

Publishing hospital outcomes data: is it an effective approach?

Anne Mason and Andrew Street

Centre for Health Economics, Alcuin Block A, University of York, York YO10 5DD

arm10@york.ac.uk

ads6@york.ac.uk

Abstract

Concerns about escalating health care costs and variations in the quality of care have generated many policy initiatives. The publication – rather than merely the measurement and collection – of health outcomes data is one such initiative. Publication may also serve to strengthen accountability, transparency and openness; and be a response to consumer demand for information as a right in itself.

Drawing on a literature review, this paper overviews the strategies employed in the UK and US to publish hospital outcomes data, noting the differences and similarities between the two systems. Despite the different political and economic catalysts behind publication in these countries, common themes emerge.

Presenting the limited evidence that exists, we review the potential beneficial and harmful effects of publishing hospital outcomes data, together with the associated costs. The potential benefits of publication are considered in terms of promoting public trust, supporting patient choice, and stimulating action. We also consider the risks of making incorrect inferences based on these data and the potential for dysfunctional consequences. Recognising that the public largely mistrusts currently published health outcomes data, we offer some recommendations for the future direction of publishing data on health outcomes.

1 Introduction

Since the mid-1980s, the publication of hospital outcomes data has become increasingly popular. Canada and the US operate performance reporting systems, with similar initiatives planned in Australia and New Zealand.¹ In Europe, outcomes data are collected and published in the UK, Italy, Scandinavia and the Netherlands.²

Whilst political and regulatory attitudes differ across countries, the economic motivations are often similar. Concern with escalating health care costs and regional variations in the quality of care has led countries to examine ways to improve value for money from their health systems, one of which is to place key data in the public domain.³⁻⁵ Publication also forms part of a framework of accountability, along with regulation such as audit, accreditation, licensing and inspection; market (or quasi market) forces; and legislation.⁶ More broadly, publication is a means of realising the key political and cultural objectives of transparency and openness: publication aims to promote – or restore – public trust.^{7, 8} A related motivation is society's increasing emphasis on a general 'right to know'.⁹ Thus, the availability of information is also valued for its own sake, whether or not this changes behaviour.

The aims of this paper are to explain why outcomes are published, to describe and discuss particular systems of publication of hospital outcomes data in some detail, to present a critique of these systems and to explore the potential implications for policy and practice in the UK health care system. Box 1 provides some definitions of key terms.

Box 1: Definition of key terms

'Publication' includes paper and electronic media.

'Hospital' includes institutions providing acute and/or mental health services, including specialist services.

'Outcome' is defined primarily to mean clinical health outcomes such as morbidity and mortality. However, we also consider those 'process outcomes' that are often used either to proxy the former or that are published in conjunction with clinical outcomes data. To artificially abstract the clinical outcomes from their context could lead to a misunderstanding and misinterpretation of findings.

In section 2 we set out some of the reasons that might be advanced to justify publication of outcomes data. In section 3 we provide an historical overview of hospital outcomes publication in England, Scotland and the US, followed by a discussion of similarities and differences between the UK and US. Section 4 considers the beneficial effects and drawbacks of publication, based on the experience these two countries. Section 5 draws together the findings from the previous sections and offers some recommendations for the future direction of hospital outcomes publication.

2 Reasons for publishing hospital outcomes data

Many reasons might be advanced to support a policy of publishing outcomes data, but three appear particularly important in explaining current UK interest: to promote public trust; to support patient choice; and to stimulate action.

2.1 Promoting public trust

Publication of outcomes data may serve to reassure the public about the performance of medical profession and the NHS more generally. The two main instruments employed by the medical profession to evaluate performance have been disciplinary procedures and medical audit. The General Medical Council (GMC), the profession's regulatory body, is charged with identifying and dealing with unacceptable practice.¹⁰ Medical audit was developed by the profession in the 1980s and included the confidential enquiry into perioperative deaths (CEPOD).¹¹ Reliance on these two instruments was called into question in 1990s. Public confidence in the medical profession's ability to protect the interest of patients was undermined by a series of cases, of which the serial murders by Harold Shipman and the misconduct charges brought at the Bristol Royal Infirmary were the most serious. Whilst the Shipman case could be seen as an isolated incident,¹² the Bristol tragedy revealed systemic failures of existing forms of self-regulation and audit processes, placing the GMC under heavy criticism and eroding public trust in the medical profession more generally.^{8, 13, 14} Events at Bristol precipitated a fundamental shift in the relationships among the public, the government and the profession and resulted in a whole-scale re-evaluation of the system by which medical competence is monitored and regulated.

The incoming Labour government of 1997 was keen to demonstrate that it could 'do something' about poorly performing doctors.¹⁵ The government refused to dismiss medical scandals as isolated incidents, believing unsatisfactory performance to be widespread. The government's response was multi-faceted, and included the development of the NHS performance assessment framework; placing ultimate responsibility for assuring the quality of services with hospital chief executives;¹⁶ and mandatory participation by the medical profession in audit activities.¹⁷

But among governmental responses was the proposal to publish and publicise outcomes data, helping to restore public confidence by making the NHS "accountable to patients, open to the public and shaped by their views".¹⁸ Frank Dobson, then the Secretary of State for Health, referred specifically to "the appalling tragedy in Bristol" when announcing to the House of Commons that mortality tables were to be published.¹⁹ These mortality statistics²⁰ were never intended to capture all aspects of clinical performance, but to demonstrate to the electorate that action was being taken to improve performance. Publication may then have been symbolic of the wider performance agenda,²¹ reassuring the public that government and officials are accountable, their dealings transparent and open. But this is, of course, a weak justification for publication of this particular type of information: many other indicators might have served such a symbolic purpose. Other reasons are required to explain the publication of outcomes data.

