REFLECTING ON THE VALUE OF HEALTHCARE

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INTRODUCTION

"Value must be the fundamental goal of any healthcare system. Measuring value, and improving it, must become the driving force for every participant in the system."

Porter (2008 p172)

Echoing Porter (2008), Gray (2011 p1) predicts that the focus in the health sector for the next era will be on value:

"21st century healthcare will be dominated by patients, outcome and value, because the challenges facing 21st century healthcare in every society are massive and growing."

Internationally, escalating public expenditure in the health sector has brought pressure for cost savings, performance improvements, resource allocation, accountability and more equitable delivery (Broadbent and Guthrie 1992, Broadbent and Laughlin 1998, Lowe 2000; Cordery, Baskerville and Porter 2010, Lawrence, Alam, Northcott and Lowe (1997). Hopwood (1992) and Bloomfield Coombs, Cooper and Rea (1992) point out that resource management was historically the sole responsibility of the medical profession and Rea (1994, 87) notes that

"rights of clinical autonomy meant the work of doctors could only be assessed by other members of the profession, according to whether it was within accepted standards of treatment and ethics. Decisions to treat, over forms of treatment, and over treatment duration remained relatively free of accountability outside the profession."

Subsequently, health sector accounting primarily concerned the treasury function rather than the provision of information for managerial decision-making (Hopwood 1984) and early healthcare accounting was limited to developing accounting systems (Bloomfield et al. 1992, Rea 1994). ‘*Hospitals and health management had invested lightly in the accounting craft, in part because health care had not been perceived as primarily an economic phenomenon*’ (Hopwood 1990, 16). Rea (1994) observes that from the 1950s to 1980s, a department-based costing system was favoured, which expressed expenditures at highly aggregated functional levels.

Healthcare accounting emphasized cost control and containment (Preston 1992) which involved the definition, measurement and costing of health service outputs (Jones and Wicks 1999). Effectiveness and efficiency grew in importance because funding was made available only to those services that produced
positive results at a reasonable cost (Gray 2011). Calls to improve efficiency in the health sector were accompanied by the reorganisation of accounting information (Hopwood 1984 and Robson 2007).

As many groups and individuals have a vital stake in the effective and efficient management of a health system, we consider their views as important in the process of measuring value. A recent report into the serious failings at the Mid Staffordshire NHS Foundation Trust (Francis 2013) reinforced this. The enquiry investigates why, between 2005 and 2009, death rates among the Mid Staffordshire NHS Foundation Trust patients were considerably higher than expected. The Trust leadership erred by relying too heavily on financial indicators, while neglecting cure indicators. This flowed through to the organisation, to the detriment of patient care. As the enquiry chair Robert Francis (2013, 45) highlights:

the Trust was operating in an environment in which its leadership was expected to focus on financial issues, and there is little doubt that this is what it did. Sadly, it paid insufficient attention to the risks in relation to the quality of service delivery this entailed.

In introducing his report Francis (2013, 3) states:

the story it tells is first and foremost of appalling suffering of many patients. This was primarily caused by a serious failure on the part of a provider Trust Board. It did not listen sufficiently to its patients and staff

A robust conception of value in healthcare is pivotal to taking up Porter’s call. Accordingly, the aim of this paper is to refine the current conception of the value of healthcare in the light of a recent model of value in healthcare and insights from an empirical study on clinical trials completed recently (Blank 2013a, 2013b)

This paper contributes to debate on ways to measure value in health; principally we believe that to measure value in health we must measure stakeholder perceptions of the benefits and costs associated with the treatment process. We therefore suggest that Porters’ (2010) model of value be augmented by reference to stakeholder perceptions.

