideration by NHPA staff. The first three relate to broad strategic and operational issues whilst the last three are more specific to the choice of indicators in performance frameworks.

7.1 Quality Statements

Recommendation 1: NHPA review the English Quality Statements and give consideration to adopting a similar system in Australia.

The indicators in England's NHS Outcomes Framework and the Clinical Commissioning Framework, and published on the Health and Social Care Information Centre's Indicator Portal (https://indicators.ic.nhs.uk/webview/), are accompanied by a "Quality Statement". A Quality Statement is designed to provide key information on criteria underpinning an indicator. They essentially establish the principles by which an indicator is chosen. The criteria used are:

- Relevance
- Accuracy and Reliability
- Timeliness and Punctuality
- Accessibility and Clarity
- Coherence and Comparability
- Trade-offs between Output Quality Components
- Assessment of User Needs and Perceptions
- Performance, Cost and Respondent Burden
- Confidentiality, Transparency and Security

The Quality Statements provide the public and policy makers with a level of confidence that can be ascribed to indicator data. They may point to relevant actions that could be necessary to improve the reliability and validity of indicator data.

7.2 Indicator publication purpose

Recommendation 2: NHPA review the structure of international online health care performance reporting systems in relation to targeting different users.

Countries which have been publishing nationally consistent and locally relevant indicators for a number of years were increasingly designing their websites with their users in mind. Best practice seems to distinguish between two sets of users – the public, and others, comprising healthcare providers on the one hand and governments and their policymakers on the other. In England, there is a website for the public (known as NHS Choices) and for others, the Health and Social Care Information Centre's Indicator Portal. Canada's current CIHI indicator website is designed for policymakers and healthcare providers. However, Canada recognises that a complementary website is necessary for public consumption, and this is currently in the design phase. The "public" websites tend to have user-friendly language, and less detail than the policy-focussed websites.

7.3 Learning from the role of the National Institute for Health and Care Excellence (NICE) in indicator development

Recommendation 3: NHPA to review the NICE and CIHI processes for possible application in future indicator development and review cycles.

NICE in England has a major role in developing evidence for use in the English National Health Service (NHS) and to integrate this evidence into performance framework indicators. NICE develops guidelines and uses the evidence within the guidelines to develop national quality standards and then indicators for consideration within performance frameworks. It has responsibility to test indicators and widely consult with stakeholders before finally recommending that the indicators are released within performance frameworks. NICE staff use standardised and transparent methods for all phases of evidence and indicator development. The CIHI in Canada also has robust and transparent methods for converting evidence into indicators.

7.4 Balancing process and outcome indicators

Recommendation 4: NHPA should consider including more process indicators relating to effectiveness – safety and quality in both the Hospital/LHN and Medicare Local sections of the Performance and Accountability Framework (PAF).

The project found benefits in including both process and outcome indicators and for a balanced approach within a performance framework.

Within the effectiveness-safety and quality domain in the PAF, 15 of the 16 Hospital/Local Health Network (LHN) indicators[9] are outcome-based with the exception of "6.2.1.7 rate of community follow up within the first seven days of discharge from a psychiatric admission". The international list collated for this project has 81 examples of Hospital /LHN process effectiveness indicators, many of which are applicable to high volume procedures or admissions and are based on evidence-based clinical guidelines, for example:

- Patients with atrial fibrillation are treated with anti-coagulation drug therapy or an anti-platelet therapy
- Heart attack patients given aspirin at discharge
- Proportion of patients mobilised within 24 hours of hip fracture surgery
- Timely administration of antibiotics in patients with severe community acquired pneumonia

Similarly, within the effectiveness-quality domain (community), three of the five Medicare Local indicators are outcome-based. The two process indicators, "diabetic patients who have a GP annual cycle of care" and "asthma patients with a written asthma plan" are good examples of measurable

[9] Each of the five conditions relating to in-hospital mortality rates and six conditions related to unplanned hospital readmissions are considered as a separate indicator consistent with the structure of the international indicator review.

actions in high volume conditions which have a significant burden of disease in Australia. The international list has 97 examples of other community-based process effectiveness indicators.

The benefits of process measures include being suitable for quality improvement as these are under some control of the clinicians. Compared to outcome measures, less risk adjustment is needed, they are generally more timely, and collection is more amenable to automatic electronic collection.

7.5 Patient experience

Recommendation 5: NHPA should enhance their current patient experience indicators with more patient reported process measures and consider patient reported outcome measures in future iterations of the PAF.

The indicators for patient experience (Hospital/LHNs - 6.2.2.1, Medicare Locals - 6.3.2.1) are not specified in detail in the PAF, however some are reported on the My Healthy Communities website. The international experts viewed patient experience as an important and necessary inclusion within a performance framework. They also pointed to a current trend away from patient satisfaction as there are issues relating to reliability as expectations of the healthcare system can be markedly different between individuals and across socioeconomic status, and there are also definitional issues. Patient reported process measures (did the right thing happen at the right time? For example, the "GP explained the reasons for referral to a medical specialist" which is an indicator on the Health Communities website) and outcome measures (generally around patient's functional status) are becoming more common and more research is being devoted to their utility within performance frameworks. Patient reported process measures are shown in rows 344 - 351 and patient reported outcome measures are in IDs 353 - 371 in the international list.

7.6 Indicators relating to special interest or vulnerable groups

Recommendation 6: NHPA should consider reporting on healthcare system performance for special interest or vulnerable populations such as mental health and the elderly.

One indicator (6.3.3.9: "GP service utilisation by residents of Residential Aged Care Facilities") is focused specifically on a special interest or vulnerable group. Such groups may not benefit from optimal healthcare system performance because of barriers such as culture, language, gender, age, disability, discrimination, income and level of literacy. The PAF is structured to allow analysis of healthcare system performance stratified by vulnerable groups as well as by Hospitals/LHNs or Medicare Local. The NHPA has used this stratification method when reporting immunisation rates for Aboriginal and Torres Strait Islander children (4), and should consider replicating the method for other groups and indicators.

For clients with mental health issues, health system performance reporting can be enhanced by either stratifying or adding more indicators. There are five mental health indicators in the PAF, three relating to Hospitals/LHNs and two relating to Medicare Locals. Both Medicare Local indicators are in the Access domain, meaning there are currently no mental health effectiveness indicators in the community. Given its high burden of disease, and its status as a national priority, mental health may

consequently be under-represented in the PAF. The international list shows 41 mental health indicators (30 process, 11 outcome), with 33 applicable to Hospitals/LHNs and 26 applicable to Medicare Locals.