2.2 Supporting patient choice

There is a prevailing belief in the US that informing patients is a key means to improving the quality of care.^{22, 23} There has been less of a tradition of this 'consumerist' philosophy in the UK, but this is changing with the 'Patient Choice' agenda,²⁴ which aims to move the emphasis from quality control by government-imposed targets to quality driven by patient demand:

As targets fall away they will be replaced by the power and preferences of patients and [Trust Chief Executives'] abilities as leaders and clinicians to respond to their needs.²⁵

Increasing patient choice translates into giving patients more say in how, when and where they are treated.²⁶ The patient choice agenda requires an information strategy, but this does not necessarily involve the publication of outcomes data. Reading about performance indicators may provide reassurance about competency but may tell the patient nothing about what sort of people will provide the care. Patients with chronic conditions, whose choices involve longer-term investments in their health, may have an on-going interest in various types of health information,³ including access issues (facilities, expertise and therapies) and travel considerations. Doctor-patient relationships and the availability of 'escape routes', should any transfer be unsuccessful, may outweigh quantitative evidence based on routine data.²⁷ This may explain why patients appear to rank qualitative evidence from informal sources, such as friends and family, more highly than quantitative data from official sources.²⁸

But publication of outcome data could improve decision-making. Doctors often act as an agent on their patients' behalf, interpreting, providing or facilitating access to the information that patients need to make an informed decision. However, for various reasons the agency relationship may be imperfect. Publication of various types of information, including information on quality,²⁹⁻³¹ may make agents better representatives or help patients to be more active in the decision-making process.

It may not be necessary to empower all patients in order to achieve improvements. In theory, this pressure could be expressed in two possible ways: 'exit', where patients change provider to signal their discontent with services; or 'voice', where patients, individually or collectively, negotiate quality improvements.³¹ General improvements might be stimulated even if only small numbers of patients exercise choice. Such an argument was advanced as a justification of general practice fundholding, it being suggested that the scheme would create spillover benefits that patients of non-fundholding practices would enjoy. This implies that quality improvement is a 'public', rather than a 'private', good because those not exercising choice may benefit from others' choices. But patient choice may undermine equity, with better-educated people more likely to exercise choice. In a capacity-constrained system, this may mean that benefits accrue to better-informed people at the expense of the less-informed, the more seriously ill, or the most vulnerable. If certain patients have a higher elasticity of demand with respect to quality (i.e. are more likely to exercise choice and select better quality care) than others, then quality improvements may in turn out to be a private good, enjoyed only by those who exercise choice.

2.3 Stimulating action

One of the main reasons for measuring and collecting outcomes data is to improve the quality of care. Having outcomes data is clearly an important if insufficient step to quality assurance. Drawing lessons from the Bristol tragedy, it has been argued that the principal problem was the failure not *to monitor*, but *to act* on available evidence.³² Even if action does occur, it may not be across the board. Performance indicators may provide little more than a 'safety net', ensuring that performance does not fall below minimum acceptable standards, with managers more concerned about eliminating bad performance than enhancing good or satisfactory performance.³³ The possibility of more widespread action may be enhanced by giving greater visibility to the data. Publication may encourage managers and health professionals to act. In the remainder of the paper we consider the evidence that publication stimulates action, after first reviewing examples of publication from the UK and US.

3 Examples of publication in the UK and US

3.1 England

The *collection* of mortality statistics in the UK dates back to the sixteenth century when weekly 'Bills of mortality' were collected to track the deadly impact of the plague. The *publication* of hospital mortality data can be traced back to the efforts of Florence Nightingale and William Farr in the mid-1800s. Driven by concern about the 'great and unnecessary waste of life' that they attributed to poor hygiene, Nightingale and Farr used hospital statistics

to 'wage their civilian reform campaign'.³⁴ In 1859, Nightingale had a set of her 'Model Forms' printed, allowing hospitals to record hospital mortality by disease, injury and type of operation.³⁵ From 1862, The *Journal of the Statistical Society of London* published the data.³⁶⁻⁴⁰ Publication ceased in 1866, partly because of technical problems of measurement and comparison, but also because of opposition from the Royal College of Surgeons⁴¹ and hostility from Parliament and government ministries.⁴²

It wasn't until 1992 that hospital mortality rates were again made public, being included in the Health Service Indicators. The *Sunday Times* gave these statistics some publicity, bringing them to the attention not only of the public but also of health authorities and government ministers. Publication of the HSIs ceased in 1996, being replaced by Patients Charter standards but these did not contain direct indicators of outcome.

The most recent publication of mortality statistics in England has taken place within the broader National Framework for assessing performance.⁷ Mortality rates, along with other clinical indicators, form a component of the information used to produce 'star ratings' of NHS Trusts.⁴³ Intended as an assessment of the "overall patient experience", rather than "a commentary on the quality of clinical care",⁴³ the first star ratings were published in 2001.

While the overall ratings are the focus of much attention, efforts have been made by the government to report separately some of the data used to inform the rankings. First appearing in 2001, the 'Good Hospital Guide' summarises the performance of all public and private hospitals in the UK against a range of indicators, including mortality rates.^{44, 45} The Guides are published by *Dr Foster*, an independent organisation which collects and analyses information on the availability and quality of health services, covering different disease areas and information on hospital consultants.

Dr Foster publishes selected surgeon-level data, but mostly these are not freely available. Although the Labour government had planned to publish data on individual surgeon performance from April 2004,⁴⁶ an inadequate technical infrastructure delayed implementation.^{47, 48} The model for publication comes from the Society of Cardiothoracic Surgeons (SCTS), which first established a surgical register in 1977.^{49, 50} Performance evaluation of all UK cardiothoracic surgery is fed back to hospital units,⁵⁰ and highly-aggregated data are published in SCTS annual reports. The NHS Information Authority is to take over data collection from the Society and the Central Cardiac Audit Database will enable mortality tracking through the Office for National Statistics.⁵¹ The 2004 SCTS report used crude mortality data to demonstrate that all surgeons met acceptable standards,⁵² but the Department of Health is pressing the Society to make individual, risk-adjusted, surgeon-level data available.^{47, 53} Whether or not the Department is successful in realising its plans, the Freedom of Information Act 2000 (which comes into effect in January 2005) may mandate the publication of named data, since these are held by a public organisation.

An important advance over simply *publishing* information has also taken place. It is of limited value to be told that there are variations in performance across the country, particularly if people cannot act on the information. But it may reassure the public that publication is accompanied by a plan of action. Recent publications by *Dr Foster* not only show variations in mortality rates, but also indicate the point at which rates trigger an alert.⁵⁴ This initiative combines the publication of both hospital *outcomes* with reassurance that there is a *process* in place to identify and respond to poor results.

