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Editorial

Value-based plastic surgery



Background

The demands of healthcare services often exceed the resources available to them.¹ This difference has been widened in many countries since the global financial collapse and has become acutely relevant during the COVID-19 pandemic, as plastic surgery services have altered dramatically to balance resource and need.² This is not the first time that attention has been drawn to the value of plastic or hand surgery in recent years. In 2018, NHS England proposed changes to funding for several common operations on the basis of clinical-effectiveness, including surgery to treat carpal tunnel syndrome, trigger finger and Dupuytren's disease.³ This decision was contested, with the counter-argument presented that these procedures were highly valuable.⁴ In this editorial, we explore the meaning of value in plastic surgery and strategies that have been proposed to facilitate the delivery of value-based healthcare.

What is value?

Michael Porter defines value in healthcare as the patient outcomes achieved per unit of cost.⁵ In this definition, both outcomes and cost relate to the whole patient journey, and not just a single intervention or encounter.⁶ For example, the value of a flexor tendon repair depends on the quality of postoperative rehabilitation and not just the surgery. Other definitions of value have considered the cost to society and not just to the patient or provider (for example, postoperative downtime when a working patient cannot be economically productive),⁷ as well as population equity, sustainability, transparency and the patient experience of healthcare delivery.^{1,8}

The value-based healthcare movement has been gaining traction over the last decade, particularly in the USA where changes in legislation have supported value-based payment models.⁹ But it has also been criticised as a less-scientific rebranding of health economics.¹⁰

There are similarities between value-based healthcare and health economics. Health economics might aim to model the cost-benefit, cost-effectiveness or cost-utility of an intervention or process.¹¹ The cost-benefit of an intervention refers to its potential to save costs compared to the price of the intervention itself. For example, if dipping ten patients' breast implants in antimicrobial solution were to cost £200, but saved £10,000 by avoiding a revision surgery, this would represent a cost-benefit.

Cost-effectiveness weighs the treatment effect in "natural units" against the costs of the intervention. The natural units of treatment effect might be finger joint angle improvement in Dupuytren's disease, or pain score improvement in nerve entrapment. The cost-effectiveness of one treatment cannot be compared to the cost-effectiveness of another unless these natural units are directly comparable (i.e. comparing the cost per degree of contracture release to the cost per unit of pain score improvement is not straightforward).

In cost-utility, changes in health state utility that follow an intervention are compared to an intervention's cost. Utility values represent the desirability of a given health state and are derived from preference-based experiments involving potential users of a health service. Different natural units can be mapped onto the same utility scale and therefore cost-utility analyses are able to compare the cost-per-effect of different treatments in different contexts.¹² For example, how (un)desirable it is to have carpal tunnel syndrome can be compared to 'perfect health', as can having a severe facial palsy.

Cost-utility analyses are commonly used by the National Institute for Health and Care Excellence (NICE) for UK National Health Service (NHS) commissioning decisions, where interventions are assessed in quality-adjusted life years (QALYs), a unit of utility-adjusted survival.¹³ One QALY represents one year lived in perfect health. Interventions that cost more than £20,000 - £30,000 per additional QALY, when compared to standard treatment, are less likely to be approved than those that cost less per additional QALY.¹⁴ It is worth noting that in health economics, cost represents the numerator of the cost-gain

equation, whereas in value-based healthcare it forms the denominator.

An interpretation that we favour is that value-based healthcare is a cultural movement that focusses on pragmatic and actionable management solutions, whereas health economics is a science that aims to further our understanding of the impact of healthcare processes and provide evidence to support commissioning decisions.

Measuring value

In order to improve value, we must first measure it. This is a complex and contentious subject. Some important variables to consider measuring are patient outcomes, patient experience, healthcare costs and population equity (e.g. the uptake of a healthcare service across different population subgroups or geographical regions).