8. APPENDIX A: THE PERFORMANCE AND ACCOUNTABILITY FRAMEWORK

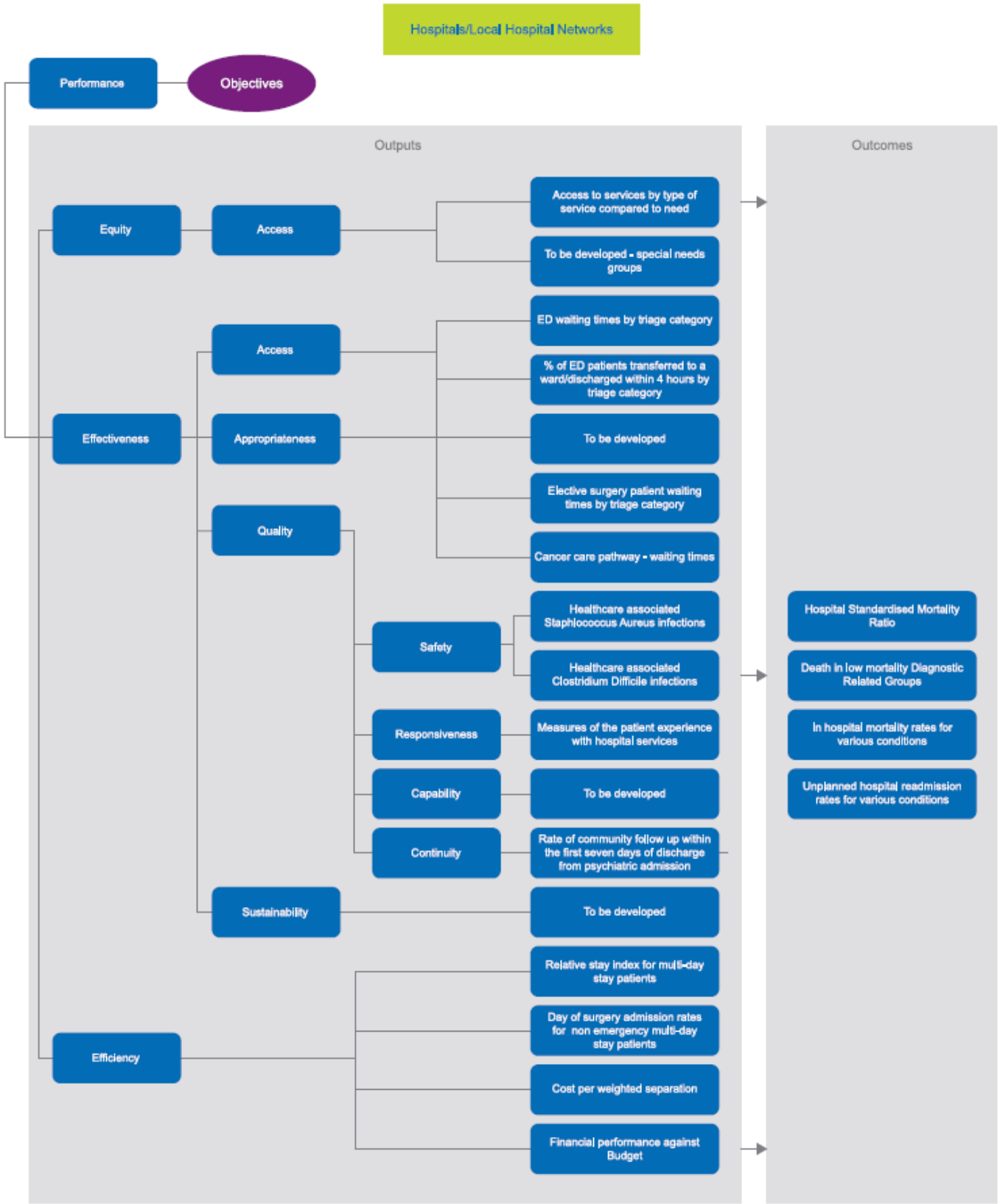


Figure 7: The PAF for Hospitals / LHNs

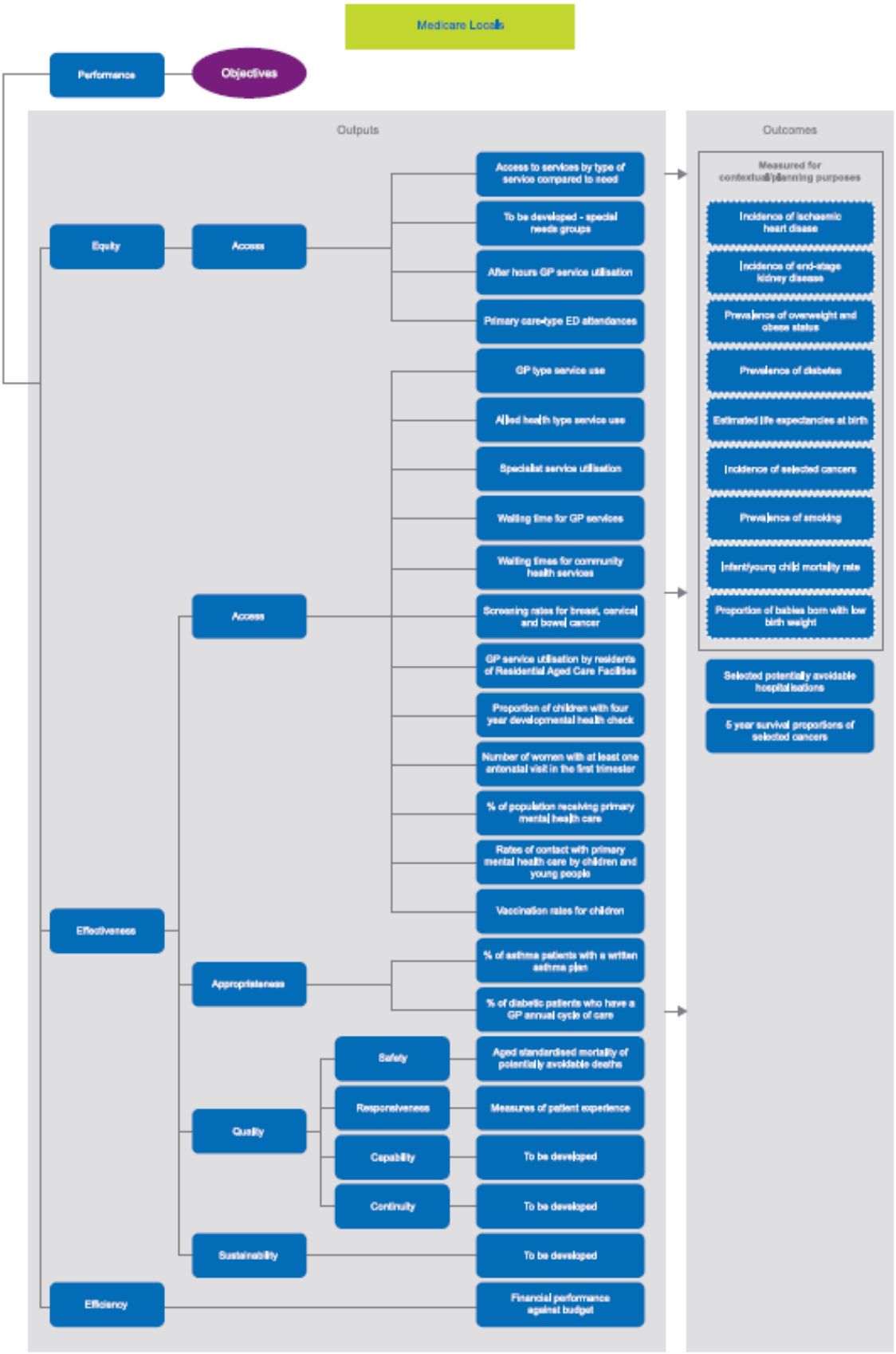


Figure 8: The PAF for Medicare Locals

9. APPENDIX B: FRAMEWORK FOR QUESTIONS TO INTERNATIONAL EXPERTS

9.1 Describe the task

- Outline the documents and relevant agencies that we have identified.
- Have we missed any important data source or agency?

9.2 Performance frameworks – their purpose and target

- When, who, why, how was it developed?
- Who owns it? What is that agency's responsibility?
- How often is it reviewed?
- Who is the Target audience ie government, health care providers, public?
- Key objectives: So is the purpose trying to hold the providers accountable, or for the public to make an informed judgement about the local health service, or for providers to respond to gaps in care that have been identified (quality improvement)?
- Can the performance frameworks be used for both accountability and quality improvement? (given that the criteria for suitability of an indicator for judgement are highly likely to be more stringent than those for QI)
- Is the performance framework linked to a pay for performance scheme?
- Do you have any evidence of gaming or perverse incentives built into the system?
- What are the inclusion and exclusion criteria to develop indicators in the framework?
- How do you select new indicators, ie review of other countries, driven by local results etc?

9.3 Relative utility of process and outcome indicators

- Have you had a debate about including process and outcome indicators? What mix do you use and why?

9.4 Utility of patient-reported / experience indicators

- Do you use patient experience indicators? Are they important to include in a performance framework?

9.5 Indicators associated with integration

- Is integration / co-ordination between primary and secondary care a policy driver in your country?
- Are any of your indicators targeting integration / co-ordination? If yes how many approximately and what impact have they had?

9.6 Health care provider outliers and excellence

- Who manages outliers (ie health care providers who perform poorly or "below standard")? What is the action taken?
- Are there any thresholds or targets that are published as criteria for poor performers?
- Is it possible to identify health care provider excellence?

- Does any agency identify health care provider excellence? What do they do with this information?

9.7 Reasons why indicators that have been discarded

- Is there an ongoing monitoring process on utility of the indicators individually and as a whole to ensure that they are broadly representative?
- How many indicators do you have? Are there any limitations on how many is appropriate?

10. APPENDIX C: THE IMPACT OF PERFORMANCE MEASUREMENT ON THE QUALITY OF HEALTHCARE: A RAPID REVIEW OF THE INTERNATIONAL LITERATURE

10.1 Introduction

A rapid review of the international grey and peer-reviewed literature was undertaken to form background to our examination of international performance indicator frameworks. The search was guided by the following question:

- What can academic research and grey literature tell us about the impact of performance measurement regimes on the quality of healthcare?

The definition of the term 'performance indicators' used in this review is taken from Crampton et al. (9 p.3) who describe them as 'measurable elements of practice performance for which there is evidence or consensus that they can be used to assess the quality, and hence change of quality, of care provided. [...] They can relate to clinical, population health, financial and organisational performance.' Overall, this review found that although there is a substantial literature dealing with the design, properties and scientific soundness of individual indicators, there is much less consideration of how indicators are actually used in practice and of the impact they may have on behaviour of health professionals or on the quality of care.

This document is structured into five parts:

Overview: describes how the literature search was conducted and gives a broad overview of the characteristics of the resulting documents.

Purpose of performance indicators: situates the performance indicator discussion in the wider debate about performance measurement and monitoring in healthcare.

Mechanisms and barriers: summarises the investigation of a theoretical link between performance measurement and quality improvement in terms of the putative facilitators of, and barriers to, this link.

Evidence of impact: examines the empirical support for performance measurement affecting the quality of care in either a positive or perverse way.

Recommendations: synthesises the advice given in this body of literature for those wishing to maximise the potential that a measurement framework will induce quality improvement (or at least, quality improvement-directed activity).

10.1.1 The literature search

Two databases were searched. One [Medline: http://www.nlm.nih.gov/bsd/pmresources.html] is considered a comprehensive source of academic journal articles related to all aspects of healthcare, and another [King's Fund library in the U.K.: http://www.kingsfund.org.uk/library] holds a broad selection of internationally published grey literature as well as academic articles. The search strategy for each database is detailed at the addendum to this chapter; it was designed to capture articles

which examined aspects of the relationship between performance measurement and the quality of healthcare.

The resulting references from both databases were imported into a reference management program, Endnote X5, and their abstracts screened. Any articles not meeting the following inclusion criteria were excluded. The full texts of those remaining were included in the review.

- Inclusion criteria:
- Any article whose focus is on the relationship between performance measurement and some aspect(s) of the quality of healthcare [these articles are labelled 'central relevance' in the search results below (Table 7)];
- OR any article whose focus is on the development or operation of a national- or regional- level performance measurement regime, *and* addresses the link between that regime and quality improvement [these articles are labelled 'useful background' in the search results table below (Table 7)];
- If the article relates to a particular country, this country should be one of those included in our indicator search [US, UK, Canada, Denmark, Netherlands, New Zealand, Australia] unless it is especially relevant to the research question.

10.1.2 **Search results**

The results of applying the search strategy were as follows. (Table 7)

Table 7: Articles identified in two databases

	MEDLINE DATABASE	**KING'S FUND DATABASE**
Total number of articles	720	668
Total after duplicates removed from within each database	653	668
Total after inclusion criteria applied	106 [of which 41 were of central relevance to the question; the remainder were useful background]	121 [of which 64 were of central relevance to the question; the remainder were useful background]
Total for both databases after duplicates between them removed	217 [of which 100 were of central relevance to the question: remainder were useful background]	

In addition to the references obtained from the two databases, 29 relevant articles were identified using 'snowballing', i.e. through reading reference lists in the above articles, via a review of Google Scholar's forward citations function, and through colleagues' recommendations.

10.1.3 **Characteristics of this literature**

Of the 100 articles of central relevance to the guiding question, 17 were from the grey literature and the remainder from the peer-reviewed journal literature. Forty-six dealt with performance measurement regimes in the UK, 17 compared systems or experiences in multiple countries, four examined Dutch performance measurement, 17 looked at systems in the US, four in Canada, three in Australia, and one each in Norway, France and Germany. The others were conceptual papers which discussed the theory of performance measurement rather than its relation to any particular health system.

Klazinga et al. (124) examined the health services research literature for studies relating to performance indicators and benchmarking in the European context. They reported that journal articles published on these topics increased by an average of 18% each year between 2000 and 2010. Most research had been done on hospital-related indicators, followed by primary care indicators and those relating to patient experience and patient safety. The vast majority of research Klazinga and colleagues uncovered related to the analysis of specific indicators (in terms of their design, reliability, validity and so on) rather than to the methods and challenges of conceptualising, designing or implementing indicator frameworks as a whole. They found little about the impact of introducing such frameworks on the quality of care, recommending further research.

This conclusion is supported by others who note that the evidence base for such impact is weak (16, 30, 125, 126). Empirical research in relation to performance measurement more generally is also recognised to be limited: 'it is likely that in some settings individual managers and clinical leaders have found effective ways to use and apply performance measurement information, just as in some settings quality improvement has been applied effectively ... but virtually no rigorous studies have described effective broader-level performance measurement practice and elucidated its features' (125 p. 67). This does not mean that such schemes do not have positive effect on quality; rather it may reflect the difficulty of attributing change solely, or partly to the activity of performance measurement.

10.2 The purpose and method of performance measurement

Performance indicators are specific measures of healthcare inputs, outputs, processes or outcomes. It has been claimed that they 'create the basis for quality improvement and prioritization in the healthcare system' (10 p.523), and many believe that performance measurement should be an integrated part of wider quality improvement efforts. There is no consensus on this point, however; some see sets of indicators as political tools with mainly symbolic and ritual value (11). Since developing indicator sets requires some judgement about what constitutes good quality healthcare, they may also be considered 'conceptual technologies' that shape '*which* issues are thought about and *how* people think about them' (12 p.130). This is a key point: indicators deemed important will be in the foreground and privileged; and those not will receive less attention, even though the issues they represent may require attention or be considered important by some stakeholders.

By their nature, performance measurement efforts 'create winners and losers,' and therefore have an 'immensely political nature' which may 'challenge vested interests' for different stakeholders in

the healthcare system (17 pp. 697-698). The stakes are high, as well: 'performance measurement done well is broadly productive for those concerned. Done badly, it can be very costly and not merely ineffective but harmful and indeed destructive' (33 p. 1).

Nevertheless, most, if not all, health systems in the developed world incorporate some form of measurement and data collection to monitor the health of the population and the activity of organisations responsible for delivering healthcare. Historically, the purpose of such efforts (whose first proponents included Florence Nightingale) was to gauge the amount of activity being completed in return for the investment made by funding bodies. In recent years, technological and policy developments have driven measurement effort towards a focus on organisational performance in terms of the quality of care. The available information infrastructure has become more sophisticated, and the policy agenda in many countries has shifted from simply increasing output per unit of investment towards improving patient experiences and outcomes. It is the association between this goal of quality improvement and the burgeoning activity of performance monitoring which this literature review seeks to examine.

10.2.1 **Indicator sets**

Indicator frameworks are complex to design because they are structured according to multiple dimensions. The quest for a single 'composite' indicator to show the quality of a health system has largely been abandoned (14) and a dimension-based approach with a mix of indicators is thought to provide a rounded picture which does not disguise areas of weakness. Dimensions require balancing according to the health system's goals and priorities (127). Firstly there are broad domains describing what the indicator measures. The three most common examples of domains are those grouping measures of the efficiency and effectiveness of organisational activities, as well as the equity of their distribution across the population (40). A commonly referenced way to define the quality of care uses these three plus three others: patient safety, timeliness of care, and patient-centeredness (3).