3.2 Scotland

The clinical resource and audit group (CRAG) was established in 1989 to assess economic and quality issues for the NHS in Scotland.^{*} Three years later, a subcommittee of CRAG was set up to produce annual reports on performance. The 1994 report included 17 clinical outcome indicators covering patient populations in the Health Boards of Scotland, acute hospitals and psychiatric hospitals,^{28, 55} and subsequent reports included coronary artery

^{*} <http://www.show.scot.nhs.uk/crag/topics/facts/history.htm#croc> (accessed 08/11/04)

bypass graft (CABG) procedures (1998), mortality rates within 30 days of elective surgery (2002) and 7-day emergency readmission statistics (2002).

The intention of the publication was, and remains, to highlight issues that might need further investigation. A 'health warning' accompanies the reports, emphasising that the indicators are not a 'league table' of performance, that no direct inferences about quality of care should be drawn from them. Rather, the indicators should "provide useful clues and limited evidence relating to quality of care or performance".⁵⁶

3.3 United States

While recent pressure to publish hospital outcome data in the UK has come mainly from the government, demands for such information in the US have come from several sources. Managed care organisations' concern about escalating health care expenditure focussed data collection on relative costs, but information on the quality of care was needed to inform value based purchasing^{3, 57} and has led to a growing recognition of 'quality gaps' within the US health care system. The roots of recent moves to publication can be traced to the beginning of the twentieth century and the impetus behind publication is summarised in Box 2.

Box 2. Hospital Outcomes reporting in the US: the impetus for publication

- In the early 1900s, Ernest Codman unsuccessfully attempts to have his 'End Results Idea' adopted more widely, although his efforts are recognised posthumously.[†]
- In 1985, changes in the regulatory guidelines to the Freedom of Information Act (1966) mandate the publication of Medicare data that had been assembled for quality review purposes.⁵ The Health Care Financing Administration (HCFA) publish the data annually until 1993.
- Whilst most systems are voluntary, some are state-mandated, such as those operating in New York (1990), Pennsylvania (1992), New Jersey (1997) and Rhode Island (2001). In 1991, the Freedom of Information Act is invoked in New York State to force publication of surgeon-level data.
- In 1989, a Cleveland coalition of businesses, hospitals and physicians is convened in response to excessively high local health care costs. The project ends in 1999 after several hospitals withdraw, claiming that purchasers are failing to honour their original commitment to 'Buy Right' (i.e. to choose higher quality providers).
- By 2000, hundreds of reporting systems are in operation, although few provide physician-level data. Information on Health Plans is prolific and many websites provide the public with comparative data. The National Committee for Quality Assurance (NCQA), an independent, not-for-profit organisation and the largest accreditor of health plans, evaluates and reports on the quality of managed care plans.⁵⁸ However, because most systems are voluntary, coverage is partial and selective.

Perhaps the most important recent development is 'Project Public Trust', better known as the 'Hospital Quality Alliance', which is underpinned by a large public/private collaboration. The aim of the Quality Alliance is to provide the public with "valid and reliable information on which to assess the quality of health care being received by hospitalized patients".[‡] In their 'Call for Action on Collaborative Effort' to hospitals, the three organisations[§] leading the initiative explain its context:

The pressure for more and better publicly available information about the quality of hospital care is coming from every direction. The potential to confuse the public with incomplete, poorly analyzed and conflicting or misleading information

[†] Since 1997, a large US accrediting body has offered the 'Codman Award' for "achievement by organizations and individuals in the use of process and outcomes measures to improve organization performance and quality of care."

<http://www.jcaho.org/accredited+organizations/codman+award/index.htm> (accessed 08/11/04)

[‡] http://www.hospitalconnect.com/aha/key_issues/patient_safety/advocacy/040203hcaphsletter.html (accessed 08/11/04)

[§] The American Hospital Association, the Association of American Medical Colleges and the Federation of American Hospitals

is enormous... Hospitals must continue to improve quality internally and be publicly proactive. The issue no longer is whether quality data are to be made public – that is already happening. For hospitals, this is an opportunity to be leaders in forging a shared national strategy for quality measurement and public accountability.⁵⁹

Although participation is voluntary, there is a financial incentive to encourage hospital participation: hospitals that do not submit performance data on quality measures receive 0.4% lower Medicare payments in the following fiscal year than they otherwise would.⁶⁰

3.4 A story of convergence?

There are striking differences between the UK and the US histories of publishing hospital outcomes data. The catalysts for change are different: the principal trigger behind modern US publication was statutory right, embodied in the Freedom of Information Act (1966), whereas in the UK, the Labour government's response to high profile failures of professional self-regulation was the main driver, with political support for greater patient choice being a later development. Reflecting the very different underlying political and health care structures, participation in the reporting systems differs: in the US, participation is generally voluntary and non-punitive (although with notable exceptions), whilst the UK approach is characterised by statute and regulation and is underpinned by government-stipulated incentives.

Nonetheless, the commonalities between the systems are many and a convergence between them is beginning to appear. Key areas of overlap include:

- *Beginnings*: whilst the catalysts for publication differed, in both countries there had been a pioneer whose – apparently unsuccessful – attempts to publish hospital outcomes data arguably paved the way for modern developments.
- *Starting points*: in both countries, modern publication initially focussed on the assessment of acute hospital care.
- *Obstacles*: both countries have battled with the problems inherent in the use of routine data and the dangers of inducing 'unintended consequences' (see section 4.3).
- *Dynamics*: as a consequence of the difficulties experienced, both systems are characterised by evolution, growth and change. Both countries continue to strive to tackle shortfalls in their respective systems.
- *Approaches*: attempts to integrate efforts and to rationalise the measures published are evident in both countries.^{61, 62}
- *Objectives*
 - *Public trust*: heightening public trust through publication, demonstrating a willingness to be accountable to the public they serve, transparency, openness and trust are motives frequently cited to justify publication on both sides of the Atlantic.^{46, 59, 63} However, both countries have found publication to be a two-edged sword that can undermine public trust by drawing attention to deficiencies and failures.
 - *Quality control*: policy makers in both countries are concerned over regional variations in the quality of care. In the UK, geographical variations in prescribing ('postcode prescribing') and other 'unacceptable variations' were highlighted by the Labour government.¹⁸ In the US, the National Committee for Quality Assurance (NCQA) claimed that 57,000 lives were unnecessarily lost annually due to 'quality gaps' in the health care system.²³
 - *Cost containment*: in the UK, budgetary allocations place a ceiling on public sector health care expenditure, putting the opportunity cost of care high on the political and managerial agenda. In the US, cost concerns within managed care and business drove many of the early attempts to publish outcomes data. More recently, the NCQA highlighted the "wasted billions" of dollars resulting from substandard care.²³

Despite the different catalysts behind publication, the principal objectives of publication in the US and UK are remarkably similar, with both countries using publication as a tool for achieving these aims. But what difference does the publication of hospital outcomes make? Do beneficial effects outweigh harmful ones? We now examine the empirical evidence for the effectiveness of publication.