VALUE IN HEALTHCARE

Subjectivity, Perceptions and Value

Bourguignon, (2005) subdivides ‘value’ into three clusters: (1) measurement value, (2) economic value and (3) philosophical value. Measurement value is comparable to the measure or approximate
quantification of an element in a hierarchically structured series. Economic value includes both usage value (the social utility of a commodity) and exchange value (the relation between supply and demand) (Pack 2010). Philosophical value incorporates both subjective and objective value and reflects the degree of importance or worth of physical as well as abstract objects. Bourguignon (2005) points out that although the distinction between subjective and objective value is not clear-cut, subjective value involves personal opinions and feelings rather than facts. Stakeholder perceptions, which feature later in this paper, resonate with this sliver of the philosophical value concept. Intrinsic value is contained within and based on social utility while instrumental value is associated with meeting a specified goal or purpose (Bourguignon 2005).

Hilmer (1975 p1) observes that value may hold ‘different meanings for different people, or at different times, different meanings for the same person’ (see also Bowman and Ambrosini 2010). What a person judges as value depends on their focus – what Llewellyn (2007) calls differentiated reality. Value crosses the boundaries among the physical, structural, agential, cultural and mental realms. Llewellyn (2007) distinguishes five differentiated realities that can provide an explanation for the wide range of costs and benefits identified in the study. The physical realm enables the identification of health outcomes in the study, which include both positive health improvements and adverse drug reactions. The structural realm assists the identification of structure, policies and procedures that govern the ethics committees, the treatment protocol and the operation of clinical trials. The agential realm facilitates the feelings experienced from doing something worthwhile and doing something for future generations. The cultural realm enables the valuing of participant and caregiver education and the knowledge created by the trial that is transferred to standard clinical practice. Finally, the mental realm facilitates perception, thought, feelings, desires, emotions and predispositions.

Following a US survey (200 biopharmaceutical executives, 153 managed care executives, 400 primary care physicians, 103 specialists, and 1,000 adults diagnosed with a chronic disease) in which the question was asked: ‘In your own words, how would you define “value” in healthcare?’ Quintiles (2011, 5) observe:
Stakeholders have internalized the concept of value in very different ways, with biopharma executives as the only group in which a majority includes outcomes as part of their definition. For patients and physicians, the process (quality of care) appears to matter as much as the outcome when it comes to value, although nearly one-third of patients do not feel they can define value.

Means-end chain theory (Gutman 1982; Howard 1977; Young and Feigin 1975) reveals why some stakeholder groups perceive some benefits and costs differently from others. This theory assumes that stakeholders’ subjective perceptions of a service are the result of associations between its benefits and its costs (the ‘means’) and more abstract cognitive schemata, which include the personal values underlying certain behaviour (the ‘ends’). These associations determine the value that stakeholders place on the service in question (López-Mosquera and Sánchez 2011; Reynolds and Gutman 1988).

Quantifying Perceptions

Many surveys of patient perceptions and experience include scales that enable the results to be quantified. Quantification allows both the national and cross-national comparison of patient perceptions and experiences of healthcare. With further development, surveys will provide opportunities to measure value in healthcare more accurately. While crossing the line from qualitative to quantitative may afford a means of consolidating results, the unique information value of qualitative insights may be compromised.

Gray (2011) extends patient-perception of care when he identifies three key factors that influence patient experience, (1) hotel amenities, (2) interpersonal and (3) technical/clinical. He suggests that understanding how patients perceive value in healthcare requires a consideration of all three aspects. Patient perceptions revealed in our study illuminate these aspects; for example, the patient reporting the peaceful and quiet waiting room relates to what Gray calls ‘hotel amenities’. The perceptions of kind and caring staff fit the category of ‘interpersonal skills’, while the thoroughness of assessments can be considered ‘technical skills’.

Perceptions of care are important in understanding the differences in health outcomes between population groups. In New Zealand, health outcomes between indigenous Māori and non-Māori are significant (Mills, Reid and Vaithianathan 2012).
We subscribe to the notion of philosophical value, which subsumes both objective and subjective value. 'Value' is a multi-faceted concept; perceptions of value are not uniform. There can be no absolute 'objectivity' since it is reliant on individual judgment. Even money is worth only what the users believe it is worth. Therefore measuring value can never be a purely objective exercise.

