

# Measuring quality

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## Abstract

It is no longer sufficient for health care professionals to provide high quality health care, they must also be able to demonstrate that they are meeting and often exceeding quality targets. Quality indicators (QIs) provide a means of measuring and assessing quality, however there are advantages and disadvantages of indicator measurement. Further, the clinical perspective needs to be balanced against managerial control when developing valid, reliable, sensitive and specific QIs. While indicators do not represent a perfect measurement device, they may provide a useful tool for improving patient safety and meeting community expectations.

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IN THE PURSUIT OF system-wide health care improvement the measurement of quality has become a major issue.<sup>1</sup> Quality indicators (QIs) are becoming increasingly popular as tools for assessing quality. The Australian Council on Healthcare Standards (ACHS) has recently released the *Clinical indicator report* for 2006, a summary of results on 308 indicators from 654 health care organisations.<sup>2</sup> While participation in the ACHS indicator program is not mandatory, the measures provide a means for contributing

## What is known about the topic?

There is increasing emphasis being placed on quality indicators to assess quality.

## What does this paper add?

This paper provides an overview of the advantages, disadvantages and issues associated with the development and use of quality indicators. Based on this analysis the authors conclude that many existing indicators have not been rigorously investigated as to whether they are reliable and valid in measuring quality.

## What are the implications for practitioners?

Health care management and policy practitioners must consider implementation of feasible quality indicators that meet clinical and management decision-making needs.

facilities to demonstrate their performance. While medical practitioners generally support organisation performance measurement, concerns have been raised over how such performances should be quantified.<sup>3</sup> The proliferation of health care QIs comes at considerable collection and measurement cost. There is no systematic approach to the introduction of QIs and frequently little appreciation of the benefits and limitations of these measures. This review aims to provide an overview of the role of QIs in health care and discuss their uses and potential limitations.

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## What is quality?

The US Institute of Medicine defines quality as the “degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge”.<sup>4</sup> This definition highlights the issues involved in measuring quality of care, including the need for a specific focus on what is to be assessed, understanding the links between process and outcome, and measuring the ability of the system to keep pace with advances in treatment. Many issues surrounding quality

## I Structure, process and outcome quality indicators

Type of indicator	Examples
Structure	Access to specific treatments or technologies (eg, CT scan) Availability of human resources (eg, trauma team not activated on admission of trauma patient)
Process	Any patient sustaining a gunshot wound to the abdomen who is managed non-operatively Proportion of patients with myocardial infarction who received thrombolyses
Outcome	Mortality/morbidity Complications Return to operating room within 48 hours

indicators are attributable to the differing needs of key stakeholders. Patients are concerned with the degree to which care meets their needs, as well as the communication, concern and courtesy shown to them during their health care experience.<sup>5</sup> Purchasers measure quality based on efficient use of funds and resources. Providers and clinicians often focus on technical expertise and their ability to act freely in the best interests of their patients.<sup>5,6</sup>

From a management perspective, quality may be best measured through outcomes at an organisational or systems level, while clinicians typically focus on processes of care for individual patients. Therefore, any attempt at measuring quality must first establish the purpose and from whose perspective measurement is occurring. The involvement of key stakeholders in directing the future trends of indicator measurement is essential to maintain the balance between political, economic and public interests.<sup>7</sup>

## Quality indicators

Quality indicators may be used to identify variations from best practice, permit comparisons between providers, and identify trends in quality of care over specified time periods.<sup>8</sup> Such uses can drive local change through performance improvement projects or facilitate systems-level quality developments. For example, a quality indicator which flags cases of in-hospital falls may be able to reduce the impact of fall-related injuries at a specific hospital, while benchmark-

ing best performance on a similar indicator may provide system-wide benefits for providers and patients.

## Classifying quality indicators

A QI is a measure of clinical management and/or outcome.<sup>9</sup> Donabedian first proposed the classification of QIs as structure, process or outcome based.<sup>10</sup> Structural indicators relate to the attributes of the environment in which care is delivered and include material resources, personnel and the organisational structure. Process indicators are concerned with what is done by those involved in patient care, while outcomes are the results of the interaction between the patient and the health system, as well as other non-treatment factors.<sup>10</sup> Examples of structure, process and outcome QIs are presented in Box 1.