4 The pros and cons of publication

4.1 Evidence for the beneficial effects of publication

Despite the interest in and resources expended on the production of comparative performance reports, there has been remarkably little formal evaluation of their impact on the various stakeholders or the effect of the reports on the processes and outcomes of care.³⁰

Given the importance placed on publication of quality indicators, it is surprising how little evaluation of the positive and negative impacts of publication has been conducted. A review found published evaluations of only seven reporting systems, all of which operated in the US.⁶⁴ The reviewers concluded that the impact on health outcomes was uncertain, but that there may be a small positive effect.

There is little evidence that consumers make much direct use of published information. Research in the UK has found little awareness of or enthusiasm among the public for hospital league tables,⁶⁵ but the evidence base is likely to expand as the Patient Choice agenda is extended. With a few exceptions, the publication of data in the US appears to have had little impact on consumers or their employers, who are the main purchasers of health care.^{7, 66} In the case of Cleveland program (see below), employers, though encouraged to use the 'exit' option, in practice favoured 'voice', using information on quality to negotiate better deals with existing providers rather than switching allegiance.

Hospitals may be considered the most receptive audience and there are examples of hospitals taking action to identify reasons for their poor performance.⁶⁷ But this is not the rule: a survey of 17 acute public hospitals revealed that most had made no effort to improve quality in response to the California Hospital Outcomes Project (CHOP) reports.⁶⁸ This was primarily because adequate performance was considered sufficient, although the cost of undertaking quality improvements was also an important factor.

There is little evidence about the economic implications of publication,⁶⁴ but an unsuccessful experiment in Cleveland casts doubt on whether publication is cost effective for hospitals. Set up by a regional coalition of businesses, hospitals and physicians in 1989, the Cleveland Health Quality Choice (CHQC) program was designed to tackle high local health care costs through the 'Buy Right' philosophy:

If Cleveland businesses can reliably identify the highest quality, cost-effective hospital services then this information can be used to encourage their employees to choose these institutions for their hospital care. In turn, with the incentive of more patient volume and reliable comparative information, hospitals will strive to maintain or improve their quality of care, while controlling their costs.²⁷

Publication of appropriate health outcomes facilitated the functioning of this deal.⁶⁹ But in 1999 the program collapsed after several of the participating hospitals withdrew from the coalition, arguing that employers were making little use of the data other than to negotiate improvements with their existing providers. A subsequent analysis confirmed this view: publication caused no change market share and, with one exception, failed to improve outcomes.²⁷

Evaluations of the publication of English outcomes data are scant; in particular, there is little evidence to substantiate government claims that performance is improving as a result of

either publication or 'naming and shaming' policies.⁷⁰ One study of adult critical care found no association between the star rating awarded to a hospital Trust and the quality of care provided.⁷¹ A statistical analysis of the relationship between acute Trust characteristics and their star ratings for 2001 and 2002 supported the absence of a link between rating and quality of clinical care, although higher ratings were associated with better managerial performance in several dimensions.⁷²

The publication of performance data as part of the Scottish CRAG initiative was met with initial enthusiasm. Among clinicians and managers, there was "virtually no simplistic and unquestioning use of the indicators to inform decisions without further enquiry"⁷³ (page 158). Media coverage was "informed and responsible"⁷³ (page 158) and there was "very little evidence that publication of the indicators produced public unease or distress"⁷³ (page 159). However, a subsequent independent evaluation of the system painted a less positive picture. The evaluation involved interviews with stakeholders from eight NHS hospital Trusts and their corresponding Health Boards, and with a random sample of general practitioners.²⁸ A postal survey of all 16 Health Councils, bodies that represent consumer interests, assessed consumer use of the data. Focussing on two indicators,^{**} the study found low levels of awareness of and interest in the data. Hospital Trust staff were generally aware of the data, which they used principally to support funding applications and service development.⁷⁴ Hospital Boards rarely used the data, except to identify potential problems requiring further scrutiny. One quarter of the GPs interviewed had accessed the data, chiefly to inform their own assessments of local hospitals. Just one Health Council reported any consumer interest in the data. The key lessons from this study were that the perceived quality of the indicators was a barrier to their use and that an incentive structure was needed to ensure data were used for continuous quality improvement.⁷⁴

4.2 Data problems

Routine data have limited explanatory power⁷⁵ and are associated with considerable methodological problems.⁴ Despite the quantity of data produced in the US, the validity of routine administrative data for quality assessment remains unclear.¹ There is some evidence that this is also true of routine data collected in the UK,^{75, 76} although such data may serve as a marker for poor performance requiring further investigation.⁷⁷

Problems with routinely-collected data include:

- Incomplete or missing data
- Lack of adequate adjustment for confounding factors
- Risk of over interpretation of data and failure to understand the play of chance
- Miscoding / variation in coding practice

Chiefly for these reasons, the British medical profession has resisted the call for consultant-specific death rates to be made public. In its discussion paper published in response to the proposal to publish clinical indicators, the British Medical Association argued that there was no measure that could provide the required data because of the problems of case-mix or risk-adjustment.⁷⁸ Without adequate risk-adjustment, doctors may be tempted to avoid treating high-risk patients.⁷⁹ Nor do individualised data recognise the collective nature of health care delivery.^{80, 81}

The risk of making inaccurate inferences is likely to be lower if the organisations or doctors being assessed perform large numbers of a procedure where casemix is well described. However this is often not the case. For example, annual volumes of CABG surgery may be too small for meaningful mortality comparisons and this problem is more severe for surgeon-level data. Some 'high-mortality outliers' in Pennsylvania were found to have been misclassified as a result of the inadequate corrections to the raw data.⁸²

* :5-year survival from breast cancer, reported at the level of the Health Board; 30-day survival after emergency admission for stroke, reported at the level of the hospital Trust.