Secondly, indicator sets commonly contain a combination of the Donabedian triad (structure, process and outcome assessments) (66). Aspects of structure include contextual factors such as population need in an area, the organisational design and incentives in place or level of financial or human resources available to an organisation; these factors may affect the ability to achieve a certain level of quality. Process measures are those which show the extent to which an organisation is undertaking its workflows and conducting associated activities according to approved procedures, standards or evidence-based guidelines; usually the process under scrutiny has been linked to improved outcomes. Outcome measures gauge the impact a health service has had on an individual or population's health, and include mortality rates, functional or quality of life improvement, and patient experience of care. Emphasis on one or more of these types of indicators may be appropriate for different purposes – process measures are better for timely feedback to clinicians on their service's performance, as outcomes mostly involve a time lag – but generally it is considered advisable to assess quality using all three (125).

Until recently, data used for performance measurement was almost exclusively that which had been provided by a clinician providing care or by the administrators of an organisation. However, in many countries, emphasis on the patient's experience of healthcare and their satisfaction with it, as well as policy prioritisation of patient-centred care and shared decision making, has come to be seen as a central plank of quality (e.g. Darzi, 2008 (13)). Patients' self-reports are the way to access this type of information, and indicators which incorporate data from patient surveys have become commonplace in many national indicator sets. Examples of this are patient-reported outcome measures (PROMs) which are collected across the English NHS before and after all episodes of four types of surgery (hip replacement, varicose vein removal, knee replacement, and hernia repair) (128), and which form the basis of many indicators in the NHS Outcomes Framework (129).

Complicating matters further in the effort to develop a national-level indicator set is the need to assess all these factors over the lifespan, across different types of healthcare, and within a range of health conditions. The dimensions which are taken into account when developing indicator sets are reflected in Table 8 (collated from: 12, 14, 126, 130)

Table 8: Dimensions of indicators

Dimension	Example aspects of dimension
Domain	Effectiveness [survival, intended outcome, quality of life] Appropriateness [evidence-based, timely, patient-centred] Efficiency [inputs/investment Vs outputs/outcomes] Equity [of access, outcomes]
Indicator type	Structure [contextual factors such as population need, level of resource] Process [such as evidence of compliance with guidelines] Outcome [intermediate or final]
Type of reporting	Administrative data Provider reported Clinician reported Patient reported
Setting	Hospital inpatient Hospital outpatient Rehabilitation and residential care General practice and community care
Life stage	Maternity Child Adult End of life
Condition	Low level community illness Emergency and acute illness Long term conditions Mental illness Terminal illness
Performance level	Individual practitioner Provider organisation Regional

	State National

10.2.2 **Who uses indicators, and what for?**

A key theme emerging from this literature review is that indicators of performance are not an end in themselves; 'it is only when someone uses these measures in some way that they accomplish something,' (131 p.586). They are used by 'diverse parties for diverse purposes' (11 p.12). Examples of the purposes to which indicators are put by stakeholders are listed in Table 9 (collated from: 15, 16, 131, 132).

Table 9: Stakeholders and their use of indicators

Stakeholder	**Purpose**
Patients and potential patients	To make an informed selection of provider or treatment
General public	To form a judgement about a local health service
Media	To form and publicise a judgement about a local health service To rank health providers
Government-as-payer and other purchasers of care	To hold providers of care accountable To compare/ benchmark providers
Government-as-regulator and other regulatory or accrediting agencies	To control behaviour To judge performance against agreed standards To be alert to 'alarm bells' of poor performance To monitor impact of policy initiatives
Managers of providing organisations	To control behaviour To monitor gaps between expected and actual activity or performance To aid resource management and planning To design local improvement strategies
Clinicians in providing organisations	To drive self or team improvement To compare performance against peers
Research	Investigate the impact of policy or other interventions Monitor trends over time

10.2.3 **Accountability versus improvement**

The greatest debate in the literature about the uses of indicators surrounds the top down – bottom up distinction between the application of indicators by Government or purchasers for accountability, and their application (often internally to an organisation) for quality improvement purposes (12, 15-17). Some have suggested that there is a need to 'differentiate performance reporting at a national level for purposes of accountability from reporting at a local level needed to build knowledge of effective and safe care processes' (133)). Although others say that indicators used for each purpose

'need not be mutually exclusive' sets (15), they do imply contrasting requirements of each indicator. These different requirements have been adapted from characterisations proposed by Raleigh and Foot (16 p.6) and Freeman (12 p.129) and collated in Table 10.

Table 10: Two key applications of indicators: by government and improvement agents

Indicators for judgement (e.g., government)	**Indicators for improvement (e.g., improvement agents)**
Interpretation must be unambiguous	Tolerance for variable interpretation
Attribution must be clear	Tolerance for ambiguity
Will be taken as definitive marker of quality	Screening tool to highlight areas for further investigation
Can stand alone	Possible to take context into account
Require good data quality, statistical reliability	Reliability required but data quality less important and lower precision allowable
Require good risk-adjustment	Partial risk-adjustment tolerable
Usually cross-sectional	Time trends more useful
Used for punishment/ reward	Used for learning/changing practice
Mainly external (including public) use	Mainly internal organisational use
Risk of unintended consequences	Lower risk of unintended consequences

As Table 10 shows, the selection, interpretation and use of indicators may well be different in a set designed primarily for judgement purposes as against a set designed primarily for improvement purposes. As Raleigh and Foot see it, the criteria used to evaluate the suitability of an indicator for judgement are much more stringent than those for improvement, simply because the results are likely to be taken (particularly by the media and public) as definitive markers of that organisation's quality of care, however many caveats are attached to their publication. Because many indicators do require such caveats, and cannot always be interpreted in isolation from other variables, there is therefore a greater risk of unintended consequences such as misplaced vilification of an organisation and its staff (123, 134).

10.2.4 **National indicator framework**

Internationally, relative emphasis on judgement against improvement manifests variably in national indicator frameworks. Those studies describing the development of cross-country comparison frameworks – such as the World Health Organisation PATH (Performance Assessment Tool of quality improvement in Hospitals) tool and the OECD Quality Indicators Project – highlight these differences. There are 'major differences ... with regard to the philosophy' behind national indicator projects. In a study of 11 national indicator frameworks, Groene et al. (130) found that these could be characterised in two groups according to the principal use of results. While around half of the countries emphasised public reporting and accountability, the other half used the results purely for (non-publicised) feedback to organisations to stimulate improvement.

A particularly judgement-focussed measurement framework was the 'star ratings' system in the English NHS, which was operational between 2001 and 2005 (18). This system was one in which

achievement on a limited number of ‘target’ indicators (including 4-hour wait in emergency and 18-week maximum wait from referral to treatment for elective surgery) determined an organisation’s published ‘star rating’ – from zero to three stars. Relying largely on the fear of reputation loss, it was later labelled a ‘targets and terror’ regime (132). On the other hand, a particularly improvement-focussed performance measurement regime is a German voluntary reporting scheme (Bundesauswertungen – BQS) where regular feedback sessions with staff are based on ‘structured dialogue’ and emphasis is on identifying quality improvement actions in relation to each indicator (19, 130).

Overall, authors included in this literature review express greater favour for using indicators for formative improvement rather than for summative judgement. Indicators, they say, are just that – indications that further exploration is necessary. This is exemplified in a phrase which is often quoted in this set of literature: most indicators are ‘tin openers rather than dials. By opening up a can of worms they do not give answers but prompt investigation and inquiry, and by themselves provide an incomplete and inaccurate picture,’ (20 p.49). So whatever mix of indicators is included in a framework, caution in their interpretation and use is recommended.

10.3 The link between performance measurement and quality improvement

We turn to literature describing the theoretical link between performance measurement activities and quality improvement. Broadly conceived, 'the rationale behind monitoring performance is to impose an inherent pressure to improve practice ... some believe that monitoring alone alters professionals' performance through psychological pressures similar to the Hawthorne effect ...' (21 p.2). It is difficult to assess whether this is in fact the case, since performance monitoring is not relied upon in isolation, but usually forms part of a suite of levers intended to encourage quality improvement. Generally it is thought that ‘the agent needs an incentive to take notice of the performance measures’ (17 p.688) and some of these levers and incentives are introduced below. This is followed by an assessment of research which highlights the potential barriers to measurement-induced improvement.

10.3.1 **Levers and incentives**

The link between performance measurement and quality improvement is disputed and not well understood or researched (40). Further, the existence of this link is often assumed rather than investigated by those implementing measurement frameworks, as data are thought to ‘foster insight into practice ... [and act as a] focus for feedback and learning’ (12 p.128). There is, however, little disagreement that there is a need for health systems to undergo some sort of performance assessment to inform decision making: ‘the performance of healthcare services and systems needs to be made explicit and used as the basis for improvement strategies.’ (124 p.39). There is consequently a body of work which examines the nature and impact of mechanisms which are believed to help promote quality improvement through the use of performance data. Principal among these are intrinsic motivation, pay for performance, public reporting, accreditation/regulation and benchmarking.

These five mechanisms are thought to work to improve quality through the behaviour change they engender in two groups (15). The first group is composed of those stakeholders who are external to the organisation, and who (it is thought) can act to improve the overall quality of healthcare by selecting better performing providers or de-selecting those performing less well. This selection can happen via public reporting of performance results, and may be done by patients (who may vote with their feet), private purchasers such as health funds (who may provide or withdraw patronage), or by regulators and accreditation agencies (by 'scoring' the provider, conferring advantage on good performers, instituting some form of penalties or disadvantage on poor ones, or in extreme circumstances de-registering them).

The second group comprises those stakeholders – such as clinicians and managers – who work within the organisation subject to measurement. The use of data to plan and undertake activities intended to effect improvement, such as the introduction of projects or initiatives e.g. process redesign, hand hygiene or training and focus on improving patients' experiences of care, are the internal mechanism of change. Changes in processes and activities may be induced by sparking intrinsic motivation in staff (for example, through benchmarking with other organisations and peer competitiveness), by promising rewards or punishments (such as target regimes and pay for performance), or through fear of reputation loss (following a negative published judgement by regulators and subsequent media). The question of whether such activities in fact do have a positive impact on the quality of care is a separate issue which is often investigated separately in the literature. Evidence of this kind of impact will be examined in Section 8.5 of this review.

10.3.2 **Barriers**

Multiple barriers to a positive relationship between performance measurement and quality of care are cited in the literature. These can be grouped into four categories: problems intrinsic to the indicator; problems with collected data; problems with the use and interpretation of the data; and the confounding influence of organisational and contextual factors.

Problems intrinsic to the indicator include all the scientific validity and reliability concerns and risk adjustment issues which attend the collection of statistical information. Even the most commonly collected indicators have been exposed in the literature as problematic in terms of risk adjustment and attribution. Mortality rates, despite their almost ubiquitous use as indicators of hospital performance, have nevertheless been labelled by two respected scholars as 'a bad idea that just won't go away' (121 p.955) and a misleading way to present quality of care. A type of mortality rate which has been especially controversial recently is the Hospital Standardised Mortality Ratio (HSMR) (135). The indicator is controversial because it is claimed to point to avoidable (excess) mortality and is therefore often seen as evidence of poor quality of care in a hospital. Problems with using HSMR to reflect level of quality are that it relates to a relatively rare event (mortality) in the total activity of the hospital and that it is insufficiently capable of being adjusted for case-mix type and severity (136). Hospital readmission rate is another indicator commonly employed to assess quality of care, but it has also been criticised as incapable of doing so fairly. This is partly because a patient may be 'readmitted' to a different hospital to that which performed the initial care, and partly because other factors outside the control of the hospital including the patient's life circumstances or poor

community healthcare may contribute to the necessity for readmission (137). Many indicators face similar problems of attribution.