As indicators can be developed by different stakeholders, QIs will focus on the specific interests of the developing body. The difference between clinician-focused indicators and those used for organisational system improvement stems in part from the different focus of indicators for individuals and those for patient populations.<sup>7</sup> In both instances, QIs may be designed to flag patient cases for review; to compare hospital or physician performance with an external standard; or specify situations which are inherently undesirable. Such indicators can be termed descriptive, prescriptive or proscriptive, respectively. Indicators relating to the care of individual patients need to be reconciled against the needs of organisations

## 2 Advantages and disadvantages of process and outcome measures

### Process indicators

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>■ Provide information on what was done: clinicians are more accountable to process of care rather than outcomes.<sup>1</sup></li> <li>■ Can be used with smaller sample sizes.</li> <li>■ Most require minimal risk adjustment.<sup>1</sup></li> <li>■ Assessed unobtrusively from routinely collected data.<sup>12</sup></li> <li>■ Information concerning a patient's treatment is available immediately — no waiting time for outcomes to eventuate.<sup>12</sup></li> <li>■ Immediately interpretable by clinicians.</li> </ul>	<ul style="list-style-type: none"> <li>■ Can hold little meaning for patients.</li> <li>■ Sicker patients may receive “more” or “better” care: paradoxical association between good care and poorer outcomes.<sup>1</sup></li> <li>■ Often highly specific in nature: a number of indicators may be necessary to generate a comprehensive picture of quality.<sup>12</sup></li> <li>■ Require constant updating to keep pace with medical techniques.</li> <li>■ Precise definitions of the process are required to preserve reliability of the indicator between and within health systems.<sup>30</sup></li> </ul>

### Outcome measures

Advantages	Disadvantages
<ul style="list-style-type: none"> <li>■ Consider all factors associated with a patient's clinical course.</li> <li>■ Can be meaningful to most patients and purchasers as end points following care.<sup>1</sup></li> <li>■ Can apply to a variety of conditions, types of care or treatments received.</li> </ul>	<ul style="list-style-type: none"> <li>■ Tend to occur over longer time frames and are thus more difficult to collect.<sup>1</sup></li> <li>■ Can be influenced by many factors not related to processes of care.<sup>12</sup></li> <li>■ Outcome rates provide no information on what can be done to improve care.</li> <li>■ Often require direct data collection from patients.</li> <li>■ Can require greater risk adjustment as they apply to a range of patient subgroups.<sup>1</sup></li> </ul>

such as state or national quality councils that may require a population-based measure of performance.

An indicator may be further classified as disease-specific or generic. While generic indicators can be relevant to most patients, inter-hospital comparisons using generic QIs may be problematic due to differences in casemix.<sup>8</sup> Risk-adjusting disease-specific indicators can provide one means to avoid this problem. Disease-specific or generic indicators may also be considered in relation to the type of care in which they are employed, such as acute, chronic or preventive care.<sup>8,11</sup> Schuster et al propose that indicators be described according to their role in the provision of health, such as those for diagnosis, treatment or follow-up.<sup>11</sup> Finally, the modality of care, such as physical examinations or radiological studies, is a further means to distinguish between QIs.<sup>11</sup>

### Developing ideal quality indicators

Before choosing indicators to track quality, several criteria first need to be satisfied. The attribute of interest must have been associated with significant effects upon morbidity or mortality; the current quality of care must be variable; the attribute should be amenable to change; and the process or structure being measured must be linked empirically with outcome.<sup>12</sup>

The fundamental link between processes of care and outcomes has called into question the benefits of process measures over those of outcome assessment. Advantages and disadvantages of each are presented in Box 2. Process indicators measure what was actually done for a patient, while outcome measures assess the end points of a clinical intervention, are unable to distinguish between different phases of clinical care and require considerable risk adjustment for confounding factors.<sup>1,13</sup> Moreover, process

indicators provide immediate information while outcomes may require a longer time frame to develop, and can therefore be more difficult to collect.

Indicators are routinely based on findings from the literature or consensus from expert panels.<sup>8</sup> For practicality, indicators should be readily obtained from routinely collected data and place minimal impositions on data collection practices.<sup>14</sup> Once the indicator has been defined to include the unit of analysis, the intended sample, the source of information and the appropriate risk adjustment strategy, preliminary testing is required to establish the psychometric properties of the measure.

### Validity

Validity refers to the ability of the indicator to accurately measure the area of quality it intends to measure.<sup>15</sup> For process indicators criterion validity may be measured through the association between the process and outcome, while construct validity measures the degree to which the QI measure corresponds to theoretical concepts concerning the process under study.<sup>16</sup> For indicators to be valid they need to measure features of the actual care delivered by the clinician during the present episode of care rather than other non-treatment issues.<sup>17</sup> For example, readmission to hospital may be due to poor quality care (which is what the QI aims to assess), or patients failing to adhere to medication guidelines, which is beyond the scope of the quality of care delivered by the clinician.<sup>17</sup>

### Reliability

The concept of reliability incorporates reproducibility, inter-rater reliability and internal consistency. Reproducibility is the ability of the indicator to obtain similar results on repeated applications given that the underlying condition or feature remains unchanged.<sup>15</sup> Inter-rater reliability compares the results of the indicator when administered by different raters. Internal consistency refers to the degree to which items deemed to assess the same quantity are correlated. There should be a high level of correla-

tion between items measuring the same quantity.