We examine economic evaluation measures in the next section.

**Economic Evaluation Measures and Value in Healthcare**

Five economic evaluation methods that feature prominently in the healthcare literature are: cost minimisation analysis (CMA) (Drummond, O’Brien, Stoddart & Torrance 2005), cost consequence analysis (CCA) (Mauskopf, Paul, Grant and Stergachis 1998, Canadian Coordinating Office for Health Technology Assessment 1997), cost effectiveness analysis (CEA) (Mooney 2003, Drummond et al. 2005), cost utility analysis (CUA) (Mauskopf et al. 1998, Gold, Siegel, Russell and Weinstein 1996, Mooney 2003; Mooney & Lange 1993), benefit cost analysis (BCA) (Boardman, Greenberg, Vining and Weimer 2006). Oakes, Considine and Gould (1994, 18) suggest that although each type of evaluation places a different emphasis on the way it compares benefits and costs and one method may be better suited for a particular decision than another, they share a common objective, which is

> to create a calculus of health care where outcomes can be objectively defined and measured, and where true costs can be identified and counted. This calculus can then be used to rank medical activities and prioritize health care expenditures.

On balance, BCA appears to be the most comprehensive of the economic evaluation measures (see also Boardman *et al*. 2006). Further, the academic literature identifies close links between value and BCA (see for example, Sen 2000, Lenman 2000, Hanley and Splash 1993 and Baum 2012). The benefits of healthcare are traditionally measured by the number of life years it adds (Gray 2011), which leads clinicians to focus on length of life. On the other hand, health is a function of both quantity (mortality) and quality (morbidity) of life. Rosser and Kind (1978) develop the Quality Adjusted Life Year (QALY) as a measure of the value of health outcomes. QALY combines the value of length and quality of life into a single index number. It assumes that a year of life lived in perfect health is worth 1 QALY (1 Year of Life × 1 Utility Value = 1 QALY) and that a year of life lived in a state of less than perfect health is worth
less than 1. QALY combines with medical costs to produce a common denominator of Cost/QALY (Gold et al. 1996). Although QALY provides an opportunity to solve the problem of measuring healthcare outcomes with a view to analysing cost effectiveness and making effective decisions, it suffers from a number of drawbacks. Consistent with Gray (2006; see p3 of the current paper), Sinden (2004 p198) argues that this basis of valuation lacks authenticity:

*We would never offer a friend a cash payment to “compensate” her for cancelling a lunch date, because we view friendship as simply incommensurable with money. Nor would a pet owner consider the “opportunity costs” of not eating her pet or not selling it for laboratory experiments. Similarly, many people balk at the prospect of attaching a dollar figure to the loss of an endangered species, the destruction of a pristine natural area, or the loss of a human life because they view these values as simply incommensurable with market commodities and thus not measurable along a monetary metric.*

Kind, Lafata, Matuszewski and Raisch (2010 p27) suggest:

*The use of the QALY as a health outcome measure for groups of patients is fairly clear for payers, managed care, and governmental organizations who seek to make decisions that maximize the value of health-care spending in terms of health outcomes achieved through the most efficient use of limited resources. Nevertheless, the importance and need to bring QALYs into the wider decision-making process of clinicians and patients is more controversial.*

We recognize that these complex decisions are often made during circumstances of significant emotion, uncertainty and bias. While there are issues with QALY as an appropriate health outcome measure, it presents as a pragmatic tool to improve decision-making concerned with health resource allocation. We discuss Porter’s (2012) model of value in healthcare in the next section.

