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Cost-effectiveness of surgical interventions in low-income and middle-income countries: a systematic review and critical analysis of recent evidence

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ABSTRACT

Background Cost-effectiveness evidence is a critical tool to support resource allocation decisions. There is growing recognition that the development of benefit packages for surgical care should be guided by such evidence, particularly in resource-constraint settings.

Methods We conducted a systematic review of evidence (Medline, Embase, Global Health, EconLit and grey literature) on the cost-effectiveness of surgery across low-income and middle-income countries published between January 2013 and January 2023. We included studies with minor and major therapeutic surgeries and minimally invasive intraluminal and endovascular interventions. We computed and compared the average cost-effectiveness ratios (ACERs) for different surgical interventions to the respective national gross domestic product per capita to determine cost-effectiveness and to common traditional public health interventions.

Results We identified 87 unique studies out of 20 070 articles screened. Studies spanned 23 countries, with China (n=20), Thailand (n=12), Brazil (n=8) and Iran (n=8) accounting for about 55% of the evidence. Overall, the median ACERs across procedure groups ranged from I$17/disability-adjusted life year (DALY) for laparotomies to I$170 186/DALY for bariatric surgeries. Most of the ACER estimates were classified as cost-effective (89%) or very cost-effective (76%). Low-complexity surgical interventions compared favourably to common public health interventions.

Conclusion These findings reinforce the growing body of evidence that investments in surgery are economically smart. There remains however paucity of high-quality evidence that would allow decision-makers to assess the comparative cost-effectiveness of surgery and to determine best buys across a wide range of specialties and interventions. A concerted effort is needed to advance the generation and utilisation of economic evidence in the drive towards scale-up of surgical care across low-income and middle-income countries.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Grimes *et al* (2014) and Chao *et al* (2014) separately reviewed the evidence on the cost-effectiveness of surgery in low-income and middle-income countries (LMICs) and concluded that common surgical procedures (eg, cataract surgeries, hernia repairs and appendectomies) were cost-effective, and compared favourably with common public health interventions such as vitamin A supplementation, breastfeeding promotion, antiretroviral therapy, oral rehydration therapy and BCG vaccine. We synthesised the most recent evidence (published between January 2013 and January 2023) in Medline, Embase, Global Health, EconLit and grey literature on the cost-effectiveness of major and minor therapeutic surgeries across all LMICs.

WHAT THIS STUDY ADDS

⇒ We find that most surgical interventions (evaluated) are cost-effective (89%) or very cost-effective (76%). Many high-volume, lifesaving, low-complexity surgical interventions compared favourably to common public health interventions. We identify paucity of information across a wide range of surgical interventions, calling for a concerted effort to generate more evidence to allow for an identification of best buys as part of moving towards Universal Health Coverage (UHC).

INTRODUCTION

For decades, global health was almost exclusively focused on infectious diseases while essential surgery, obstetrics and anaesthesia, otherwise collectively termed surgical care, were widely considered as prohibitively expensive and offering low return on investment. However, surgical care has now

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Our study consolidates the growing consensus that surgery is cost-effective and therefore represents a best-buy consideration in resource allocation decisions for policy-makers aiming to improve population health. This provides an impetus for greater investments in surgical care provision in LMICs where infectious disease control programmes were historically favoured over investments in surgery. More locally grounded evidence is needed to guide contextualised national surgical planning and development of UHC packages.

been recognised and adopted as a core component of Universal Health Coverage (UHC) via resolution 68.15 passed at the World Health Assembly (WHA) in 2015.[1] The commitment to strengthen surgical care was recently renewed as part of a drive towards health system preparedness and resilience set out in the WHA resolution 76.2 in 2023—"Integrated emergency, critical and operative (ECO) care for UHC and protection from health emergencies".[2] As countries are gradually expanding their focus to accommodate surgical conditions, economic evidence is needed to guide investment and resource allocation decisions at national and sub-national levels.[3]

Economic evaluation has been recognised as a valuable tool which can enable policy-makers to allocate resources across a spectrum of preventive, diagnostic and therapeutic interventions, in a way that optimises value and societal welfare. Cost-effectiveness evidence could support the efficient allocation of resources among surgical alternatives and between surgery and other potentially worthwhile healthcare interventions.[4] Two systematic reviews with a focus on the available cost-effectiveness evidence of surgery in low-income and middle-income countries (LMICs) were published in 2014.[5 6] Both concluded that common surgical procedures (e.g., cataract surgery, hernia repair and appendectomy) were not only cost-effective, but compared favourably to traditional public health interventions such as vitamin A supplementation, breastfeeding promotion, antiretroviral therapy, oral rehydration therapy and BCG vaccination.[5 6] Aimed at guiding investment decisions, the World Bank Disease Control Priorities III (DCP3) published a list of 44 surgical interventions considered as cost-effective in LMICs. However, a significant proportion of the studies that informed the list were conducted in the context of surgical camps rather than actual hospital settings, suggesting the need for context-specific analyses since the reported costs and effects may not be generalisable to those inherent to a given healthcare system.[7] Moreover, the Lancet Commission on Global Surgery provided a multicriteria decision analysis framework to determine the procedures included in the initial benefit packages under UHC, and emphasised the need for adaptation based on local contexts.[3]

Given these existing limitations, there is paucity of robust information to guide investment decisions to maximise population health benefits in resource-limited environments.[8] As countries are taking necessary steps towards strengthening surgical care capable of providing services for all citizens highlighted through the development of national surgical plans,[9] this review synthesises evidence on the cost-effectiveness of surgical interventions in LMIC contexts, which is a requisite for effective policy-making.