### Sensitivity and specificity

If the aim of a QI is to select cases where poor performance has been indicated, then a sensitive QI will identify all those cases of poor performance. A QI with high specificity will identify nearly all those cases where there has not been poor performance and thus exclude those cases from the identified dataset.<sup>18</sup> Therefore, an ideal indicator will identify all cases of poor performance but not include cases where there was no evidence of poor performance. If indicators are not specific or sensitive, professionals or institutions may be incorrectly labelled as low quality, or not identified at all.<sup>17</sup> It is important that an acceptable balance be gained between sensitive indicators which identify all poor performers (resulting in few missed cases), and specific indicators which exclude those cases who are truly not performing poorly.

### Limitations of quality indicators

Quality indicators aim to assist in improving the quality of health care services. In some instances however, indicators have been noted to distort behaviours and result in negative unintended consequences.<sup>19</sup> Attempts to achieve specified targets such as reduced hospital lengths of stay may be seen to be to the detriment of patient care.<sup>6</sup> Financial incentives or the public reporting of performance data may both lead to a "gaming" of QI systems through patient selection bias, while processes not included in the quality indicator may be neglected. Using quality information to standardise treatments should assist in ensuring each patient receives the highest quality of care, however such information may also be used for directing financial resources, evaluating claims of liability, or even licensing physicians.<sup>20</sup>

Indicators aim to measure quality of service with the view to instigating rapid and actionable change. Medical practitioners or other clinicians will be most responsive to indicators which

maintain clinical independence and self regulation, such as those developed by professional bodies. In contrast, health management has historically focused on more financial controls such as average cost per separation, rather than indicators of clinical quality.<sup>21</sup> In the past, this has fuelled the debate between management control and professional autonomy. For example, a managerial drive to reduce acute care lengths of stay may conflict with the opinions of clinical staff as to what is in the best interests of the patient. Recently, however, many health providers have combined measures of clinical and financial quality through the use of balanced scorecard systems, potentially providing a more even-handed quality assessment.<sup>22</sup>

Indicators that do not promote action or change may be of limited use. Widespread support for QI systems assists in ensuring acceptance of indicators at managerial and clinical levels.<sup>17</sup> The ability of the indicator to promote change will be facilitated through the willingness of the stakeholders to improve performance.<sup>23</sup> There are specific examples of where QIs have been incorporated into administrative and funding models and have resulted in a modification of behaviour. For example, the Emergency Service Enhancement Program (ESEP) in Victoria incorporated a bonus payment system designed to reduce waiting times in emergency departments and was associated with a significant reduction in waiting times for triage categories 2 and 3.<sup>24</sup> In this instance, the link between administrative support and funding incentives facilitated the implementation of the ESEP indicators.

### Quality indicator issues

Differences in funding systems need to be appreciated when developing QIs in order to produce comparable measures. A recent discussion by McLoughlin et al highlighted the differences between the Australian, US and UK health systems.<sup>25</sup> While the United Kingdom is characterised by a centralised system which aims to assess quality from a national perspective, the United

States operates through a market-driven service comprised of independent private sectors propelled by consumer satisfaction. In contrast, Australia has a mixed public/private funding model.

The use of indicators differs in each system. Over the last 15 years public release of performance data has been a major aim of many quality initiatives.<sup>26</sup> In the US this was intended to allow consumers and businesses the opportunity to choose between health plans and health providers. In a consumer-governed environment, this can spark competition and theoretically enhance quality of care.<sup>27</sup> For universal health systems such as in Australia and the UK, uptake of this approach has been slower, due to the perceived risks of reduced provider cooperation, increased punitive focus, and limited applied research.<sup>28</sup> In Australia, continued difficulties in obtaining reliable and valid clinical data, as well as providing a national set of quality indicators meaningful to all, continue to plague quality measurement.<sup>25</sup>

### Conclusions

Quality indicators are useful for measuring the ability of health care systems to meet the demands of the people they serve, however, many routinely used QIs have not been rigorously investigated.<sup>29</sup> The future challenge for those developing and using QIs is to validate appropriate indicators as fit for purpose for both administrative and clinical staff to monitor and improve clinical care.

### Competing interests

The authors declare that they have no competing interests.

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