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Measuring surgical performance: A risky game?

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ABSTRACT

Background: Interest in performance measurement has been driven by increased demand for better indicators of hospital quality of care. This is due in part to policy makers wishing to benchmark standards of care and implement quality improvements, and also by an increased demand for transparency and accountability.

Approach: We describe the role of performance measurement, which is not only about quality improvement, but also serves as a guide in allocating resources within health systems, and between health, education, and social welfare systems. As hospital based healthcare is responsible for the most cost within the healthcare system, and treats the most severely ill of patients, it is no surprise that performance measurement has focused attention on hospital based care, and in particular on surgery, as an important means of improving quality and accountability. We are particularly concerned about the choice of mortality as an outcome measure in surgery, as this choice assumes that all mortality in surgery is preventable. In reality, as a low quality indicator of care it risks both gaming, and cream-skimming, unless accurate risk adjustment exists. Further concerns relate to the public reporting of this outcome measure.

Conclusions: As mortality rates are an imperfect measure of quality, the reputation of individual surgeons will be threatened by the public release of this data. Significant effort should be made to communicate the results to the public in an appropriate manner.

Healthcare is technophobic. Digital technology has the power to collect and analyse data over populations and time, yet the healthcare sector has been slow to follow the lead of others in using this data to improve care. The evolution of 'big data' has given non-healthcare sectors the ability to accurately measure and compare performance, both across jurisdictions and over time, while we remain focused on the idea that information technology cannot capture the multi-dimensional aspects of healthcare necessary for accurate comparisons of performance. The evidence suggests otherwise. Frameworks to analyse both clinical and cost-effectiveness are continually improving, properly designed software can accurately risk adjust, and the results of this data can be immediately delivered to those who require it. In memory-computing has been used in South Korea to decrease unnecessary antibiotic use, leading to lower costs and a decrease in resistant organisms, and Darmouth-Hitchcock have used large level datasets to decrease length of stay for total knee replacement.[1] In measuring health performance, technology is no longer an obstacle. Yet using 'big data' in healthcare remains

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controversial, in part due to ethical concerns regarding data protection for patients but increasingly because of concerns regarding protection of healthcare practitioners.

Delivering value in healthcare is an increasingly popular topic, driven by increased patient demands, expensive technologies, and an awareness of financial restraint, particularly emphasized by the global economic crisis. While the term 'performance measurement' appears to have become synonymous with 'quality improvement', in reality it also serves as a guide in the allocation of resources between various interventions, and between the healthcare system and education, or the healthcare system and social welfare. Measuring performance is part of a move towards demand-driven rather than supply-driven healthcare, which makes providers accountable for their outcomes, and clarifies where resources are spent. Ultimately performance is to health policy, what evidence-based medicine is to clinical care.

The result is that the role of the healthcare provider has become entwined with the role of the manager, the economist, and the accountant. The care provided by clinicians accounts, understandably, for the most significant expenditure within the healthcare system.[2] Healthcare demand is influenced by clinicians, and supply of healthcare is delivered by clinicians. Therefore, it is not surprising that the work of clinicians is considered to be particularly relevant in measuring the performance of the health system.

However, the health system is more than a collection of doctors, and it is more than the sum of their reported outcomes. It involves preventative care, primary, secondary and tertiary care, as well as education and social welfare. Furthermore, the goals of the health care system are more than just improved health. They also include accountability, financial protection and equity of access. The World Health Report of 2000 marked a move away from examining improvements in medical care, and included equity, fairness of financial contribution, and responsiveness as goals of the healthcare system.[3] Indeed, measurement of level of health of the population accounted for only 25% of the overall score. In country analysis of health system performance should take this weighting system into account when designing their own ranking systems. More recent discussions have focused on the importance of directing resources at areas of health gain, rather than measuring and focusing on non-preventable health loss. Focusing on mortality as a health loss, rather than potential health gains from improvements in quality of life, is one of the reasons why mental healthcare does not receive adequate funding in healthcare budgets. Therefore, although hospital-related healthcare accounts for the most costly care, in order to deliver outcomes that truly matter to the population, we need to look beyond merely the hospital environment, and focus on the outcomes that matter to patients. Improving quality of care for the population requires improvements in community-based care, public health, education and employment.

Interest in performance measurement in surgery has been driven by an increased demand for better indicators of quality in hospital care. Reporting this data is in part due to an increased emphasis on demonstrating transparency in healthcare provision, and in part due to an awareness of the role of public reporting as a mechanism to improve quality of care. Berwick's framework for quality improvement shows that public reporting of outcomes leads to improvements in quality from one of two methods – either patients select better providers of care, or the data provides information on areas of underperformance, leading to a stimulus for improvement from the providers.[4] However, the assumption that the publication of this data will result in improvements in quality rests on the assumption that the outcome being measured is amenable to quality improvement. Mortality is often used as a marker of quality of healthcare, predominantly because of the ease with which data on mortality can be collected. However, this data should only be used as a marker of quality if mortality was potentially preventable. While surgical mortality may be avoidable in certain situations, and for certain patients, assuming that it is unavoidable for all is contrary to scientific knowledge. 'What's measured is what matters', and inappropriate indicators of quality may lead to resources being spent in areas of minimal benefit, at the expense of other areas of care. As the focus has now been put on measuring the mortality rates of individual surgeons, it is time to ask if the choice of mortality as an indicator is appropriate, and what unintended negative effects may result from its use.

Decades of analyses of the use of mortality as an outcome measurement in hospitals, has clearly demonstrated that the signal-to-noise ratio is too low for mortality to be reliably used as a reflection of quality.[5] This may be either because there is no real correlation between in-hospital mortality and quality of hospital care, or because of the small sample size, coding issues, or methodological concerns.[4] In reality, in-hospital death is rarely preventable, and a significant body of evidence has shown that in cases where it is, alterations in care usually resulted in delaying time to death, rather than preventing it completely. Results from surgical care in the United States, the initiators of performance measurements, has demonstrated that hospitals with the highest mortality rates were not the hospitals that were considered to have provided the poorest quality of care.[5] A comparison of four different methodological approaches to measuring hospital wide mortality for the same dataset demonstrated significant variations in mortality, depending on the inclusion and exclusion criteria chosen and the statistical approach used.[6]

The move towards reporting the mortality rates of individual surgeons is entirely based on evidence from cardiac surgery. Work from both the US and England demonstrated a positive benefit of reporting individual cardio-thoracic surgeon's mortality rates. Data from the New York State CABG program is often cited as an example of where publishing outcomes leads to improved performance as a trend of decreased CABG related mortality was observed following public reporting.[7,8] In England, public reporting of mortality first took place in cardiothoracic surgery after reconfiguration of services following high mortality rates at Bristol Royal Infirmary.[9] The specialty initially published hospital level data in 1998 and then individual surgeons' results in 2006.

However, while mortality may be an appropriate outcome measure in cardiac surgery, in other specialties it has been shown to be a poor predictor of quality.[10] If unexpected deaths are of particular importance, perhaps death in low risk groups may be a more realistic quality indicator than overall