Patient outcomes

The quality of outcome measures is variable and choosing which metric to use is not straightforward. The consensus based standards for the selection of health measurement instruments (COSMIN) provides guidance on what constitutes a high-quality measurement instrument.¹⁵ In addition to quality, measurements should be consistent within and between healthcare providers to enable the comparison of results. This requires agreement on the measurement instruments that are to be used in any given context. Several initiatives, such as the International Consortium for Health Outcomes Measurement (ICHOM), have aimed to achieve multi-stakeholder consensus on the measurement tools that should be used in different medical conditions. Currently, ICHOM have recommended standard outcome measurement sets for paediatric facial palsy, congenital upper limb differences, craniofacial microsomia and cleft lip and/or palate, amongst other medical conditions.¹⁶

Outcome measurement should be risk adjusted and assessed over an appropriate follow-up period. For example, if we compare the sensitivity of sentinel lymph node biopsy at two melanoma units, it is important to account for the tumour stages in each group (risk) and the amount of time allowed for a false negative to declare itself (follow-up).

Patient experience

Patient experience can be measured using patient-reported experience measures (PREMs). These measure “what happened before during and after a specific instance of care for a patient, and how it happened.”¹⁷ Broadly, PREMs can be functional (e.g. relating to car-parking, waiting times, cleanliness etc.), or relational (e.g. whether the patient felt listened to).¹⁸ These measures are not simple satisfaction surveys, and they can be subjected to the same rigorous standards as outcome measures, defined in the COSMIN checklist.¹⁵ In fact, patient *satisfaction* is a distinct

concept to patient experience. Satisfaction originated from consumer marketing research and compares a service to the patient’s *a priori* expectations.¹⁹ This does not necessarily reflect a patient’s experience or outcome although the three factors may be related.

Costs

Healthcare costs can directly or indirectly relate to patient care. For example, direct costs might include drugs, imaging and surgical equipment, whereas indirect costs might relate to housekeeping, medical records and administrative support. These costs can be measured using bottom-up *micro-costing* or top-down *gross costing* studies.²⁰ Micro-costing occurs at the patient level and involves an analysis of each resource used during a clinical encounter. This provides granular and patient-specific data which may be useful, but micro-costing is resource intensive. Gross costing works on a service level, capturing the total service expenditure and using this to generate average per-patient prices.

Costs may differ considerably between encounters for similar medical conditions. For example, the cost of a burn admission will vary with a patient’s age and comorbidities. Even the cost of weekend and weekday care is not necessarily the same. These differences should be considered when choosing a costing method or when interpreting the results of a costing study.

In funding a new intervention or service, it is not only important to consider direct and indirect costs, but also *opportunity* costs. Opportunity costs reflect the health benefits that would have resulted from investing the same money in a different intervention or service. Opportunity costs can be measured from different perspectives, e.g. a patient perspective or a societal perspective.²¹ For example, a craniofacial service might be cost-effective for its users, but if more benefit could be obtained by investing in a hand-trauma unit instead, this would represent a significant opportunity cost from a societal perspective.

Finally, “shadow costs” are costs that cannot be directly measured, e.g. informal care costs and patient time.²¹ Currently, in the UK, NICE Technology Appraisals account for the NHS and social care budgets but do not assess shadow costs, personal costs (e.g. private transport) or opportunity costs outside of these budgets.

Equity

Professor Sir Muir Gray has argued that value relates to the needs of a population.¹ For example, autologous breast reconstruction might have an excellent cost-utility, but it is only high value if it is accessible to people who would benefit from it. Equity, in the context of value-based healthcare is about minimising the underuse or overuse of a healthcare service and reducing unwarranted variation.

The NHS Atlas of Variation has mapped considerable discrepancies in service use. For example, in 2015/16, the population of Croydon underwent approximately seven times

more peripheral neurophysiology studies than that of neighbouring Bromley (1.4 vs 0.2 per 1000 people).²² But these data are difficult to interpret without knowing what the rate of peripheral neurophysiology studies *should* be.

How do we improve the value of plastic surgery?

