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'Best buys' for surgery in South Africa

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Improving access to basic surgical interventions has great potential to improve the length and quality of life of many people in low- and middle-income countries (LMICs). However, research has shown that current access to surgical interventions is limited, and initiatives such as the Lancet Commission on Global Surgery 2030 advocate for improved access to basic surgical interventions for all. As the needs, health system context and available budgets in each country will be different, a critical component of effective local scale-up of surgical interventions will be to use tools and processes of health technology assessment (HTA). HTA has traditionally been used in high-income countries to make decisions about which medicines and devices should be available in a health system, but its central concepts, such as assessing clinical effectiveness, cost-effectiveness and feasibility, appraising all available evidence, and incorporating wider health systems objectives in decision-making, can be applied to decisons about how LMICs can best utilise basic surgical interventions from within available resources – in essence, to focus spending on the 'best buys'. As South Africa (SA) moves towards National Health Insurance (NHI), HTA functions will be strengthened. There is potential for SA to lead the practice of application of HTA to decisions about how basic surgical interventions are chosen and implemented, contributing to the success and sustainability of NHI in SA and the health of people in LMICs worldwide.

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A new era in surgery has emerged.[1] A discipline faced with multiple challenges in the universal health coverage environment is discovering how to integrate surgical care provision into the global health agenda. The traditional perception that surgery is less cost-effective than other available interventions, such as medicines or public health interventions, is being challenged by new emerging evidence suggesting that surgery can represent good value for money.[2] Surgical care is not a pathology-based intervention, but rather a dynamic system that has a crucial role to play in managing the burden of disease, including communicable and non-communicable diseases.

Several recent developments have highlighted the crucial role of surgery in the health system. The 2015 World Health Assembly resolution 68.15 outlined the importance of 'Strengthening emergency and essential surgery and anaesthesia care as a component of universal health coverage.'[3] In addition, the Lancet Commission on Global Surgery 2030 synthesised much of the evidence supporting the role of surgery and modelled a number of scenarios.[4] Key messages from these developments reflecting the role of surgery globally and the consequence of failure to address the unmet surgical need are:

- 5 billion people cannot access safe surgery when needed
- 33 million individuals face catastrophic expenditures paying for surgery and anaesthesia annually
- Investing in surgery is affordable, saves lives, and promotes economic growth.

In South Africa (SA), there is a need to develop a care package for the different levels of service delivery in the public health system, including a package for district hospitals. Developing these packages requires an understanding of the economic implications of intervention implementation. The content of these packages could then inform the development of a national surgical plan.

The success of an initiative focused on developing and implementing surgical care packages at different levels of care will be determined by many factors, including the ability of educational institutions to facilitate the skills transfer of appropriate competencies, and the availability of appropriate infrastructure and systems to allow the delivery of the different care packages.

Surgical care is strongly linked to technology. There is a flood of new technologies and innovation in the surgical care environment, and determining the appropriate intervention for the right setting requires an evidence-based evaluation of the technologies. The spectrum of interventions that could be considered appropriate ranges from low-technology-driven procedures with a wide reach that can be offered to patients at primary care level, to high-end technologies that can only be performed at tertiary care level.

So what surgical options should we offer? This question is at the heart of priority setting, which draws on the best traditions of evidence-based medicine, health economics and medical ethics, and can help us to identify what health interventions and technologies can and should be offered to people under a universal health coverage system in SA under the rubric of National Health Insurance (NHI). It is through the use of formal processes and methods that reasoned and defensible decisions can be made about investment and implementation of low- and high-cost surgical procedures.

Priority setting allows us to identify the surgical 'best buys' for SA based on a review of available evidence and to support and ensure appropriate utilisation of resources. Best buys are packages of interventions, services and/or policies that could be implemented within a particular programme area given available resources and health-systems constraints. For example, the role of laparoscopic surgery in the management of appendicitis or hernia repairs needs to be determined in SA contexts. Utilising health technology assessment (HTA) and priority setting, we can achieve the best use of resources,

and include the most cost-effective surgical interventions regardless of their level of complexity.

Priority setting, HTA and surgery

PRICELESS SA (Priority Cost Effective Lessons in Systems Strengthening, www.pricelesssa.ac.za) is a research-to-policy programme that uses SA data to demonstrate how scarce resources can be used to derive maximum impact on health. To demonstrate the potential benefits of priority setting, PRICELESS SA works to identify best buys, using HTA to ensure that limited resources are targeted towards interventions, policies and programmes that will offer the greatest health gain across the population. For example, by prioritising 15 maternal and child health interventions we identified as best buys, the lives of an additional 10 000 mothers and newborns per year in SA could be saved at a cost of USD7 per capita.[5]