The type and quality (especially completeness) of collected data is a second potential block between measurement and improvement. Poor data quality is a commonly cited problem, both in terms of its availability and accuracy. The absence of a unique patient identifier (which stymies linkage between databases), poor standardised coding, and imprecise or contested indicator definitions – among other issues – can contribute to this situation (124). The opportunistic use of readily available data in an indicator set at the expense of developing 'newer, more important and meaningful measures' (125) may also be a barrier to improvement.

Interpretation of the results of performance measurement is fraught with difficulty (16) if misleading conclusions are to be avoided. For example, 'it is difficult to be sure that a measure truly reflects differences in the quality of two or more services ... rates may increase due to better reporting, or may be affected by changes in the type of patients rather than changes in the quality of the services' (126 p.237). The problem of under-reporting has been highlighted in the context of the national patient safety incident reporting system in England where results are identified with individual organisations. Those organisations with apparently higher rates of error may in fact have a healthier 'safety culture' in which there is less fear of reporting than in a similar organisation with apparently lower rates of error (138).

Interpretation issues also stem from taking a selection of measures of the performance of an organisation, and using them to represent the whole of that organisation's quality of care (18). This move, inherent to any performance measurement regime, has come in for criticism because 'little or no correlation exists between how well a hospital performs on one standard of safe and effective care and how well it performs on another' (121 p.955).

Performance results do not in themselves show what should be done about them, and 'most schemes appear to rely on a vague hope that providers will 'do something' in response to the data' (139 p.99). There is little research into whether and how such data are used in public sector decision making (140). Even the best quality data may not be used in a way that facilitates improvement or motivation for improvement. This may be because of a lack of capacity within an organisation to either understand the data or what they imply for action (15, 141).

Such lack of ability to look into the implications of data was recently exposed during the public inquiry into poor care at Stafford Hospital in England (22). Despite repeated notifications over a number of years that various indicators placed them as 'outliers' against their peers, this organisation habitually discounted the implications, often attributing the results to 'coding error.' The inquiry uncovered a culture at the hospital where 'results have not instinctively been welcomed as useful information that informs consideration of the safety and effectiveness of service provision; in fact, such results have provoked defensive attempts to discredit the information' (22 p.474).

Other contextual factors which may block the improvement pathway between measurement and quality include professional resistance to compliance with what is perceived to be a form of

managerial (or statist) encroachment on professional autonomy (102, 142). Patient and public inability to access, understand or interpret reported data may reduce the impact this data has on their selection of provider or health plan (143).

It should be noted that all of these stumbling blocks are seen as less of a serious problem if the goal of data collection is purely for exploration and investigation for quality improvement purposes; 'if we regard indicators as pointers, it is not necessary for them to be completely valid in order that they can be used in an appropriate manner ... the question is whether performance indicators designed for external use are always interpreted in this way' (31). Where they become potentially harmful to an organisation, in other words, is when they are reported in ways which convey overall messages about quality without the requisite caveats attached (16). On the other hand, such caveats can be used as excuses for inaction by organisations showing poor results.

10.4 Evidence of impact on the quality of care

10.4.1 **Difficulty in attribution of improvement**

Part of the reason for the relative paucity of research examining the link between indicators and improvement may be the difficulty in attributing changes in quality of care to any one policy initiative or intervention. Not only are there so many initiatives aimed at improving quality that healthcare professionals may end up suffering 'change fatigue' (144) but also it is often impossible to tell whether changes would have happened anyway without the introduction of performance measurement (35). There is also the basic problem that health outcomes are affected by many social, environmental and genetic factors which are nothing to do with the activities of healthcare organisations.

Despite these difficulties, there is published empirical research examining positive and negative associations between introducing performance measurement regimes and the quality of various aspects of healthcare. The impact of performance frameworks has been examined most frequently in relation to: targets in a 'command and control' style performance regime; pay for performance systems; and public reporting of performance. In practice, these are implemented alone or in various combinations, but each will now be examined separately, in turn.

10.4.2 **'Command and control' target regimes**

Much has been written about the negative consequences of target-driven systems of performance monitoring (17). Under such schemes, receiving rewards (whether financial or in terms of good reputation or earned autonomy) is made contingent upon reaching a small set of targets. Perhaps the best known (and most studied) of these was the 'Public Service Agreement' target framework in place under the Labour governments in England between 1997 and 2010. Scotland has more recently adopted a target-focussed approach for its public services (112).

Many scholars have argued that such initiatives encourage a range of perverse consequences which may in fact diminish the overall quality of care (e.g. 25). These include the distortion of clinical priorities – so-called 'target myopia' – and neglect of non-target driven areas of care; a tendency to

adhere to the letter rather than the spirit of the target – 'meeting the target but missing the point'; a culture of bullying and intimidation of under-performing managers and clinicians; a 'ghettoisation' or stigmatisation of poorly performing organisations with problems attracting high-calibre staff; and at worst, active manipulation of the data (16, 23, 25, 134). However, it may be that 'such unintended consequences may not be the inevitable result of targets in themselves, but rather of the particular way in which those targets were designed and enforced' (26)

Despite such perverse effects and the doubts which therefore surround the accuracy of target-related data, there is reasonable consensus that in the English NHS at least, targets led to substantial improvement in mortality and inequality of outcome in cancer and heart disease, in waiting times, in rates of healthcare-associated infections, and in other public health measures such as smoking cessation (26).There were greater improvements in these areas than those experienced in the other nations of the UK which had not introduced targets (27).

The average wait reduced significantly for elective procedures, for GP appointments, and for attention in emergency departments. Targets for substantial reductions in mortality rates from cancer and heart disease were also met (26). In addition, sustained attention to targeting a reduction in hospital-acquired infections succeeded in more than halving rates of MRSA bloodstream infections in the five years to 2008/09, and reducing the rates of *C. difficile* infections by 30 per cent in the year to 2008/09 (26). It should be noted that there was less progress on other targeted areas such as reducing teenage conception rates, reducing inequalities in access to healthcare, and improving patient experience.

Smith et al. (17 p.691-692) assess why some targets are more successful than others at inducing change, and outline the risks associated with their introduction. These are summarised in Table 11.

Table 11: Targets' success and risk factors

Characteristics of 'successful' targets	**Risks associated with introducing targets**
Short-term, precise objectives	Will be ineffective at inducing change if not accompanied by broader improvement initiatives
Based on local not national level objectives	Untargeted aspects of system risk neglect
Professionals engaged in design and implementation of the target	Long term or less controllable objectives risk neglect
Increased resources were given to organisations to facilitate achievement of the target	If targets are too aggressive, they risk inducing gaming and data distortion
Concrete incentives attached to the target	Risk a narrow mercenary attitude overtaking generalised altruistic desire

10.4.3 **Pay for performance (p4p)**

Attaching financial reward for individuals or organisations to achievement of a certain level of performance on indicators is a policy lever employed to induce quality improvement especially in the US and UK, by both public and private funders of healthcare. The rationale behind such initiatives is

that if reward is promised, the desired behaviour change and outcome improvement will follow, and many schemes have been set up on such a premise. However, this assumption does not always hold true. A recent Cochrane systematic review of the effects of pay for performance schemes on the quality of care offered by primary care physicians found 'insufficient evidence to support or not support the use of financial incentives to improve the quality of primary healthcare' (28). Evidence of impact which does exist relates mainly to increased compliance with prescribed processes of care rather than impact on health outcomes.

The literature assessed in the present review was also equivocal. For example, English and Californian physicians were found to have reacted differently to pay for performance schemes which rewarded the carrying out of certain care processes in primary care (142). The Californian initiative had markedly less impact on the rate of doctors' compliance with these processes, which was attributed partly to contextual factors (including greater doctor resistance to such control of their autonomy in the US) and partly to the design of the schemes (in England, doctors were personally rewarded with a substantial proportion of their income derived from achieving compliance, while in California the proportion was much less significant). Improved indicator scores were associated in a review carried out some time ago (145) with payments aimed at individuals not groups, and with those who were shown to be lower performers.

The UK's Quality and Outcomes Framework (QOF) is the largest-scale pay for performance scheme in operation. There is a substantial body of research examining it. This is a voluntary scheme for GP practices and has been operational since 2004. Over this time, it has employed a consistent set of around 146 indicators which provides for analysis of trends over time and putative conclusions about the effect of p4p on the processes and outcomes of care. In an analysis of 94 studies addressing the impact of the QOF on effectiveness, efficiency, equity, and patient experience, Gillam et al. (104) found that while there were substantial improvements during the first year of QOF implementation on the quality of care for chronic disease (particularly diabetes and asthma), subsequent trends are not any different to the trajectory of improvement observed before introduction of the QOF. The impact on quality of patient experience is uncertain, and although inequalities between chronic disease care received by different socio-economic groups has substantially narrowed (146), the gender gap has slightly widened in favour of men (104, 147).

Positive impacts of the QOF (and the new GP contract of which it was part) have been seen, for example, in relation to: coronary heart disease-related processes (e.g. blood pressure and cholesterol measurements, prescription of anti-platelet/anti-coagulant medications and beta blockers) (147); statin prescribing rates (148); increased employment of staff and accelerated computerisation of records (149); increasing responsibility and professional development for practice nurses (150); and increased influenza vaccination rates for CHD patients even after minimum threshold for payment was increased (151). There is limited research support for the claim that p4p helps improve health outcomes, however. Kiran et al. (152) report that the QOF was associated with reduced inequality of CHD outcomes in London. More deprived areas, they found, showed a decrease in the number of CHD-related hospital admissions, while less deprived areas showed no difference after the introduction of the QOF.

The perverse consequence noted in relation to target regimes – that of target or indicator myopia – appears to apply also to the QOF. Quality of care for those conditions and processes not incentivised by the QOF have improved at a slower rate than the trajectory shown before the QOF was introduced (153). Concerns have also been raised about the impact on continuity of care and patient-centeredness, due to a perceived 'box-ticking' approach (104, 149, 154). Others have pointed out that in many cases, ticking a box to confirm an action has been performed (e.g. smoking cessation counselling delivered) says nothing about the quality or effectiveness of that intervention (e.g. 155). In relation to p4p schemes more generally, there is also the problem of those organisations or individuals who already have the highest performance being rewarded more without extra effort than those who are struggling to improve from a low baseline (31).

10.4.4 **Public reporting of performance**

The public reporting of organisations' or individuals' performance often accompanies target regimes and pay-for-performance schemes. However, the impact of public reporting on quality of care has also been studied in its own right, in terms of changes to provider, purchaser and patient behaviour.

The US (especially New York State, Pennsylvania and California) has the longest history of public reporting and studying its effects (156), while Scotland was the earliest European example, beginning in 1994 (157). Although there are hundreds of such schemes now in existence, the number which have been subject to rigorous analysis is modest (30, 156). In an echo of their findings regarding pay-for-performance, a Cochrane systematic review stated that on the 'basis of sparse evidence of low quality, we cannot draw any firm conclusions about the effects of the public release of performance data on behaviour or on improvements in the performance and quality of healthcare' (29). These findings reflect earlier reviews on the topic (with less stringent criteria for study inclusion than Cochrane) which reported 'scant' empirical literature in this area (30) and limited evidence both of use of the data by either providers or patients as well as impact of the data publication on quality of care and expenditure (156).

In spite of these limitations, there is some empirical evidence that reporting does stimulate organisational activity to improve care (30) and other provider behaviour change. This has been attributed to fear of reputational effects of poor performance (17). For example, in a controlled study (158) of the impact of public (against private) reporting in the QualityCounts program in the United States, 'nine months after the release of the report, hospitals included in the public report were significantly more likely to be engaged in quality improvement efforts than those given a confidential, private quality report or no report at all' (159 p.1150).