Understanding the variation in performance between doctors must disaggregate at least four sources of variance, two of which are ‘benign’, one which is ‘moot’ and one which is the variance we want to measure: ‘true’ differences in the quality of care. ‘Benign’ variance due to differences in patient casemix can be lessened by adequate statistical adjustment for confounding; benign variance due to the play of chance is managed by using appropriate statistical tests, which avoid over-precise estimates. ‘Moot’ variance may arise due to differences in the resources available and /or composition of health care employed, for example in surgical, technical or nursing support, perhaps reflecting local policy variations.⁸³ Once these three are dealt with, what remains may be variance due to performance, assuming the quality marker is an adequate proxy for the quality of care delivered by the clinician team.

Robust, interpretable findings will emerge only from good data that are carefully analysed. ‘Careful’ here supposes considerable knowledge of the data as well as statistical techniques. For example, choice of both the unit of analysis and the timeframe may affect findings.⁸⁴

Rather than tackle these issues, the quality agenda in health care seems sometimes to confuse the quantity and quality of indicators. Indeed, the complexity, heterogeneity, differential importance and sheer number of different indicators cause confusion, dissipation of effort and the ‘paralysis of analysis’.⁸⁵ Appropriate information needs to be collected so that performance assessments can take account of known confounding variables, although the danger remains that some may be overlooked.⁵¹ Presenting data that are *not* risk-adjusted may yet be of value, because it emphasises the indicative, rather than designative, nature of the information.

4.3 Dysfunctional consequences of publication

Data gathering entails an opportunity cost on scarce health care resources⁸⁵ and so it is important to assess the benefits and harms that result. The key benefit for publishing outcomes data is to attempt to improve the quality of care. However, there may also be unintended harm arising from measuring, collecting and publishing such data. A typology, devised by Smith (1995),⁸⁶ of the dysfunctional consequences that might arise together with examples is given in Table 1.

Table 1: Dysfunctional consequences arising from the publication of outcomes data

Consequence	Meaning	Examples
Convergence	Aiming for average quality, rather than excellence	Hospitals not labelled as a high or low outlier by the New York rating system failed to use the data to “lift themselves from mediocrity to excellence”. ⁸⁷
Gaming	Changing behaviour to gain strategic advantage	Use of inflatable tents by ambulance trusts, to provide a ‘target-free limbo’. ⁸⁸
Misrepresentation	Includes ‘data mining’, changes in data recording, creative accounting and fraud.	Miscoding of prevalence data, reducing severity adjusted mortality rates. ⁸⁹ Use of 115 as default age where patient data not recorded to improve risk-adjusted score. ⁶⁸
Myopia	Obsession with short-term goals	Diversion of resources in London A&E departments during assessment week to meet targets. ⁹⁰
Ossification	Reluctance to experiment with innovative technologies to minimise the risk of poor performance	Self-reported reluctance of some cardiac surgeons to operate on ‘high-risk’ patients in the US ^{91, 92} and UK. ⁵⁰
Sub-optimisation	Prioritising narrow objectives that are organisation-specific over broader, inter-organisational strategic goals	Patients held back, deferred or not removed from waiting lists to ensure targets were met. ⁹³
Tunnel vision	Focussing on areas assessed, at the expense of non-assessed areas	The drive to meet new outpatient appointment targets led to delayed follow-up appointments, allegedly resulting in 25 patients losing their sight. ⁹⁴

Researchers investigating the US experience of cardiac surgery report cards⁹⁵ found that providers in states with publication systems were selecting less sick patients for CABG and that this was associated with poorer outcomes for sicker patients. However, patients were being better matched to hospital capabilities. On balance, higher costs meant that report cards led to a net reduction in welfare. An earlier study that found no systematic bias against operating on high-risk patients amongst states with public reporting systems,⁹⁶ but the analysis took no account of high-risk patients who were eligible for, but did not receive, surgery.

The danger of publishing data is that “beating the system, not improving quality, becomes the aim of the game” and “performance measurementmay pervert behaviour and engender an adversarial and defensive culture detrimental to quality”.⁴ This phenomenon is known as Goodhart’s Law’:

Any observed statistical regularity will tend to collapse once pressure is placed upon it for control purposes.⁹⁷

5 Recommendations

A consumer-led NHS needs accessible information to enable patients to participate, if they wish, in decisions about their treatment. At the managerial level, credible performance data are needed to inform a dialogue between managers and clinicians to address the quality agenda and target inadequate performance promptly as it emerges. At the policy level, the Department of Health and government need aggregate measures that value NHS health care delivery in a transparent, valid and robust manner so that both health service professionals and patients can have confidence in policy directives. It is disheartening then that publication appears to have, at best, marginal benefits.

But if the public has a ‘right to know’ about health services, the question arises as to how to provide information properly. Five pointers are offered to promote progress.

1. Recognise that publishing inadequately constructed, measured and interpreted quality indicators will have at best equivocal benefits.

Drawing on the US experience of publishing outcomes data, there are a number of desirable features for public reporting systems:¹

- **Co-ordinated systems with mandatory participation**
In many cases, outcome statistics are constructed from data collected for other reasons. These may not be ‘fit for purpose’ and attention must be given to primary data collection, with a clear articulation of data specification and objectives.
- **Aligned incentives and minimisation of dysfunctional consequences**
There is a need to establish independent systems of reporting that minimise the risk of manipulation by interested parties, supported by a regulatory framework that protects the integrity of the source data.
- **Preserve and nurture trust and an ethos of learning within the system**
The perception of a ‘blame culture’ in the NHS is damaging and unproductive. Moving to a Codman like system of ‘End Results’, or the ‘near miss’ assessments used in the Airline industry will better foster a culture of learning and continuous, supportive quality improvement.
- **Measures that are appropriate for their intended application and audience**
The assumption that the costs of disseminating information are trivial compared to data collection costs should be challenged. Unless careful thought is paid to how best to disseminate information to meet the specific needs of each target audience, the objectives of the exercise are unlikely to be realised.
- **Ensure that the process is both effective and cost-effective**
Arguments for the production and publication of ever more information need to be tempered by consideration of the added value of this information. At what point is additional information irrelevant to decision making? Is there a danger of information

overload? Rather than indiscriminate publication, policy might be better designed if alternative strategies were first piloted on a small scale.