The principle of best buys and identifying cost-effective interventions can be applied across any programme area and setting, including surgery. Investigations of cost-effective surgical interventions relative to neglected tropical diseases across sub-Saharan Africa found that basic surgical services, emergency obstetric surgery, and surgical management of fractures, soft-tissue trauma and some cancers were relatively cost-effective compared with other prioritised interventions in the region.[6] Researchers have demonstrated that surgical management of acute appendicitis represents relatively good value for money in SA, at approximately USD1 700 per life-year saved.[7] Additional cost-effectiveness research is required, especially with regard to the availability and utilisation of elective surgical procedures as a treatment option, the availability of which is often linked with socioeconomic status (SES). For example, cataract surgery coverage in Cape Town was 68% in areas associated with the lowest SES compared with 100% in areas with the highest SES. This is one example of how priority setting could inform policy and planning decisions across the health system – by showing how to deploy scarce resources effectively to address avoidable blindness.[8]

Although a consistent approach to establishing best buys and priority setting in surgery has not yet been established, progress towards NHI is likely to make this a reality. The White Paper on NHI released in 2015[9] and revised in 2017[10] indicated the important role HTA will play in the prioritisation, selection, distribution and management of medicines, devices and interventions. HTA will empower policy-makers to make the most efficient use of resources. The term HTA and associated concepts are used frequently in discussions about resource allocation improvement, so it is instructive to define it here. According to the International Society for Health Technology Assessment, HTA is a 'field of scientific research to inform policy and clinical decision making on the introduction and use of health technologies … HTA is a multidisciplinary field that addresses the clinical, economic, organizational, social, legal, and ethical impacts of a health technology, considering its specific healthcare context as well as available alternatives'.[11] Importantly, technologies are defined broadly to mean pharmaceuticals, devices and procedures (including surgical procedures), as well as clinical, public health and service/organisational interventions. Put simply, HTA is the analysis of the costs and benefits of a health intervention, incorporating other relevant factors and then using the results of the analysis to make policy decisions. HTA is a useful tool to make an evidence-based case for surgery that might otherwise be perceived as too complex or expensive to implement – the same areas that are likely to represent the highest unmet need, and where we can get the biggest 'bang for the buck' from stretched health budgets. Importantly, HTA can be used to make the clinical, economic, social and common-sense case for investment in high-impact surgical interventions that are good value for money.

Priority-setting methods and processes can extend beyond an individual procedure to packages of care and service delivery platforms. For example, in some instances the most cost-effective way to provide highly specialised services may be to fund a smaller number of specialised hospitals providing limited ranges of procedures, but at a higher volume. However, over-specialisation of surgical staff in a context with limited human resources could lead to poorer overall outcomes and cost-effectiveness of services. SA policy and planning may need to consider alternative scenarios, for example by training clinical associates to perform a single procedure flawlessly, as is done in other middle-income settings.

Acknowledging unavoidable trade-offs: Economists and surgeons

Priority setting, with its foundations in universal health coverage, takes a population-level approach. 'Best buys' defines 'best' as those interventions that can feasibly achieve the greatest health impact from available resources. Implicit in this approach is consideration of the opportunity cost: because budgets are fixed, the opportunity cost is the health gain that could be achieved elsewhere in the healthcare system had resources been used differently. All interventions involve resource use, whether it is time, money, or physical use of space. Priority setting is about weighing up these trade-offs and making an informed decision.

While terms such 'opportunity cost' and 'trade-off' are traditionally the parlance of economists, surgeons are likely to innately understand the concept. Surgical training prepares them to evaluate likely benefits and harms of a procedure, communicate this to the patient, and decide on a course of action. At a population level, surgical triage aims to arrange patient flows and prioritise treatment to maximise collective patient benefit from available resources, implicitly incorporating opportunity costs into service planning and decision-making. Priority setting is no different, except that instead of being applied to an individual patient or group of patients at a single place and time, it occurs continuously and at population level, across multiple delivery platforms and potential interventions. In addition to hard science about likely benefits, harms and costs, and their relative uncertainty, active priority setting also allows decision-makers to take into account the wider social values and health system objectives that are an inherent factor in many medical and resource allocation decisions.

A NICE approach

The National Institute for Health and Care Excellence (NICE) in the UK is a priority-setting institution that uses HTA to advise the National Health Service (NHS) on the use of particular interventions and technologies. The pros and cons of a NICE-like approach in SA have been debated,[12-14] with principal consideration in the literature given to the implication of applying cost-effectiveness/HTA decision rules to access and eligibility decisions and the feasibility of applying the NICE structure and institutional arrangements to the SA context. This literature suggests that while SA will need to develop locally appropriate institutional arrangements, individual lessons and experiences from NICE can provide a comprehensive understanding of how priority setting could be applied to surgical interventions.

For example, NICE guidance on gastro-oesophageal reflux disease (GORD) considered whether laparoscopic fundoplication should be routinely offered to patients suffering from reflux.[15] GORD patients are traditionally managed medically, but improvements in outcomes and safety of fundoplication techniques suggested that surgery might

be a more appropriate intervention. The NICE evaluation used established processes and methodological frameworks to compare laparoscopic fundoplication with medical management. The surgical option represented comparatively high up-front costs and potential risks, but provided superior long-term health and cost outcomes for many patients. Part of the evidence-review process was consideration by a multidisciplinary committee that included lay membership, which is especially important when assessing patient perceptions and experience of surgery. In addition, the committee considered whether laparoscopic surgery could routinely and safely be offered to the population in an equitable way, or whether a recommendation for use would only favour those near major surgical centres. After evidence collation and economic modelling, laparoscopic fundoplication was found to represent a good investment option for the NHS and met patient safety and equity-of-access considerations. NICE recommends that it now be offered routinely when individual patient characteristics warrant surgical intervention.