Reporting transparency and results-based competition

If measurement is the first step towards value, reporting is the second. Porter argues for transparency in reporting health outcomes.⁶ Transparency is usually internal to the healthcare provider, for example the results of a successful *wide awake local anaesthetic no tourniquet* initiative will be known by the surgeons and managers deciding whether to change their practice. Transparency may be limited. For example, surgeons may not share all informative adverse outcome data with colleagues, even though this information might be useful for service improvement. This may be the case for perceived 'mild' issues that are not included in formal processes. For example, delayed skin graft healing rate may not feature in morbidity and mortality meeting discussions, and so not be measured despite affecting resource consumption. The next level of transparency is external transparency, where other healthcare providers and the patients themselves have access to outcomes and experience data. The rationale for this is that it enables underperforming surgeons or services to learn from the best, and drives results-based competition. But this may be challenging, as data will usually be imperfect, and discouraging treatment at poorly performing units may not necessarily drive improvement if not supported by quality improvement initiatives.

In 2014, the NHS openly published outcomes data for over 5000 consultant surgeons across Britain, representing a significant step towards transparency in surgical outcomes reporting, although the MyNHS website on which they were reported has subsequently closed.²³ At a service level, the Trauma Audit & Research Network currently also report some quality standards and survival results across the UK major trauma network.²⁴

Reimbursement on outcomes and not performance

Performance measures assess system processes whereas outcome measures assess results. Healthcare services often receive financial incentives for achieving performance targets (as opposed to outcome targets). For example, the four hour target for Emergency Department waiting times. While performance indicators might predict outcomes and/or patient experience, they cannot measure them directly. Transferring a patient from the Emergency Department to an Emergency Assessment Unit to avoid a four hour target breach does not guarantee better outcomes, experience or

equity. But performance measures are not obsolete. Healthcare providers need to know why their outcomes are good or bad and an analysis of system performance can inform service improvements.^{25,26}

High volume, integrated practice units

Economies of scale describe a decrease in the cost per unit of output as the scale of a business system increases.²⁷ Porter extends this principle to healthcare providers, suggesting that high volume specialist centres achieve both better outcomes and better value.⁶ Integrated practice units (IPUs) are multidisciplinary healthcare services that are built around the demands of a medical condition, rather than to offer an isolated service.

This concept is not new to UK plastic surgery. Cleft care in the UK has been delivered in high volume IPUs since the Clinical Standards Advisory Group audit in the 1990s.²⁸ In 2001, the National Burn Care Review called for burns care to be restructured around high volume IPUs.²⁹ And most recently, in 2010, UK trauma care moved towards specialist, high volume IPUs following a report by the National Audit Office.³⁰ These examples all align with a value-based approach.

What does value look like?

Value will look different in different contexts. It would be difficult to argue that liposculpture is valuable to a population with untreated active cancer. This idea is particularly interesting in plastic surgery, where many procedures are associated with small utility-adjusted survival gains, relative to some other fields of medicine and surgery. Abraham Maslow first described a hierarchy of needs in his seminal 1943 paper "A Theory of Human Motivation".³¹ This idea has also been applied to value in a business context,³² and might be applicable to value-based healthcare. As a society progresses through its hierarchy of needs, investments in outcomes, experiences and equity are met with diminishing returns, but also decreasing opportunity costs. Interventions with low utility-adjusted survival increments may be justifiable in societies that have already achieved high utility-adjusted survival increments through advances in nutrition, sanitation and vaccination. Furthermore, people in such societies may choose to use greater disposable income to pay for treatment that is valued at the individual level, even if not valuable at societal level. An example might include choosing to self-fund cost-ineffective chemotherapy.

Conclusion

Value in healthcare is a complex concept that may incorporate outcomes, patient experience, equity and cost. Value-based plastic surgery involves robust measurement, open reporting and pragmatic management at local and national levels. The last 30 years have seen major advancements in

value-based plastic surgery, and developments in measurement science, management strategy and data collection through digital medicine are likely to bring further progress in coming years.

Funding statement

Conrad J. Harrison is funded by a [National Institute for Health Research \(NIHR\) Doctoral Research Fellowship \(NIHR300684\)](#). JNR is funded by an NIHR Postdoctoral Fellowship (PDF-2017-10-075). This represents independent research funded by the NIHR. The view expressed are the authors' own and are not necessarily those of the NIHR, NHS or [Department of Health](#) and Social Care.

Ethical approval

Not required

Declaration of Competing Interest

None declared

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17 July 2020