**PORTER'S MODEL OF VALUE IN HEALTHCARE**

We draw our interpretation of Porter’s model from his expositions of it, which developed over time (2008, 2010, 2012, 2013). He presents the model as:

\[
\text{Value in health} = \frac{\text{patient outcomes}}{\text{costs}}
\]

Porter (2010, 2) maintains: ‘*Patient satisfaction with care is a process measure, not an outcome. Patient satisfaction with health is an outcome measure.*’ By way of illustration, an arthritis sufferer regains the ability to walk to the letterbox, through the intervention of medication, physiotherapy, walking aids or hip-joint replacement. The model highlights the most cost-effective treatment without reference to patient perceptions. This could be problematic if the patient is dissatisfied with the most cost-effective treatment
and consequently does not comply with the process, leading to a diminution of value. For example, some people may avoid medication for cultural reasons; if medication were the most cost-effective treatment, the patient’s perception of value would differ from that of the health professional. This raises questions about the measurement and/or weighting of perceptions.

**INSERT FIGURE 1: MEASURING VALUE IN HEALTHCARE**

Figure 1 presents Porter’s (2012) model for measuring value in healthcare. The patient enters the system with initial conditions. The nature and severity of the conditions influence the health outcomes (upper grey line) and the prescribed treatment processes (process box). The established treatment protocols and guidelines inform the treatment process while the organisational structure and information systems influence them. Biologic indicators measure the success of the treatment process and predict the eventual health outcomes.

We illustrate Figure 1 using the clinical trials study described later in this paper. The patient’s initial condition is diabetes. The process is the clinical trial protocol; for example, the number of clinical check-ups and taking of the trial medication. The indicator is Hemoglobin A1C levels and the health outcomes are survival with no congestive heart failure. The structure is the research unit and patient adherence relates to diet and medications.

The extent to which patients comply with their treatment process affects both biologic indicators and health outcomes. An illness might have many outcomes and they might differ from patient to patient. Porter (2010) does not regard patient satisfaction with their care as an outcome. He separates objectively-determined outcomes from patient-perceptions of outcomes and he distinguishes between outcomes and processes in a later paper (2012p 2):

*Outcomes are the results of care in terms of patients’ health over time. They are distinct from care processes or interventions designed to achieve the results, and from biologic indicators that are predictors of results. However, discomfort, timelines, and complications of care are outcomes, not process measures, because they relate directly to the health status of the patient.*

Although he argues that we should measure the outcomes that matter to patients Porter appears dismissive about patient perceptions of care. He agrees that we should measure experience but presents this as
secondary to outcomes. He views patient experiences as a proxy for ‘real results’. While this distinction between process and outcome may be evident to academics, we suggest stakeholders seldom distinguish between their health care experience and their ‘outcomes’. Therefore the acceptability of the patient’s or carer’s experience of health care will influence the value they place on their outcome of care.

Porter (2010) describes a three-tiered model of outcome measurement (Figure 2). Outcome measurement begins with a definition of a set of outcomes for a specific medical condition reported on one of three tiers of the hierarchy. Tier one reports patient health status achieved, or for degenerative conditions, health status retained, while tiers two and three measures the process of recovery and the sustainability of health respectively. Each tier comprises two levels: survival and the degree of health or recovery in tier one, the time required to achieve recovery and the disutility of the care process in tier two and disease recurrences or complications and new health problems consequence on the treatment in tier three. Outcomes at the lower tiers are a progression of results, often contingent on success at higher tiers.

*INSERT FIGURE 2: PORTER’S OUTCOME MEASURES HIERARCHY*

Rigorous measurement of outcomes and costs enable systematic improvement in the care delivery process but they do not *per se* provide a mechanism through which stakeholders can influence the measurement of value or contribute to organisational decisions impacting on their lives.

Although Porter (2010) recognizes the importance of capturing the dimensions of health outcomes that are important to patients, he measures outcomes, not patient satisfaction with care processes and he is silent on the potential influence of other stakeholders’ views on value.

Porter (2008) advocates that the cost of the entire healthcare process should determine the true costs of delivering healthcare. This includes any separate facilities such as rehabilitation centres and costs borne by the patient or within primary care. From a practical point of view, this means dividing budget sheets up into program expenditure categories such as infectious diseases, blood disorders, cancers and tumours or to compare programmes of treatment and efficiently allocate resources among programs.