The most studied example of public reporting is the New York State Cardiac Surgery Reporting System, which has published surgery outcomes since the early 1990s (29). Fifteen years after reporting began, the system had seen substantial improvements in cardiac surgery mortality rates (17) although the degree to which this was due to how the data was analysed has been disputed (160). This system appeared to have induced poorly performing surgeons to stop practicing in the state at a higher rate than well performing surgeons, but there was no evidence of an impact on patient or purchaser behaviour in terms of increased market share for better performing surgeons or

their hospitals (161). This lack of impact of reporting on patient and purchaser behaviour – the 'selection pathway' to quality improvement (15) – is reinforced by other studies finding that any such impact is generally short-lived (30).

Concerns about the inequitable impact on consumer behaviour, such that better educated consumers are more able to use data and make informed choices about their healthcare provider, have to an extent been borne out by studies of Harvard University employees (162) and US federal government employees (163) which found a tendency to switch out of low performing health plans after publication of results. Overall, however, there appears to be a low rate of use of such information by consumers for decision-making in healthcare (31, 164). Personal recommendation as basis of patient choice and doctors' referral are far more influential (165). More broadly across government, there appears to be a general lack of interest by the public and politicians in published performance data (32).

Like target-oriented and pay for performance frameworks, public reporting of data can have perverse consequences. One consequence may be a reluctance to take on patients perceived as more risky or complex (so-called 'cream skimming'); this has been particularly noted in relation to the publication of surgical mortality rates where risk adjustment cannot help mitigate the effects of even a single extra death because of the rarity of the event in many types of surgery (23). Some have questioned why there is such enthusiasm for public reporting when the evidence is thin. 'In spite of its theoretical appeal, making public reporting work requires successfully addressing several challenges,' (30 p.18) such as gaining the buy-in of those whose performance will be assessed (31), designing reports in a user-friendly and accessible manner and ensuring they contain quality information which is relevant to consumers (143).

Overall, then, on the basis of this literature, public reporting appears to have had more success at stimulating the provider change side of performance improvement than it has at stimulating what Berwick et al. (15) called the 'selection' pathway to improvement where external parties like patients and purchasers change their decisions and behaviours in relation to the provider. In this respect, it would seem that the impact of public reporting on transparency and accountability – its original and primary justification – is less than its impact on provider motivation for change.

10.5 Recommendations

Many scholars have advice for those hoping to maximise the likelihood that their performance indicator framework will induce quality improvement activity as well as better quality of care. Recommendations fall into four categories (adapted from 125): conceptualisation and design of the overall framework; choice of measures; implementation; and ongoing use of the framework.

10.5.1 **Conceptual underpinnings of measurement framework**

The importance of a logical, acceptable and viable conceptual framework to underpin the development of a national performance indicator set is repeatedly emphasised in this literature (e.g. 16, 17). A conceptual framework sets out the rationale and design principles for the indicator set, and links it to the wider health system context. It seeks to answer the question 'performance of what

– and to what ends?' (44). Reporting an example of how such a framework was developed for the Dutch national indicator set, ten Asbroek et al. (127 p.i67) stated that after researching the appropriate bases for the model, policy makers and researchers agreed that it should be: 'balanced, covering various performance dimensions such as effectiveness, efficiency, quality and equity [...]; comprehensive, [involving] information from all sectors in the healthcare system; [...] and needs to link performance of health services to population health.'

There are multiple reasons proposed for developing such a framework. The first is to define the scope and dimensions of measurement. This may be done on the basis of the different perspectives of different potential users of the system, as was seen in the Dutch example (127). Alternatively, as in the case of the OECD Healthcare Quality Indicators Project, framework developers can start from a health determinants model, deciding whether to include health determinants which are wider than just health system performance and characteristics (44).

The second use for a conceptual framework is to help align the performance measurement system with other policy priorities and financial exigencies, ensuring coherence and synergy with the wider healthcare environment (15). Part of this alignment task involves studying the various regulation and incentive systems already in operation to understand potential interaction with the proposed framework for different stakeholders (16, 166). Situating the performance measurement framework as one strand of a broadly agreed long-term strategy for the whole health system is also part of alignment (127), although due to the multiplicity of stakeholders and the complexity and fluidity of the healthcare environment, this may prove harder than the equivalent task in business (125).

Thirdly, if clinicians and consumers are to be encouraged to use (and share) performance data, the measurement system as a whole needs to be anchored by a clearly defined vision and goals (15, 127). In articulating this vision, it is recommended that measurement is explicitly linked to improvement, and to learning rather than punishment and blame (12, 31, 167). The value of a conceptual model, providing a clear rationale for the subsequent choice of indicators, also lies in the ability to clarify at the outset, with and for different stakeholders, how the indicator set will be used. Communicating a clear purpose can help ensure a 'common understanding of the proposed use' of indicators (12 p.133), which – if the principal goal is to aid quality improvement – may be that results will be considered less 'dials' and more 'tin openers' for further exploration (20 p.49).

What is meant by 'quality' and its improvement should also be defined at the outset, since the framework ultimately uses measures which are 'in essence quantitative measures of quality' (40 p.377). This is a highly context-sensitive question, and one commonly cited article highlights the difference between 'good quality care' for an individual and an entire population. From the individual perspective, 'quality of care may ... be reduced to two questions. First, can an individual get the care they need when they need it? Second, when they get the care, is it effective both in terms of clinical effectiveness and inter-personal relationships?' (168 p.1614). Across a population, however, 'good quality care' becomes 'the ability to access effective care on an efficient and equitable basis for the optimisation of health benefit/well-being for the whole population' (168 p.1617).

Fourthly, the involvement of the potential end-users of the information in the design of the conceptual framework and choice of indicators may be a useful tool to ensure the later relevance and usefulness of indicators for quality improvement purposes (e.g. 36). In an assessment of 11 countries' national hospital quality indicator frameworks, Groene et al. (169) found that all of these used expert groups in the development phase, and most employed user groups in development and piloting. To varying degrees, the groups included health professionals and managers, and patients and members of the public.

In sum, the development of an indicator framework requires consideration of a number of questions, which were distilled in a report by the Royal Statistical Society on the development of indicators for performance management in the public sector:

> '... what is the purpose of the PM [performance measurement]; what is the unit of study [individual or organisation]; what should be measured; for reasons of cost, convenience or burden, have proxy indicators been substituted; how should data be collected; how will the data be checked and audited; how should the data be analysed, including frequency and adjustment for context; how should the results be presented, including dissemination rules [...]; how will uncertainty be conveyed to safeguard against over-interpretation and misinterpretation?' (33 p.5)

10.5.2 **Choice of indicators**

The notion of balance is often revisited in discussions of indicator framework design. Balance needs to be found between the different possible dimensions of the framework which were outlined in Table 8. There are numerous guides available to choosing a balanced indicator set (16 p.13), and they contain many overlapping messages. Prominent among these is the need to use a combination of structure, process and outcome measures. These measures are good for different purposes. Table 12 collates discussion on the relative merits of outcome and process measures from multiple sources (17, 35, 170).

Table 12: Advantages and disadvantages of process and outcome measures

	Advantages	**Disadvantages**
Process measures	Good for quality improvement feedback, as processes are under the control of clinicians	Simply having done a process doesn't show how well or effectively it was done
	This control encourages clinicians to feel accountable for the results	Relies on assumption of reliable link to an outcome
	Results give clear indication about what could be done better.	May engender gaming and other perverse consequences
	Better timeliness than outcome measures	Make focus too narrow – on a specific intervention or condition
	Collection can be automated (e.g. through electronic health records)	Require updating with new evidence and technology
Outcome measures	Face validity for quality of care –	Time lag – action now may only

	more meaningful to stakeholders	affect outcomes much later
	Aid focus on longer term goals of the health system and for individual patients	Difficult to attribute to particular actions, as many variables can affect outcomes
	More difficult to manipulate	Considerable risk adjustment required for case-mix and other variables
	Results-oriented, thus focussed on what is important rather than activity	Easily skewed due to low volume of outcomes

A second issue of concern with producing balanced indicator sets is the degree to which indicators are developed nationally or locally, and the relative merits of each approach. While national sets are useful for comparison between organisations, locally developed indicators may be more appropriate for improvement purposes while taking account of context, may achieve better buy-in, and may encourage innovation. One compromise suggestion is to start with a core set of national indicators, while enabling the local development of indicators. These could then be submitted to a national database and if suitable selected for national collection, providing a 'cost-effective option for ensuring standards while also meeting local needs' (16 p.22)).

Indicators may be applied at individual (e.g. surgeon) level, or – more commonly – at service or organisational level. Because they are assessing the performance of these individuals, services or organisations, the indicators should measure something which is (to some degree) amenable to influence by those being assessed. The point has been made that service or organisational level measures are more likely to fall into this category than individual-level indicators, because many of the factors affecting what individual clinicians can do are not subject to their control.

In terms of selecting specific indicators, there is a good deal of consensus on criteria for doing so: scientific validity and reliability; consistency over time and space; be responsive to change over time period of measurement; capacity to be attributed to an organisation; under an organisation's influence to improve; feasible to collect; cost does not outweigh potential benefit; audience-appropriate disaggregation level, timeliness and adjustment; minimise the chance of perverse consequence; and do not add unduly to the burden of bureaucracy (33, 34). The Institute of Medicine published guidance for choosing 'good' indicators in 2006, which it summarised as follows:

> *'they should be capable of being generally applied; they should fit into a broad perspective on healthcare; they should be relevant to patient care; they should be based on scientific evidence; they should be reliable; and they should take account of areas that are hard to measure and populations that are hard to reach'* (31 p.25).

The problem of attribution is especially pertinent to healthcare performance measurement. This is because there are commonly many determinants of a health outcome, many of which are nothing to do with healthcare. Isolating the impact of healthcare is difficult, and isolating this to one particular organisation (e.g. a hospital as opposed to a community health service) even more troublesome.

There has been little research on how to measure outcomes which rely on the actions of more than one organisation (125). A number of steps have been proposed to help address attribution bias, which are mainly risk adjustment techniques for evaluating the link between interventions and outcomes (17 p.686). Presenting performance results alongside measures of uncertainty can also help overcome problems of misinterpretation (33).

The need to pilot individual indicators is highlighted by Campbell et al. (171) who describe the process of developing new indicators for inclusion in the UK's Quality and Outcomes Framework (QOF). They note that until that time, QOF indicators had been chosen based on scientific criteria but not on their 'real-world' effects which can only be tested through piloting. Through this process, some proposed indicators were dropped due to poor acceptance by clinicians who questioned their appropriateness and effect on patients. Piloting can also help eliminate or adjust indicators whose statistical properties prove problematic in real-world use (33).

10.5.3 **Implementation**

Some recommendations surround the design of the incentive mechanisms thought to link measurement with improvement. For example, in the case of target-driven regulation, the problem of gaming and manipulation of data can be tackled at implementation (23). These authors suggest three ways to do this:

- Introducing uncertainty into indicator specification so that they are 'transparent in process and in retrospect but not in real time' (p. 533) and cannot therefore be anticipated and gamed so easily;
- Introducing an element of randomness into service inspection and evaluation; and
- Increasing 'face-to-face' evaluation techniques to supplement self-assessment and impersonal data reporting machinery.

For public reporting mechanisms to induce quality improvement, a number of implementation recommendations are made. For example, tailoring the presentation of performance to the needs and abilities of the intended audience is a vital aspect of ensuring data are used for decision making which drives improvement (141, 167, 172). The first step in using data to influence consumer choice is raising their awareness that such schemes exist (164). While for consumers of healthcare it is important that data are easily digestible but not over-simplified in ways that distort their information value (167), for data to have impact on clinicians' behaviour it is essential that presentation of data is timely and encourages exploration rather than acting to close down discussion. This type of improvement focus may also be encouraged by requiring organisation self-assessments to include action plans for improvement (36).