None of the hospital outcome measures considered in this paper systematically addresses each of these points to inform a policy of publication. The Department of Health's new 'developmental standards'⁹⁸ should attempt to accommodate these issues.

2. Recognise that different users have different informational needs

Increasing levels of aggregation are needed as we move from patient or carer, to health professional, manager, regional office and government. When making choices about consumption we (often effortlessly) make our own aggregation to inform our choice. As health care moves towards a consumerist ethos, we will have to become better at describing the range and probability of potential consequences of treatment if patient choice is to be promoted. Managerial aggregated measures of outcome are not helpful in this respect. Managers at various levels need appropriately aggregated data on performance. In the past, these data appear to have attracted a 'halo' of irrefutability once published and a far more intelligent approach to aggregate data is required, understanding that the quality of care is only one source of variance.

3. Work with each target group to develop valid quality indicators, and determine their use, rewards and sanctions

This concept is fully concordant with the principles of clinical governance. Informed by existing research, consultation, development, feedback and piloting are essential to promote trust and get the users to work together towards shared goals.

If quality indicators are to be used to inform performance-related rewards and sanctions it is important to determine which values these will be based upon and explore positive and negative consequences, particularly in the context of other incentives in the system, such as those contained in the new Consultant and General Medical Services contracts. Rewards and sanctions could be based on market share or professional minimum standards and either might be expected to interact differently with publicly and privately funded health care systems with different remuneration systems for clinicians. The timing of assessments needs careful consideration so that the potential for dysfunctional responses is minimised.

4. Understand users' modes of access to information

Assuming we can develop valid information to inform patient choice, measures will need to be taken to ensure that not just the articulate middle classes, but all strata of society are empowered and that the interests of vulnerable groups are protected.⁹⁹ The process can be informed by previous research. For example, patients prefer detailed locally relevant information including involvement in designing output formats, low levels of aggregation of data and access via a trusted intermediary, or agent, such as the GP, an information officer at Primary Care Trust level or patient groups.⁶⁵ Innovative approaches, such as the women's magazines produced by the Department of Health and *Dr Foster*,^{100, 101} should be evaluated and adapted.

5. Resist the temptation to over-simplify

Initiatives such as the UK hospital 'star ratings' are difficult to interpret because there are so many possible reasons for a good or bad rating not all of which are to do with the quality of care delivered. The very nature of a profession means that there is skill and expertise held by professionals that cannot be encapsulated by simple rules and regulations: their tacit knowledge.⁴ No single approach to performance management is likely to be supreme.⁴ Describing the product of a hospital is complex and a reductionist approach, such as that encapsulated by a 'star rating', can easily send discouraging, perverse and counterproductive signals to staff and simplistic messages to the public.

6 References

1. Mannion R, Davies HT. Reporting health care performance: learning from the past, prospects for the future. *Journal of Evaluation in Clinical Practice* 2002;8(2):215-28.
2. Marshall MN, Brook RH. Public reporting of comparative information about quality of healthcare. *Medical Journal of Australia* 2002;176(5):205-206.
3. Marshall MN, Shekelle PG, Davies HT, Smith PC. Public reporting on quality in the United States and the United Kingdom. *Health Affairs* 2003;22(3):134-48.
4. Davies HT, Lampel J. Trust in performance indicators? *Quality in Health Care* 1998;7(3):159-62.
5. Fottler MD, Slovensky DJ, Rogers SJ. Public release of hospital specific death rates. Guidelines for health care executives. *Hospital & Health Services Administration* 1987;32(3):343-56.
6. Davies H. Falling public trust in health services: implications for accountability. *Journal of Health Services & Research Policy* 1999;4(4):193-4.
7. Marshall MN, Shekelle PG, Leatherman S, Brook RH. Public disclosure of performance data: learning from the US experience. *Quality in Health Care* 2000;9(1):53-7.
8. Davies HTO, Shields AV. Public trust and accountability for clinical performance: lessons from the national press reportage of the Bristol hearing. *Journal of Evaluation in Clinical Practice* 1999;5(3):335-342.
9. Secretary of State for Health. Freedom of Information Act 2000. London: The Stationery Office; 2000. <http://www.legislation.hmso.gov.uk/acts/acts2000/20000036.htm>
10. NHS Executive. Supporting doctors, protecting patients. London: NHS Executive; 1999
11. Buck N, Devlin HB, Lunn JN, Vickers MD. The Report of a confidential enquiry into perioperative deaths. London: King Edward's Hospital Fund for London; 1987
12. Ransley P. In need of urgent attention. *The Guardian* 2000 8 August; 16.
13. Dunn P. The Wisheart affair: paediatric cardiological services in Bristol, 1990-5. *British Medical Journal* 1998;3171144-5.
14. Smith R. All changed, changed utterly. *British Medical Journal* 1998;3161917-8.
15. Smith R. Regulation of doctors and the Bristol inquiry. *British Medical Journal* 1998;3171539-40.
16. Department of Health. Star ratings system for hospital performance has improved services for patients. Press Release; 2003/0138 2003.
17. Warden J. NHS hospital doctors face compulsory audit. *British Medical Journal* 1998;3161851.
18. NHS Executive. The New NHS: modern, dependable. Leeds: NHS Executive; 1997. Report No.: Cm3807.
19. Warden J. Hospital death rates to be published for England. *British Medical Journal* 1998;3161767.
20. NHS Executive. Quality and performance in the NHS: clinical indicators. Leeds: NHS Executive; 1999.
21. Jacobs K, Manzi T. Performance indicators and social constructivism: conflict and control in housing management. *Critical Social Policy* 2000;20(1):85-103.
22. Baker DW, Einstadter D, Thomas CL, Husak SS, Gordon NH, Cebul RD. Mortality trends during a program that publicly reported hospital performance. *Medical Care* 2002;40(10):879-90.
23. National Committee for Quality Assurance. The State of Health Care Quality: 2003. Washington: NCQA; 2003. September. <http://www.ncqa.org/Communications/State%20Of%20Managed%20Care/SOHCREPORT2003.pdf>
24. Department of Health. The NHS Plan: a plan for investment, a plan for reform. London: HMSO; 2000
25. Reid J. Speech by Rt Hon John Reid MP, Secretary of State for Health, 10th February 2004: Chief Executives Conference. 2004.
26. Epstein AM. Public release of performance data: a progress report from the front. *Journal of the American Medical Association* 2000;283(14):1884-6.