While management of reflux may not be a high priority in SA, the principles by which a robust and trusted priority-setting process might work are highly relevant to the proposed NHI environment.

HTA for surgery: Challenges

Traditionally, government institutions involved in explicit priority setting such as NICE in England, the Health Intervention and Technology Assessment Program in Thailand or the Pharmaceutical Management Agency of New Zealand started with assessments and decisions about pharmaceuticals. The reasons for this focus on pharmaceuticals vary, as the priority-setting journey is always unique, but a common factor is the tractability of the decision problem. HTA involves an assessment of the likely costs and effects of an intervention, and on a population level it is generally easier to isolate both the marginal spend and clinical effectiveness estimate of a pharmaceutical product compared with a surgical intervention. To apply HTA to surgery, we must ensure that we can accurately, reliably and consistently represent costs and effects of surgical interventions at population level. This will allow them to be considered on a level playing field with competing surgical interventions and other potential healthcare investments.

Surgical skill and experience, in addition to health system organisation and referral structures, has a direct impact on costs and patient outcomes, just as the clinical effect of a course of medication will vary depending on the prescribing physician, the service environment and patient compliance. Surgical costs can, however, be vastly different between centres depending on surgical techniques, case mix, patient throughput volumes and financing arrangements for capital equipment. For example, annual surgical cost in India was USD5 000 per bed in a 60-bed charity hospital, USD800 per bed in a 400-bed, first-level public hospital, and USD2 000 per bed in a 655-bed private teaching hospital; the high costs of the charitable hospital were attributed to expatriate staff and external funding.[16] This variation in costs and effects makes obtaining a central estimate and distribution challenging – a factor that can be overcome by improved data collection and management.

Another challenge to HTA for surgery is the uneven nature of the inputs (costs) and outputs (patient health). For a patient receiving medical treatment for a chronic condition, the costs (e.g. one tablet per day) and clinical outcomes are relatively consistent and predictable. In contrast, with surgery the costs and risks are mostly incurred up front, with clinical benefit often extending for many years, particularly for life-saving interventions. Again, this calculation issue can be overcome through the use of analytical techniques that take into account short- and long-term effects and costs. It is, however, important to acknowledge this analytical challenge and the potential unacceptability to policy-makers with limited budgets to prioritise surgical investments that may represent a large 'pay now, benefit later' offer.

Using HTA to inform decisions on the use of surgical interventions and the appropriate level of care may also be challenging. In addition, once surgical services with their supporting infrastructure are in place, the estimates of the incremental cost-effectiveness of interventions will be affected (compared with facilities without this infrastructure), leading to inconsistent estimations of the cost-effectiveness of the interventions. These dilemmas require techniques to assess options for referral systems or different service delivery platforms, and for analyses that look more carefully at incremental and marginal costs rather than just average costs. While these approaches may add complexity to the analyses, the results enable more robust policy decisions on service availability and better resource use from primary to tertiary level, with better outcomes for patients.

Conclusion: Advancing priority setting for surgery

High-impact, low-cost surgical interventions may be a good use of limited health funds in SA. However, to make the case for the necessary investments, two key elements are required. Firstly, frameworks for accurately representing and analysing costs and clear outcomes for surgical interventions need to be developed. This is often seen as primarily an area for policy makers, but the surgical community must play its part in this process. The surgical community can contribute by conducting research to determine which surgical procedures account for better or worse balances between number of admissions, mortality, complications and costs on the one hand, and improvements in length and quality of life on the other. The second element that is required is the strengthening of priority-setting frameworks. This involves introducing processes and methods for analysing and deliberating the clinical and economic evidence, but also for more systematic consideration of social values such as the need to improve equity in access to health services. An important component of these processes will be to adopt a population-level perspective. This will ensure that opportunity costs of investments are understood and that optimal health outcomes are achieved from within available budgets. These frameworks would need to be applied across several programme areas and types of medical technology and intervention. However, it is certain that various surgical interventions would be considered good investments, strengthening the case for their implementation and ultimately improving the health of all South Africans.

Salient points

- There is a large unmet need for basic surgical interventions in many low- and middle-income countries.
- Priority setting is a process by which decisions are made on health priorities based on evidence of potential benefit, risk, resource use and opportunity cost, in addition to consideration of values such as equity and fairness.
- HTA is a mechanism to synthesise, present and appraise the evidence required for priority setting.
- The case for high-impact, low-cost surgery in SA would be strengthened by an HTA approach, as well as establishment of an effective priority-setting system or agency.

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