Another common recommendation for implementation of a new indicator set is to ensure that data collection, feedback and 'actioning' processes are linked and can be embedded within existing quality improvement efforts rather than adding to the burden of administrative tasks undertaken by clinical staff (130, 140).

10.5.4 **Ongoing maintenance**

Once an indicator set is in operation, experience internationally shows that there is a greater tendency for more indicators to be added than for indicators to be removed. However, 'retirement' is necessary when achievement reaches a persistent ceiling; when the indicator becomes outmoded; when the costs of collection outweigh the benefits; and when flaws are found through use of the indicator (35-37). The need for ongoing assessment of indicators and their effect and benefits is examined in detail by Chassin et al. (35 p.686). These authors suggest regularly vetting the indicators against four criteria (the discussion applies to process measures too):

1. There should be a research foundation that the process indicator, when improved, contributes to clinical outcome improvement;

2. The process measure must capture whether evidence-based care has been delivered. Ticking a box that something has been done (e.g. smoking cessation counselling) does not indicate how this has been done – whereas review of a medication chart is sufficient evidence of aspirin having been administered post AMI – the former invites gaming rather than actual improvement of clinical care.

3. The measure should relate to a process which is proximate to an outcome – in other words, must relate to a process that has to happen before an improved outcome can occur. In community care, upstream processes may be measured, but paired with more downstream process measures.

4. The measure should have no or minimal adverse consequences – these can be learnt from experience of using a measure.

10.5.5 **Conclusion:**

This synthesis and commentary represents a snapshot of the literature to date. In the end, consideration of what the measurement systems intends, which indicators to use, careful design and thoughtful application are required.

10.6 Addendum: Medline Search Strategy 1 July 2013

1. "performance indicator*".af.
2. *"Quality Indicators, Health care"/
3. *quality indicators, / or *risk adjustment/ or *"standard of care"/ or *data collection/ or *"outcome and process assessment (health care)"/ or *"outcome assessment (health care)"/ or *"process assessment (health care)"/ or *patient satisfaction/
4. *Quality Indicators, Health Care/
5. (impact or perverse or effectiveness).mp. [mp=title, abstract, original title, name of substance word, subject heading word, keyword heading word, protocol supplementary concept, rare disease supplementary concept, unique identifier]
6. 4 and 5

7. *Health Status Indicators/
8. 4 or 7
9. performance.mp.
10. *Quality Indicators, Health Care/ or *"Outcome Assessment (Health Care)"/
11. *"Process Assessment (Health Care)"/
12. 10 or 11
13. "performance assessment".mp.
14. "performance measurement".mp. or *"Outcome and Process Assessment (Health Care)"/
15. "performance monitoring".mp.
16. "performance evaluation".mp.
17. "performance target".mp.
18. 12 or 13 or 14 or 15 or 16 or 17
19. (impact* or develop* or effective* or perverse or reporting or collect* or implement* or framework*).m_titl.
20. 18 and 19
21. limit 20 to (english language and yr="1998 -Current")
22. (australia* or canad* or "united states" or "USA" or america* or danish or denmark or dutch or netherlands or english or england or scotland or scottish or "new zealand" or UK or NHS).ab.
23. 21 and 22

11.REFERENCES

1. National Health Performance Authority. National Health Performance Authority Webpage. Accessed online April 2013 at http://wwwnhpagovau/internet/nhpa/publishingnsf/Content/About-us.
2. Australian Government. National Health Reform Act 2011. 2011;Accessed online April 2013 at http://www.comlaw.gov.au/Details/C2011C00952.
3. Institute of Medicine. Crossing the Quality Chasm: A New Health System for the 21st Century. Washington, DC: Institute of Medicine, 2001.
4. National Health Performance Authority. Healthy Communities: Immunisation rates for children in 2011-12. Sydney: NHPA, 2013.
5. National Health Performance Authority. Performance and Accountability Framework. Accessed online April 2013 at http://wwwnhpagovau/internet/nhpa/publishingnsf/Content/PAF.
6. Australian Government Department of Health and Ageing. Primary Health Care Reform in Australia - Report to Support Australia's First National Primary Health Care Strategy. Accessed online April 2013 at http://wwwyourhealthgovau/internet/yourhealth/publishingnsf/Content/nphc-draftreportsupp-toc~nphc-draftreportsupp-ch3~nphc-draftreportsupp-ch3-comp - UWwF-rXI0k .
7. Australian Institute of Health and Welfare. Australia's Health 2010. Australia's health series, no 12. 2010;Cat. no. AUS 122. Canberra: AIHW.
8. Organisation for Economic Co-operation and Development. Statistical profile of Australia 2013.Accessed online April 2013 at http://www.oecd-ilibrary.org/economics/country-statistical-profile-australia_20752288-table-aus.
9. Crampton P, Perera R, Crengle S, Dowell A, Howden-Chapman P, Kearns R, et al. What makes a good performance indicator? Devising primary care performance indicators for New Zealand. The New Zealand Medical Journal. 2004;117(1191):1-12.
10. Mainz J. Developing evidence-based clinical indicators: a state of the art methods primer. International Journal for Quality in Health Care. 2003;15 Suppl 1:i5-11.
11. Johnsen Å. What does 25 years of experience tell us about the state of performance measurement in public policy and management? Public Money and Management. 2005;January:9-17.
12. Freeman T. Using performance indicators to improve health care quality in the public sector: a review of the literature. Health Services Management Research. 2002;15:126-37.
13. Department of Health. High Quality Care For All: NHS Next Stage Review Final Report. London: Department of Health, 2008.
14. Smith P, Papanicolas I. Health system performance comparison: an agenda for policy, information and research. Copenhagen: WHO ROE, 2012 20771576.
15. Berwick D, James B, Coye M. Connections between quality measurement and improvement. Medical Care. 2003;41(1 (Supplement)):I30-I8.
16. Raleigh VS, Foot C. Getting the measure of quality: opportunities and challenges. London: The King's Fund, 2010 9781857175.
17. Smith P, Mossialos E, Papanicolas I, Leatherman S. Conclusions. In: Smith P, Mossialos E, Papanicolas I, Leatherman S, editors. Performance Measurement for Health System Improvement. Cambridge: Cambridge University Press; 2010.
18. Bevan G, Hood C. What's measured is what matters: Targets and gaming in the English public health care system. Public Administration. 2006;84(3):517-38.
19. BQS Outcome. BQS Institut für Qualität & Patientensichherheit. 2013 [cited 1 Aug 2013]; Available from: http://www.bqs-outcome.de/.
20. Carter N, Klein R, Day P. How Organisations Measure Success. The Use of Performance Indicators in Government. London: Routledge; 1995.
21. Boyce M, Browne J. Does providing feedback on patient-reported outcomes to healthcare professionals result in better outcomes for patients? A systematic review. Quality of Life Research. 2013. Epub 17 March 2013.
22. Mid Staffordshire NHS Foundation Trust Public Inquiry. Mid Staffordshire NHS Foundation Trust Public Inquiry Report Volume 1: Analysis of evidence and lessons learned (Part 1). London: 2013.

23. Bevan G, Hood C. Have targets improved performance in the English NHS? British Medical Journal. 2006.
24. Mannion R, Braithwaite J. Unintended consequences of performance measurement in healthcare: 20 salutary lessons from the English National Health Service. Internal Medicine Journal. 2012;42(5):569-74.
25. Mannion R, Davies H, Marshall M. Impact of star performance ratings in English acute hospital trusts. Journal of Health Services Research and Policy. 2005;10(18):18-24.
26. The Kings Fund. Have targets improved NHS performance? : The Kings Fund; 2010 [cited 1 Aug 2013]; Available from: http://www.kingsfund.org.uk/projects/general-election-2010/key-election-questions/performance-targets.
27. Connolly S, Bevan G, Mays N. Funding and performance of healthcare systems in the four countries of the UK before and after devolution London: Nuffield Trust, 2009.
28. Scott A, Sivey P, Ait Ouakrim D, Willenberg L, Naccarella L, Furler J, et al. The effect of financial incentives on the quality of health care provided by primary care physicians. Cochrane Database of Systematic Reviews. 2011;2011(9).
29. Ketelaar N, Faber M, Flottorp S, Rygh L, Deane K, Eccles M. Public release of performance data in changing the behaviour of healthcare consumers, professionals or organisations. Cochrane Database of Systematic Reviews 2011(11).
30. Shekelle P, Lim Y-W, Mattke S, Damberg C. Does public release of performance results improve quality of care? London: Health Foundation, 2008.
31. Wollersheim H, Faber MJ, Grol RP, Dondorp WJ, Struijs AJ. Confidence in responsible care? The effects of performance indicators and moral issues associated with their use: 2006 monitoring report on ethics and health. The Hague: Centre for Ethics and Health, 2006 9078301023.
32. Pollitt C. Performance Information for Democracy : The Missing Link? Evaluation. 2006;12(1):38-55.
33. Bird S, Cox D, Farewell V, Goldstein H, Holt T, Smith P. Performance indicators: Good, bad and ugly. Journal of the Royal Statistical Society. 2005;68(1):1-27.
34. Nuffield Trust. Rating providers for quality: a policy worth pursuing? A report for the Secretary of State for Health. London: Nuffield Trust, 2013 9781905030.
35. Chassin M, Loeb J, Schmaltz S, Wachter R. Accountability measures: Using measurement to promote quality improvement. New England Journal of Medicine. 2010;363(7):683-8.
36. Collopy B. Clinical indicators in accreditation: An effective stimulus to improve patient care. International Journal for Quality in Health Care. 2000;12(3):211-6.
37. Reeves D, Doran T, Valderas E. How to identify when a performance indicator has run its course. British Medical Journal. 2010;340:899-901.
38. Central Intelligence Agency. The World Factbook 2013-14. Washington, DC: 2013.
39. Department of Health. The NHS Outcomes Framework 2012/13. London: Department of Health, 2011.
40. Arah O, Klazinga N, Delnoij D, ten Asbroek AHA, Custers T. Conceptual frameworks for health systems performance: a quest for effectiveness, quality, and improvement. International Journal for Quality in Health Care. 2003;15(5):377-98.
41. National Institute of Public Health and the Environment. Dutch Healthcare Performance Report. Accessed online July 2013 at http://wwwrivmnl/en/Documents_and_publications/Scientific/Reports/2012/april/Dutch_Health_Care_Performance_Report.
42. Agency Healthcare Research and Quality. 2011 National Healthcare and Disparities Report. Washington, D.C.: 2011.
43. The Commonwealth Fund. Rising to the Challenge - RESULTS FROM A SCORECARD ON LOCAL HEALTH SYSTEM PERFORMANCE. Accessed online August 2013 at http://wwwcommonwealthfundorg/~/media/Files/Publications/Fund Report/2012/Mar/Local Scorecard/1578_EXEC_SUMM_Commission_rising_to_challenge_local_scorecard_2012_FINALpdf. 2012.
44. Arah O, Westert GP, Hurst J, Klazinga N. A conceptual framework for the OECD Health Care Quality Indicators Project. International Journal for Quality in Health Care. 2006;Sept:5-13.
45. Wikipedia. Canada. Accessed online July 2013 at https://enwikipediaorg/wiki/Canada. 2013.