27. Baker DW, Einstadter D, Thomas C, Husak S, Gordon NH, Cebul RD. The effect of publicly reporting hospital performance on market share and risk-adjusted mortality at high-mortality hospitals. *Medical Care* 2003;41(6):729-40.
28. 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):277-286.
29. Department of Health. Reforming NHS financial flows: introducing payment by results. London: Department of Health; 2002
30. Marshall M, Davies H. Public release of information on quality of care: how are health services and the public expected to respond? *Journal of Health Services Research & Policy* 2001;6(3):158-62.
31. Klein R. Models of man and models of policy: reflections of "Exit, Voice, and Loyalty" ten years later. *Milbank Memorial Fund Quarterly Health & Society* 1980;58(3):416-29.
32. Willis J. Case arose through a failure of action, not of detection. *British Medical Journal* 1998;317811.
33. Goddard M, Mannion R, Smith PC. Assessing the performance of NHS hospital trusts: the role of 'hard' and 'soft' information. *Health Policy* 1999;48119-134.
34. Iezzoni LI. 100 apples divided by 15 red herrings: a cautionary tale from the mid-19th century on comparing hospital mortality rates. *Annals of Internal Medicine* 1996;124(12):1079-85.
35. Nightingale F. Hospital statistics. Appendix: proposal for a uniform plan of hospital statistics. In: Fourth Session of the International Statistical Congress; 1860; London: Eyre & Spottiswoode for Her Majesty's Stationary Office; 1860. p. 63-71.
36. Turner T. Statistics of the general hospitals of London, 1861. *Journal of the Statistical Society* 1862;25384-8.
37. Statistical Society of London. Statistics of metropolitan and provincial general hospitals for 1862. *Journal of the Statistical Society* 1864;27401-9.
38. Statistical Society of London. Statistics of metropolitan and provincial general hospitals for 1863. *Journal of the Statistical Society* 1865;28527-35.
39. Statistical Society of London. Statistics of metropolitan and provincial general hospitals for 1864. *Journal of the Statistical Society* 1866;29112-21.
40. Statistical Society of London. Statistics of metropolitan and provincial general hospitals for 1865. *Journal of the Statistical Society* 1866;29596-605.
41. Bishop WJ, Goldie S. A Bio-bibliography of Florence Nightingale. London: Dawsons of Pall Mall; 1962
42. Vicinus M, Nergaard B, editors. Ever yours, Florence Nightingale. London: Virago Press; 1989.
43. Department of Health. NHS Performance Ratings Acute Trusts 2000 - 2001. London: Department of Health; 2001
44. Anonymous. Good Hospital Guide - part 1. *The Sunday Times* 2001 14 January; supplement.
45. Anonymous. Good Hospital Guide - part 2. *The Sunday Times* 2001 21 January; supplement.
46. Department of Health. Government response to Bristol Royal Infirmary report. Press Release; 2002/0030 2002.
47. Carlisle D. How the Government broke its Bristol Inquiry Pledge. *Health Service Journal* 2004;114(5930):12-13.
48. Day M. BUPA to be first medical provider to show success rates of surgeons. *The Telegraph* 2004 18 April.
49. Treasure T. Lessons from the Bristol case. *British Medical Journal* 1998;3161685-6.
50. Keogh BE, Kinsman R. National Adult Cardiac Surgical Database Report 2000 - 2001. London: Society of Cardiothoracic Surgeons of Great Britain and Ireland; 2002. <http://www.scts.org/index.cfm?ukcardiacreg=yes>
51. Keogh B, Spiegelhalter D, Bailey A, Roxburgh J, Magee P, Hilton C. The legacy of Bristol: public disclosure of individual surgeons' results. *British Medical Journal* 2004;329(7463):450-4.
52. Society of Cardiothoracic Surgeons. Cardiac Surgery Standards Improve Again. Press Release 2004;10th September.
53. Hawkes N. Surgeons are ordered to reveal heart operation failure rate. *The Times* 2004 4 November; 7.