While we support Porter’s (2012) call for value-based healthcare we argue that the perceptions of stakeholders play a role in determining value and that individual patients' satisfaction with care should be
an element of the value of healthcare. We next draw on insights derived from a case study of the value of clinical trials.

**CASE STUDY: THE VALUE OF CLINICAL TRIALS**

We gained insights from a study of the value of clinical trials at a New Zealand hospital (Blank 2013a, 2013b). The study involves two long-term clinical trials performed over eight years, including pre-trial, trial and follow-up periods. We adopt a simultaneous parallel mixed methods design (Teddlie and Tashakkori 2009; Blank 2011). As shown in Figure 3, it comprises three strands; health outcomes, economic outcomes and multiple stakeholder perceptions. At the top of the diagram, the clinical trials connect the strands, which progress through parallel data collection and data analysis phases to produce independent outcomes. The study concludes by considering the three sets of outcomes for a collaborative evaluation of sponsored clinical trials.

**INSERT FIGURE 3: RESEARCH STRANDS**

**Health Outcomes Strand**

A team of medical researchers conducts the health outcomes strand, which is a retrospective cohort study of changes in clinical trial participants’ health status and mortality rates. The health outcomes of clinical trials, which approximates the first tier of Porter’s (2010) hierarchy of outcome measures [namely survival and the degree of health or recovery (Figure 2)]. This strand forms the platform for the economic outcomes and multiple stakeholder perceptions strands.

**Economic Outcomes Strand**

We apply quantitative methods in the economic outcomes strand to identify costs and economic outcomes data and to calculate the average annual revenue and cost streams per participant over the period of the clinical trials. According to the findings from the economic outcomes strand, the research unit, the health board and New Zealand society all derive financial benefits from these trials. The magnitude of the economic benefits differs depending on the (micro-, meso-, macro-) perspective. Porter’s analysis of value is essentially at the meso-level. He asserts that value improves if outcomes improve at equal or lower cost, or if outcomes remain the same at lower cost. He does not compare values
across medical conditions because he maintains that the set of relevant outcomes is different for each medical condition. Similarly Porter (2010) questions the validity of using a single number to determine QALY on the grounds that the quality of life is multidimensional and the relevant dimensions vary by medical condition. Porter’s approach may not help the decision maker to select the best value options across medical conditions in the absence of a common unit of analysis.

**Multiple-Stakeholder Perceptions Strand**

In the third strand, we adopt a qualitative approach to capture the benefits and costs of sponsored clinical trials as perceived by seven stakeholder groups, namely: 1) trial participants; 2) trial participants’ family members and caregivers; 3) health board staff; 4) researchers; 5) the community; 6) government, government bodies and politicians; and 7) members of the pharmaceutical industry.

We ask stakeholders to report perceived benefits and costs because they are more immediate than the abstract notion of value. Each stakeholder values the clinical trial according to the degree to which it contributes towards achieving their desired goal, i.e. different desired goals lead to different values. Transport to and from the clinical trial is an example. While some stakeholders regard this as an unacceptable cost to trial participants, the trial participants themselves do not, arguably because they view the transport as a value-added cost relative to clinical-trial participation. Stakeholders’ experiences with clinical trials add perspectives that are not evident in the findings of either the health outcomes or economic outcomes strands. This achieves ‘complementarity’ (Hammond and Wiriyapinit 2005 p390).

Pharmaceutical representatives, health board staff and politicians feel strongly that gaining access to new medicines is a strong motivator for participation in a trial. However, those enrolled in the trial feel that the support is more important than the medication ‘The medicine was only a substitute for what I was getting anyway’ (trial participant). Most trial participants feel that it is easy to get the medicines they need from their family practitioner but getting ongoing support is much harder because their general practitioner does not have time to investigate them thoroughly. Trial participants value being given the choice of participating in a trial; as one trial participant put it, the ‘feeling of control over ones illness’.
We were able to explore reasons why diabetics on a clinical trial would at the same time find it helpful in keeping to their diets (Blank 2013b); ‘It made me behave. It was like going to weight watchers’ (trial participant).