46. Canadian Healthcare. Organisation. Canadian Healthcare. Accesed online July 2013 at http://wwwcanadian-healthcareorg/.
47. Health Canada. Canada's Healthcare system. Accessed online July 2013 at http://wwwhc-scgcca/hcs-sss/index-engphp.
48. Arah OA, Klazinga NS, Delnoij DMJ, ten Asbroek AHA, Custers T. Conceptual frameworks for health systems performance: a quest for effectiveness, quality, and improvement. International Journal for Quality in Health Care Using Performance Measurement to Improve the Quality and Safety of Health Care. 2003;15(5):377-98.
49. Canadian Institute for Health Information. Health Indicators 2013. Ottawa: 2013.
50. Arah OA, Westert GP. Correlates of health and healthcare performance: applying the Canadian health indicators framework at the provincial-territorial level. BMC Health Services Research. 2005;5(76).
51. Statistics Canada. Health Indicators 2013: definitions Data Sources and Rationale. 2013.
52. Canadian Institute for Health Information. Canadian Hospital Reporting Project Technical Notes—Clinical Indicators. Accessed online July 2013 at http://wwwcihica/CIHI-ext-portal/pdf/internet/CHRP_TNCI_PDF_EN. 2013.
53. Government of Canada. Healthy Canadians: A Federal Report on Comparable Health Indicators 2010. Accessed online July 2013 at http://wwwhc-scgcca/hcs-sss/alt_formats/pdf/pubs/system-regime/2010-fed-comp-indicat/index-engpdf. 2010.
54. Alberta Health Services. About Alberta Health Services.Accessed online Septmeber 2013 at http://www.albertahealthservices.ca/about.asp.
55. Alberta Health Services. Alberta Health Services Performance Report - Q4 2012/13. 2013;Accessed online September 2013 at http://www.albertahealthservices.ca/Publications/ahs-pub-pr-2013-06-performance-report.pdf.
56. Canadian Institute for Health Information. Health Care in Canada 2012: A Focus on Wait Times. . Accessed online July 2013 at https://securecihica/free_products/HCIC2012-FullReport-ENwebpdf. 2012.
57. Canadian Institute for Health Information. Fewer people could be hospitalized for injuries resulting from suicidal and self-harming behaviour if social disparities reduced. Accessed online July 2013 at http://wwwcihica/CIHI-ext-portal/internet/en/Document/health+system+performance/indicators/health/RELEASE_23MAY13. 2013.
58. Ministry of Foreign Affairs of Denmark. Denmark: The official website of Denmark. Ministry of Foreign Affairs of Denmark 2013 [cited 24 July 2013]; Available from: http://denmark.dk/.
59. Olejaz M, Juul Nielsen A, Rudkjøbing A, Okkels Birk H, Krasnik A, Hernández-Quevedo C. Denmark health system review. 2012 1817-6127 (Electronic)

1817-6119 (Linking).
60. The World Bank. GDP per capita. The World Bank; 2013 [cited 24 July 2013]; Available from: http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?order=wbapi_data_value_2012+wbapi_data_value+wbapi_data_value-last&sort=desc.
61. World Health Organization. Life expectancy: Life expectancy by Country. World Health Organization; 2013 [cited 24 July 2013]; Available from: http://apps.who.int/gho/data/node.main.688.
62. Juel K, Bjerregaard P, Madsen M. Mortality and life expectancy in Denmark and in other European countries: What is happening to middle-aged Danes? The European Journal of Public Health. 2000;10(2):93-100.
63. Statistics Denmark. The Statistical Yearbook 2012. Statistics Denmark; 2012 [cited 24 July 2013]; Available from: http://www.dst.dk/pukora/epub/upload/16251/06soci.pdf.
64. World Health Organization. Mortality rate, infant (per 1,000 live births) World Health Organization; 2013 [cited 24 July 2013]; Available from: http://data.worldbank.org/indicator/SP.DYN.IMRT.IN.
65. Thomson S, Osborn R, Squires D, Jun M. International Profiles of Health Care Systems. The Commonwealth Fund; 2012 [updated cited 1 August 2013]; Available

from: http://www.commonwealthfund.org/Publications/Fund-Reports/2012/Nov/International-Profiles-of-Health-Care-Systems-2012.aspx.
66. Donabedian A. Evaluating the quality of medical care. The Milbank Memorial Fund Quarterly. 1966;44(3):166-206.
67. OECD Health Division. OECD Reviews of Health Care Quality: Denmark. Executive Summary, Assessment and Recommendations. OECD Directorate for Employment, Labour and Social Affairs; 2013; Available from: http://www.oecd.org/els/health-systems/ReviewofHealthCareQualityDENMARK_ExecutiveSummary.pdf.
68. Mainz J, Krog BR, Bjørnshave B, Bartels P. Nationwide continuous quality improvement using clinical indicators: the Danish National Indicator Project. International Journal for Quality in Health Care. 2004;16(suppl 1):i45-i50.
69. Wikipedia. England. Wikipedia; 2013 [cited 2013 26th August 2013]; Available from: http://en.wikipedia.org/wiki/England.
70. Wikipedia. National Health Service. Wikipedia; 2013 [cited 2013 26th August 2013]; Available from: http://en.wikipedia.org/wiki/National_Health_Service.
71. HM Treasury. Economic and Fiscal Strategy Report and Financial Statement and Budget Report. London: HM Treasury, 2008.
72. Department of Health. The NHS Constitution. London: Department of Health, 2013.
73. National Health Service. The NHS in England. 2013 [cited 2013 26th August 2013]; Available from: http://www.nhs.uk/NHSEngland/thenhs/about/Pages/authoritiesandtrusts.aspx.
74. World Health Organisation. United Kingdom. World Health Organisation; 2013 [cited 2013 26th August 2013]; Available from: http://www.who.int/countries/gbr/en/.
75. Department of Health. Equity and excellence: Liberating the NHS Department of Health, 2010.
76. NHS England. High quality care for all, now and for future generations. 2013 [cited 2013 27th August 2013]; Available from: http://www.england.nhs.uk/ccg-ois/.
77. National Institute for Health and Clinical Excellence. About the Clinical Commissioning Group Outcomes Indicator Set (CCGOIS). 2013; Available from: http://www.nice.org.uk/aboutnice/ccgois/CCGOIS.jsp.
78. NHS Confederation, British Medical Association. Quality and Outcomes Framework guidance for GMS contract 2009/10: Delivering investment in general practice. London: 2009.
79. National Institute for Health and Clinical Excellence. About the Quality and Outcomes Framework (QOF). 2013; Available from: http://www.nice.org.uk/aboutnice/qof/.
80. National Institute for Health and Clinical Excellence. Developing clinical and health improvement indicators for the Quality and Outcomes Framework (QOF): Interim process guide. 2009.
81. National Institute for Health and Clinical Excellence. Developing indicators for the Commissioning Outcomes Framework (COF): Interim process guide. London: NICE, 2012.
82. National Institute for Health and Clinical Excellence. Quality Standards. London: National Institute for Health and Clinical Excellence, 2013.
83. Health and Social Care Information Centre. Quality and Outcomes Framework, Achievement, prevalence and exceptions data, 2011/12. Health and Social Care Information Centre, 2012.
84. Wikipedia. Netherlands. Accessed online July 2013 at http://enwikipediaorg/wiki/Netherlands.
85. Schäfer W, Kroneman M, Boerma W, van den Berg M, Westert G, Devillé W, et al. The Netherlands - Health system review. Health Systems in Transition. 2010;12(1).
86. Daley C, Gubb J, Clarke E, Bidgood E. Health Care Systems: The Netherlands. Accessed online July 2013 at http://wwwcivitasorguk/nhs/download/netherlandspdf. Updated 2011 and 2013.
87. The World Bank. Health expenditure, total (% of GDP). Accessed onlne July 2013 at http://dataworldbankorg/indicator/SHXPDTOTLZS.
88. Ten Asbroek AHA, Arah OA, Geelhoed J, Custers T, Delnoij DM, Klazinga NS. Developing a national performance indicator framework for the Dutch health system. International Journal for Quality in Health Care 2004;16(Supplement 1):65-71.

89. van den Berg M, Heijink R, Zwakhals L, Verkleij H, Westert G. Health care performance in the Netherlands: Easy access, varying quality, rising costs. EuroHealth.16(4).
90. Cordasev H, Arne Björnberg M, Hjertqvist O. Cross border care EU: How to choose the best hospital? - A study of hospital information portals in five EU countries. 2010.
91. Statistics New Zealand. Population Clock. 2013 [cited 2013 29th August 2013]; Available from: http://www.stats.govt.nz/tools_and_services/population_clock.aspx.
92. International Monetary Fund. Report for Selected Countries and Subjects 2013 [cited 2013 29th August 2013]; Available from: http://www.imf.org/external/pubs/ft/weo/2012/01/weodata/weorept.aspx?pr.x=57&pr.y=12&sy=2009&ey=2012&scsm=1&ssd=1&sort=country&ds=.&br=1&c=196&s=NGDPD%2CNGDPDPC%2CPPPGDP%2CPPPPC%2CLP&grp=0&a=.
93. Ministry of Health. Overview of the Health System. 2013 [cited 2013 29th August 2013]; Available from: http://www.health.govt.nz/new-zealand-health-system/overview-health-system.
94. Ministry of Health. District Health Boards. 2013 [cited 2013 29th August 2013]; Available from: http://www.health.govt.nz/new-zealand-health-system/key-health-sector-organisations-and-people/district-health-boards.
95. Ministry of Health. About primary health organisations. 2013 [cited 2013 29th August 2013]; Available from: http://www.health.govt.nz/our-work/primary-health-care/about-primary-health-organisations.
96. World Health Organisation. New Zealand. 2013 [cited 2013 29th August 2013]; Available from: http://www.who.int/countries/nzl/en/.
97. Ministry of Health. About the health targets. 2013 [cited 2013 29th August 2013]; Available from: http://www.health.govt.nz/new-zealand-health-system/health-targets/about-health-targets.
98. DHB Shared Services. PHO Performance Programme. 2013 [cited 2013 29th August 2013]; Available from: http://www.dhbsharedservices.health.nz/Site/SIG/pho/Default.aspx.
99. Open for Better Care. About the Campaign. 2013 [cited 2013 29th August 2013]; Available from: http://www.open.hqsc.govt.nz/open/about-the-campaign/.
100. Health Quality and Safety Commission. Atlas of Healthcare Variation. 2013 [cited 2013 29th August 2013]; Available from: http://www.hqsc.govt.nz/our-programmes/health-quality-evaluation/projects/atlas-of-healthcare-variation/.
101. The Trustees of Dartmouth College. Dartmouth Atlas of Healthcare. 2013 [cited 2013 29th August 2013]; Available from: http://www.dartmouthatlas.org/.
102. Exworthy M, Wilkinson E, McColl A, Moore M, Roderick P, Smith H, et al. The role of performance indicators in changing the autonomy of the general practice profession in the UK. Social Science and Medicine. 2003;56:1493-504.
103. Scottish Government. Scotland's International GDP Per Capita Ranking. Scottish Government; 2013 [cited 30 July 2013]; Available from: http://www.scotland.gov.uk/Resource/0041/00416075.pdf.
104. Gillam S, Niroshan Siriwardena A, Steel N. Pay-for-performance in the United Kingdom: Impact of the Quality and Outcomes Framework - a systematic review. Annals of Family Medicine. 2012;10(5):461-8.
105. General Register Office for Scotland. Life Expectancy UK and European Comparison. 2012 [cited 30 July 2013]; Available from: http://www.gro-scotland.gov.uk/statistics/at-a-glance/high-level-summary-of-statistics-trends/index.html.
106. BBC News Scotland. Scotland's life expectancy amongst lowest in Europe. 2011 [updated 30 July 2013]; Available from: http://www.bbc.co.uk/news/uk-scotland-12898723.
107. NHS Scotland. NHS Scotland Chief Executive's Report 2011/12. Edinburgh: The Scottish Government, 2012.
108. NHS Information Services Division. Scottish Perinatal and Infant Mortality and Morbidity Report. 2013; Available from: http://www.isdscotland.org/Health-Topics/Maternity-and-Births/Publications/2013-03-26/2013-03-26-SPIMMR2011-summary.pdf.
109. World Bank. Health expenditure, total (% of GDP) 2013 [cited 30 July 2013]; Available from: http://data.worldbank.org/indicator/SH.XPD.TOTL.ZS.