54. Taylor R. Mortality rates. *Health Service Journal* 2004;114(5908):27.
55. Scottish Office. Scotland getting better: the National Health Service in Scotland: annual report 1994-95. Edinburgh: Scottish Office; 1995.
56. Clinical Outcomes Working Group. Clinical outcome indicators: May 2002. Edinburgh: Clinical Resource and Audit Group; 2002
57. Berwick DM, Wald DL. Hospital leaders' opinions of the HCFA mortality data.[erratum appears in *JAMA* 1990 Jun 27;263(24):3261]. *Journal of the American Medical Association* 1990;263(2):247-9.
58. Epstein AM. Rolling down the runway: the challenges ahead for quality report cards. *Journal of the American Medical Association* 1998;279(21):1691-6.
59. American Hospital Association, Association of American Medical Colleges, Federation of American Hospitals. The Quality Initiative: a public resource on hospital performance. Call for Action on Collaborative Effort 2003.
60. Centers for Medicare and Medicaid Services. CMS Announces Guidelines for Reporting Hospital Quality Data. Press Release 2004;202-690-6145.
61. US Department of Health & Human Services. HHS Achievements in 1998 Build a Healthier America. HHS Fact Sheet 1998;(202) 690-6343.
62. NHS Executive. The new NHS modern and dependable: a national framework for assessing performance - consultation document. Leeds: NHS Executive; 1998.
<http://www.dh.gov.uk/assetRoot/04/01/44/86/04014486.pdf>
63. Davies HT. Public release of performance data and quality improvement: internal responses to external data by US health care providers. *Quality in Health Care* 2001;10(2):104-10.
64. Marshall MN, Shekelle PG, Leatherman S, Brook RH. The public release of performance data: what do we expect to gain? A review of the evidence. *Journal of the American Medical Association* 2000;283(14):1866-74.
65. Magee H, Davis LJ, Coulter A. Public views on healthcare performance indicators and patient choice. *Journal of the Royal Society of Medicine* 2003;96(7):338-42.
66. Schneider EC, Lieberman T. Publicly disclosed information about the quality of health care: response of the US public. *Quality in Health Care* 2001;1096-103.
67. Dziuban SW, Jr., McIluff JB, Miller SJ, Dal Col RH. How a New York cardiac surgery program uses outcomes data. *Annals of Thoracic Surgery* 1994;58(6):1871-6.
68. Luce JM, Thiel GD, Holland MR, Swig L, Currin SA, Luft HS. Use of risk-adjusted outcome data for quality improvement by public hospitals. *Western Journal of Medicine* 1996;164(5):410-4.
69. Farley DO, Haims MC, Keyser DJ, Olmsted SS, Curry SV, Sorbero M. Regional Health Quality Improvement Coalitions: Lessons Across the Life Cycle: RAND Corporation; 2003. October. Report No.: ISBN: 0-8330-3502-9.
<http://www.rand.org/publications/TR/TR102/TR102.pdf>
70. Snelling I. Do star ratings really reflect hospital performance? *Journal of Health Organization and Management* 2003;17(3):210-223.
71. Rowan K, Harrison D, Brady A, Black N. Hospitals' star ratings and clinical outcomes: ecological study. *British Medical Journal* 2004;328(7445):924-5.
72. Jacobs R, Smith PC. A descriptive analysis of general acute trust star ratings. York: Discussion Paper 189. University of York; 2004.
73. Kendrick S, Cline D, Finlayson A. Clinical outcomes indicators in Scotland: lessons and prospects. In: Davies HTO, Tavakoli M, Malek M, Neilson AR, editors. *Managing Quality: Strategic Issues in Health Care Management*. Aldershot: Ashgate Publishing Ltd; 1999.
74. Mannion R, Goddard M. Impact of published clinical outcomes data: case study in NHS hospital trusts. *British Medical Journal* 2001;323(7307):260-3.
75. McKee M, Hunter D. Mortality league tables: do they inform or mislead? *Quality in Health Care* 1995;4(1):5-12.
76. Bridgewater B, Grayson AD, Jackson M, Brooks N, Grotte GJ, Keenan DJ, et al. Surgeon specific mortality in adult cardiac surgery: comparison between crude and risk stratified data. *British Medical Journal* 2003;327(7405):13-7.
77. McKee M, James P. Using routine data to evaluate quality of care in British hospitals. *Medical Care* 1997;35(10 Suppl):OS102-11.
78. British Medical Association. Clinical Indicators (League Tables) - discussion document. London: British Medical Association; 2000

79. Keogh BE, Dussek J, Watson D, Magee P, Wheatley D. Public confidence and cardiac surgical outcome. *Cardiac surgery: the fall guy in medical quality assurance. British Medical Journal* 1998;316(7147):1759-60.
80. Dawson R. Benefits of openness and teamwork must be emphasised. *British Medical Journal* 1998;317812.
81. Egan R. Concept of collective responsibility is important. *British Medical Journal* 1998;317813.
82. Localio AR, Hamory BH, Fisher AC, TenHave TR. The public release of hospital and physician mortality data in Pennsylvania. A case study. *Medical Care* 1997;35(3):272-86.
83. Seagroatt V, Goldacre MJ. Hospital mortality league tables: influence of place of death. *British Medical Journal* 2004;328(7450):1235-6.
84. Mukamel DB, Mushlin AI. Quality of care information makes a difference: an analysis of market share and price changes after publication of the New York State Cardiac Surgery Mortality Reports. *Medical Care* 1998;36(7):945-54.
85. Davies HT. Performance management using health outcomes: in search of instrumentality. *Journal of Evaluation in Clinical Practice* 1998;4(4):359-62.
86. Smith P. On the Unintended Consequences of Publishing Performance Data in the Public Sector. *International Journal of Public Administration* 1995;18277-310.
87. Chassin MR. Achieving and sustaining improved quality: lessons from New York State and cardiac surgery. *Health Affairs* 2002;21(4):40-51.
88. McKee M. Not everything that counts can be counted; not everything that can be counted counts. *British Medical Journal* 2004;328(7432):17.
89. Green J, Wintfeld N. How accurate are hospital discharge data for evaluating effectiveness of care? *Medical Care* 1993;31(8):719-31.
90. Mayor S. Hospitals take short term measures to meet targets. *British Medical Journal* 2003;326(7398):1054.
91. Schneider EC, Epstein AM. Influence of cardiac-surgery performance reports on referral practices and access to care. A survey of cardiovascular specialists. *New England Journal of Medicine* 1996;335(4):251-6.
92. Burack JH, Impellizzeri P, Homel P, Cunningham JN, Jr. Public reporting of surgical mortality: a survey of New York State cardiothoracic surgeons. *Annals of Thoracic Surgery* 1999;68(4):1195-200; discussion 1201-2.
93. Dobson R. Staff may be disciplined over "fiddling" waiting lists. *British Medical Journal* 2004;328(7450):1220.
94. Gulland A. NHS staff cheat to hit government targets, MPs say. *British Medical Journal* 2003;327(7408):179.
95. Dranove D, Kessler D, McClellan M, Satterthwaite M. Is More Information Better? The Effects of "Report Cards" on Health Care Providers. *Journal of Political Economy* 2003;111(3):555-88.
96. Hannan EL, Siu AL, Kumar D, Racz M, Pryor DB, Chassin MR. Assessment of coronary artery bypass graft surgery performance in New York. Is there a bias against taking high-risk patients? *Medical Care* 1997;35(1):49-56.
97. Goodhart CAE. *Monetary Theory and Practice: the UK experience*. London: Macmillan Press Ltd; 1984 0333 36060 5.
98. Department of Health. *National Standards, Local Action: Health and Social Care Standards and Planning Framework 2005/06–2007/08*. London: Department of Health; 2004. 21/07/04. <http://www.dh.gov.uk/assetRoot/04/08/60/58/04086058.pdf>
99. Fairfield G, Hunter DJ, Mechanic D, Rosleff F. Implications of managed care for health systems, clinicians, and patients. *British Medical Journal* 1997;314(7098):1895-8.
100. Department of Health. *New local maternity magazine for all Mums-to-be*. Press Release; 2003/0527 2003.
101. Department of Health. *It's Your Life: NHS launches women's health magazine*. Press Release; 2004/0021 2004.