Several researchers and one politician express concern for the vulnerability of some groups in clinical trials. An emergent view is that health boards disadvantage the indigenous people of New Zealand (Maori) by focussing on clinical trials, so promoting the over-use of pharmaceuticals. Understanding why some groups comply with one treatment regime in preference to another may eliminate waste and leads to better value in healthcare.

**DISCUSSION AND CONCLUSION**

We have examined Porter’s (2008, 2010, 2012 2013) suggestions for estimating value in healthcare. While Porter’s model clarifies important aspects, it appears to be incomplete. We draw on insights from our work on the value of clinical trials as a basis for enhancing the model, by including patient care and recognizing the centrality of stakeholder perceptions. Porter’s model focuses on health outcomes, which are achieved by structure and processes, managed by biologic indicators and are subject to patient initial conditions and patient adherence. All of these elements contribute to health outcomes and have cost implications. While Porter (2012) acknowledges that health outcomes result from patient care, he distinguishes between care processes aimed at achieving the outcomes and biologic indicators that predict results on the one hand and discomfort, timeliness and complications, because the latter are process outcomes, not process measures.

Philosophical value recognizes both subjective and objective elements and it should be acknowledged that even objective elements may be influenced by subjectivity. Given that value has a large subjective component, any measurement of value requires both qualitative and quantitative elements. Mixed method research gathers hard data and the perceptions of multiple and diverse stakeholders for decision-making that incorporates the data and an understanding of stakeholders’ views.

Each of the three strands comprising our study measures a different component of value: health outcomes, economic outcomes and stakeholder perceptions. While the data in our study of clinical trials do not
support triangulation between the qualitative and quantitative methods, the qualitative analysis complements the quantitative data analysis. Collectively the results provide complementary evidence and contribute to a comprehensive understanding of the outcomes of clinical trials. The dimensions of value revealed in the clinical trials study provide many opportunities for those conducting clinical trials to manage the formulation of strategy, performance management processes, and communication with stakeholders.

We conceptualize value in healthcare as comprising patient care, health outcomes and cost. The numerator in the expression below reflects the sum of patient care and health outcomes. The subscript “p” represents perceptions in both cases).

\[
\text{Value} = \frac{(\text{Care} + \text{Care}_p) + (\text{Outcomes} + \text{Outcomes}_p)}{\text{Cost}}
\]

This allows the health service to take into account the wider economic, social and cultural implications of their activities. For example our model is applicable with end of life care. Having patients write their end of life care plans has changed the way one hospital treats the terminally ill. Whereas once medical staff tried to extend life as long as possible even if this meant the patient died in hospital connected to a life saving machine now patients often opt for a shorter life but to die in their own homes surrounded by family. The patients and caregivers perception of care has influenced the value.

Comorbidities and other complicating factors are also recognised in the model (for example geriatrics). Because of their comorbidities some patients require a different treatment process to achieve an equitable outcome. This will impact on the cost.

We emphasize that the representation is conceptual; an expression that represents both quantitative and qualitative elements does not slide easily into a decision. However, a guideline for value in healthcare is incomplete in the absence of subjective/qualitative input. We argue that the explicit inclusion of the patient care process and of stakeholders’ perceptions enhances the measurement of value in healthcare and leads to better decisions.
REFERENCES


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**FIGURE 1: MEASURING VALUE IN HEALTH CARE**

*(SOURCE: PORTER 2012, P18).*
FIGURE 2: PORTER'S OUTCOME MEASURES HIERARCHY

(SOURCE PORTER 2010, p10)
FIGURE 3: RESEARCH STRANDS
(Source: Blank 2011 P81)
FIGURE 4: THREE PERSPECTIVES ON BENEFIT COST ANALYSIS

MACRO
Quality adjusted life years

MESO
Cost avoidance and overheads

MICRO
Trial profits and loss statements