110. Bouamrane MM, Mair FS. A study of general practitioners' perspectives on electronic medical records systems in NHS Scotland. BMC Medical Informatics and Decision Making. 2013;13(1).
111. ISD Scotland. Quality Measurement Framework 2013 [cited 30 July 2013]; Available from: http://www.isdscotland.org/Health-Topics/Quality-Measurement-Framework/.
112. The Scottish Government. Scotland Performs: NHSScotland. 2013 [cited 30 July 2013]; Available from: http://www.scotland.gov.uk/About/Performance/scotPerforms/partnerstories/NHSScotlandperformance.
113. Wikipedia. United States.Accessed online August 2013 at http://en.wikipedia.org/wiki/United_States.
114. Chua K-P. Overview of the U.S. Health Care System Accessed online August 2013 at http://wwwamsaorg/AMSA/Libraries/Committee_Docs/HealthCareSystemOverviewsflbashx. 2006.
115. Wikipedia. Health care in the United States. Accessed online August 2013 at http://enwikipediaorg/wiki/Health_care_in_the_United_States.
116. Wikipedia. Patient Protection and Affordable Care Act. Accessed online August 2013 at http://enwikipediaorg/wiki/Patient_Protection_and_Affordable_Care_Act.
117. Quality AHRa. 2011 National Healthcare and Disparities Report. Accessed online August 2013 at http://wwwahrqgov/research/findings/nhqrdr/nhqrdr11/measurespec/patient_centerednesshtml.
118. The Commonwealth Fund. Foundation History. Accessed online August 2013 at http://wwwcommonwealthfundorg/About-Us/Foundation-Historyaspx.
119. The Mid-Staffordshire NHS Foundation Trust Public Inquiry. Report of the Mid-Staffordshire NHS Foundation Trust Public Inquiry. London: House of Commons, 2013.
120. NHS Commissioning Board. Commissioning for Quality and Innovation (CQUIN): 2013 guidance. London, 2013.
121. Lilford R, Pronovost P. Using hospital mortality rates to judge hospital performance: a bad idea that just won't go away. British Medical Journal. 2010;340:955-7.
122. Mohammed MA, Lilford R, Rudge G, Holder R, Stevens A. The findings of the Mid-Staffordshire Inquiry do not uphold the use of hospital standardized mortality ratios as a screening test for 'bad' hospitals. QJM. 2013;106(9):849-54.
123. Lilford R, Mohammed M, Spiegelhalter D, Thomson R. Use and misuse of process and outcome data in managing performance of acute medical care : avoiding institutional stigma. The Lancet. 2004;363:1147-54.
124. Klazinga N, Fischer C, ten Asbroek A. Health services research related to performance indicators and benchmarking in Europe. Journal of Health Sciences Research & Policy. 2011;16(Supp 2):38-47.
125. Adair CE, Simpson E, Casebeer AL. Performance management in healthcare: Part II - State of the science findings by stage of the performance measurement process. Healthcare Policy. 2006;2(1):56-78.
126. Øvretveit J. Quality evaluation and indicator comparison in health care. International Journal of Health Planning and Management. 2001;16:229-41.
127. ten Asbroek AHA, Arah O, Geelhoed J, Custers T, Delnoij DM, Klazinga NS. Developing a national performance indicator framework for the Dutch health system. International Journal for Quality in Health Care. 2004;16 Suppl 1:i65-71.
128. Health and Social Care Information Centre. Provisional Monthly Patient Reported Outcome Measures (PROMs) in England: A Guide to PROMs methodology. Leeds: Health and Social Care Information Centre, 2013.
129. Department of Health. The NHS Outcomes Framework 2013 -14 London: Department of Health, 2012.
130. Groene O, Skau JKH, Frølich A. An international review of projects on hospital performance assessment. International Journal for Quality in Health Care. 2008;20(3):162-71.
131. Behn RD. Why measure performance? Different purposes require different measures. Public Administration Review. 2003;63(5):586-606.
132. Propper C, Sutton M, Whitnall C, Windmeijer F. Did 'targets and terror' reduce waiting times for hospital care? The BE Journal of Economic Analysis and Policy. 2008;8(1).

133. McLoughlin V, Leatherman S, Fletcher M, Owen JW. Improving performance using indicators : Recent experiences in the United States, the United Kingdom, and Australia. International Journal for Quality in Health Care. 2001;13(6):455-62.
134. arah. Unintended consequences of performance measurement in healthcare: 20 salutary lessons from the English National Health Service. Internal Medicine Journal. 2012;42(5):569-74.
135. Jarman B, Gault S, Alves B, Hider A, Dolan S, Cook A, et al. Explaining differences in English hospital death rates using routinely collected data. BMJ. 1999;318(7197):1515-20.
136. van Gestel Y, Lemmens V, Lingsma H, de Hingh I, Rutten H, Coebergh J. The Hospital Standardized Mortality Ratio fallacy: a narrative review. Medical Care. 2012;50(8):662-7.
137. Fischer C, Anema H, Klazinga N. The validity of indicators for assessing quality of care: a review of the European literature on hospital readmission rate. European Journal of Public Health. 2011;22(4):484-91.
138. NHS England. Latest patient data shows improvement in reporting. 2013 [cited 1 Aug 2013]; Available from: http://www.england.nhs.uk/2013/03/20/patient-data/.
139. Goddard M, Mannion R, Smith P. Enhancing performance in health care: A theoretical perspective on agency and the role of information. Health Economics. 2000;9(2):95-107.
140. Van de Walle S, Bovaird T. Making better use of information to drive improvement in local public services: A report for the Audit Commission. Birmingham: University of Birmingham, 2007.
141. Galvin RS, McGlynn EA. Using performance measurement to drive improvement: a road map for change Medical Care. 2003;41(S1):148-60.
142. McDonald R, White J, Marmor TR. Paying for performance in primary medical care: learning about and learning from 'success' and 'failure' in England and California. Journal of Health Politics, Policy and Law. 2009;34(5):747-76.
143. Hibbard J, Greene J, Daniel D. What is quality anyway? Performance reports that clearly communicate to consumers the meaning of quality of care. Medical Care Research and Review. 2010;67(3):275-93.
144. Dixon-Woods M, McNicol S, Martin G. Overcoming challenges to improving quality: Lessons from the Health Foundation's improvement programme evaluations and relevant literature. London: Social Science Applied to Healthcare Improvement Research (SAPPHIRE) Group, 2012.
145. Dudley R, Frølich A, Robinowitz DL, Talavera JA, Broadhead P, Luft HS, et al. Strategies to support quality-based purchasing: A review of the evidence (Technical Review No. 10, AHRQ Publication No. 04-0057). Rockville, MD: Agency for Healthcare Research and Quality, 2004.
146. Doran T, Fullwood C, Kontopantelis E, Reeves D. Effect of financial incentives on inequalities in the delivery of primary clinical care in England: analysis of clinical activity indicators for the quality and outcomes framework. Lancet. 2008;372(9640):728-36.
147. McGovern M. The effect of the UK incentive-based contract on the management of patients with coronary heart disease in primary care. Family Practice. 2008;25:33-9.
148. Alabbadi I, Crealey G, Turner K, Rafferty T, Keenan L, Murray P, et al. Statin prescribing in Northern Ireland and England pre and post introduction of the quality and outcomes framework. Pharmacy World & Science. 2010;32(1):43-51.
149. Roland M, Campbell S, Bailey N, Whalley D, Sibbald B. Financial incentives to improve the quality of primary care in the UK : predicting the consequences of change. Primary Health Care Research and Development. 2006;7:18-26.
150. McGregor W, Jabareen H, O'Donnell CA, Mercer SW, Watt GC. Impact of the 2004 GMS contract on practice nurses: a qualitative study. British Journal of General Practice. 2008;58(555):711-9.
151. Kontopantelis E, Doran T, Gravelle H, Goudie R, Siciliani L, Sutton M. Family doctor responses to changes in incentives for influenza immunization under the U.K. Quality and Outcomes Framework pay-for-performance scheme. Health Services Research. 2012;47(3 Pt 1):1117-36.
152. Kiran T, Hutchings A, Dhalla IA, Furlong C, Jacobson B. The association between quality of primary care, deprivation and cardiovascular outcomes: a cross-sectional study using data from the UK Quality and Outcomes Framework. Journal of Epidemiology & Community Health. 2010;64(10):927-34.
153. Doran T, Kontopantelis E, Valderas JM, Campbell S, Roland M, Salisbury C, et al. Effect of financial incentives on incentivised and non-incentivised clinical activities: longitudinal analysis of data from the UK Quality and Outcomes Framework. British Medical Journal. 2011;342:d3590.

154. National Primary Care Research and Development Centre. What difference has QOF made?: a summary of research on the Quality and Outcomes Framework carried out at the National Primary Care Research and Development Centre. Manchester: NPCRDC, 2009.
155. Coleman K, Reiter KL, Fulwiler D. The impact of pay-for-performance on diabetes care in a large network of community health centers.[Erratum appears in J Health Care Poor Underserved. 2008 May;19(2):657]. Journal of Health Care for the Poor & Underserved. 2007;18(4):966-83.
156. Marshall M, Shekelle P, Leatherman S, Brook R. The public release of performance data: What do we expect to gain? A review of the evidence. JAMA : the journal of the American Medical Association. 2000;283(14):1866-74.
157. Mannion R, Goddard M. Public disclosure of comparative clinical performance data: lessons from the Scottish experience. Journal of Evaluation in Clinical Practice. 2003;9(2):277-86.
158. Hibbard J, Stockard J, Tusler M. Does publicizing hospital performance stimulate quality improvement efforts? . Health Affairs. 2003;22(2):84-94.
159. Hibbard J, Stockard J, Tusler M. Hospital performance reports: impact on quality, market share, and reputation. Health Affairs. 2005;24(4):1150-60.
160. Shahian D, Normand S, Torchiana D, Lewis S, Pastore J, Kuntz R, et al. Cardiac surgery report cards: comprehensive review and statistical critique. Annals of Thoracic Surgery. 2001;72(6):2155-68.
161. Jha A, Epstein A. The predictive accuracy of the New York State coronary artery bypass surgery report-card system. Health Affairs (Millwood). 2006;25(3):844-55.
162. Beaulieu N. Quality information and consumer health plan choices. Journal of Health Economics. 2002;21(1):43-63.
163. Jin G, Sorensen A. Information and consumer choice: the value of publicized health plan ratings. Journal of Health Economics. 2006;25(2):248-75.
164. Faber M, Bosch M, Wollersheim H, Leatherman S, Grol R. Public reporting in health care: how do consumers use quality-of-care information? A systematic review. Medical Care. 2009;47(1):1-8.
165. Tu H, Lauer J. Word of mouth and physician referrals still drive health care provider choice. Washington, DC: Center for Studying Health System Change, 2008.
166. Smith P, Mossialos E, Papanicolas I. Performance measurement for health system improvement: experiences, challenges and prospects. Copenhagen: World Health Organisation Regional Office for Europe, 2008.
167. Mullen PM. Using performance indicators to improve performance. Health Services Management Research. 2004;17(4):217-28.
168. Campbell S, Roland M, Buetow S. Defining quality of care. Social Science and Medicine. 2000;51:1611 - 25.
169. Groene O, Klazinga N, Kazandjian V, Lombrail P, Bartels P. The World Health Organization Performance Assessment Tool for Quality Improvement in Hospitals (PATH): an analysis of the pilot implementation in 37 hospitals. International Journal for Quality in Health Care. 2008;20(3):155-61.
170. Rubin H, Pronovost P, Diette GB. The advantages and disadvantages of process-based measures of health care quality. International Journal for Quality in Health Care. 2001;13(6):469-74.
171. Campbell S, Hannon K, Lester H. Exception reporting in the Quality and Outcomes Framework: views of practice staff - a qualitative study. British Journal of General Practice. 2011;61(585):183-9.
172. Mason A, Street A. Publishing outcome data: is it an effective approach? Journal of Evaluation in Clinical Practice. 2006;12(1):37-48.