METHODS

Search strategy

A systematic literature review was conducted in accordance with the guidelines published by the Centre for Reviews and Dissemination,[10] and the Cochrane Handbook for Systematic Reviews.[11] The search strategy was designed based on three search blocks: 'surgery and anaesthesia', 'cost-effectiveness' and 'low- and middle-income countries'; and validated by an institutional information specialist. The primary strategy was designed on Ovid Medline and then adapted to Embase, Global Health and EconLit (see online supplemental material 1). The search was conducted on 9 January 2023. Because this review provides an update of previous reviews (covering the period from inception until January 2013) published in 2014,[1 2] it comprises all literature published between January 2013 until January 2023. A grey literature search was conducted, including reviewing references of identified publications, and searching websites of development organisations (e.g., WHO and World Bank). No language restrictions were applied. Conference presentations, abstracts, dissertations and animal studies were excluded.

Selection procedures

Deduplication was performed in EndNote. A total of six reviewers conducted the screening exercise. For each article, the screening of the title and abstract (conducted on Rayyan—a web and mobile app designed for systematic reviews[12]) and the full-text review were performed in parallel by two researchers. Any conflicts between reviewers were addressed via discussion and resolved by a third reviewer when consensus was not reached. Full-text screening and data extraction of articles that were not in English language were performed by members of the review team who were proficient in the respective languages of publication, and where necessary, external colleagues (including international postgraduate students) in the department were consulted. Inclusion and exclusion of articles were based on prespecified eligibility criteria, in line with the Population, Intervention, Comparator, Outcome, and Study Design framework.[3] Only studies that conducted cost-utility analysis (CUA) of surgical interventions in LMICs (defined according to World Bank classification) were included. CUAs are economic evaluations reporting effects (ie, benefits) using generic measures that combine quality (utilities) and quantity (years gained) dimensions of life, for example, quality-adjusted life years (QALYs) gained, disability-adjusted life years (DALYs) averted, and

health-adjusted life expectancy (HALE) gained. Studies that performed cost-effectiveness analysis (CEA) which measures effects in natural units (eg, number of new infections averted) or cost-benefit analysis (CBA) which captures effects in monetary terms were excluded. All minor and major surgical interventions were included. Minimally invasive intraluminal or endovascular interventions were included, while extracorporeal interventions such as radiotherapy were excluded. Therapeutic as opposed to diagnostic surgeries were included; neoadjuvant and adjunct procedures were excluded. Studies evaluating policies, hypothetical initiatives or programmes aimed at improving access to surgery (eg, surgical missions) or surgeries performed under such scenarios were excluded. The complete list of applied eligibility criteria is specified in online supplemental material 2.

Data extraction and quality assessment

Six reviewers performed the data extraction using a pretested data collection proforma in Microsoft Excel. For each article, one researcher conducted the data extraction while another researcher independently reviewed the data extraction to check the completeness and accuracy of all data. A 10% sample was assessed by a third reviewer for verification purposes. Researchers extracted information on study characteristics, including bibliographic information, study methodologies and all empirical evidence related to cost-effectiveness. The Drummond checklist was employed to assess the quality of the included studies.[4]

Data analyses, syntheses and reporting

A descriptive analysis of study characteristics and results was performed for all included studies. The Incremental Cost-Effectiveness Ratio (ICER) is the standard metric for expressing the result of cost-effectiveness evaluation of a pair of alternative interventions and is therefore the most reported cost-effectiveness metric. However, as the ICER (also referred to as the Incremental Cost-Utility Ratio in CUAs) is a summary measure for a specific pair of comparators defined from the outset of a study, it is only useful in relation to the pair for which it was estimated.

ICER (AB) = (Cost of Intervention B – Cost of Intervention A)/(Benefit of Intervention B – Benefit of Intervention A)

To allow for an assessment of the cost-effectiveness of a stand-alone procedure and compare cost-effectiveness across multiple individual surgeries (from different studies) and against otherwise unrelated traditional public health services, we computed average cost-effectiveness ratios (ACERs) for individual interventions, by dividing the cost of intervention per patient by the total benefit per patient. Therefore, for each pair of comparators evaluated, two separate ACERs were computed, except where a surgical procedure was compared against a non-surgical alternative, which was dropped from the analysis.

ACER (A) = Cost of Intervention A/Benefits of Intervention A

ACER (B) = Cost of Intervention B/Benefits of Intervention B

This approach has been applied in previous research comparing the cost-effectiveness of surgical procedures to conventional public health programmes.[5 6] To facilitate this comparison across years and countries, all ACERs were converted to 2022 equivalents using World Bank Gross Domestic Product (GDP) deflators,[13] and then to International dollars (I$) using purchasing power parities.[14] For studies without information on the currency year, the publication year was proxied for the currency year. Results from different perspectives were treated as different data points even when they were reported in the same study, as were results from different countries in the same study. When multiple time horizons were reported for the same intervention in the same study, the longest time horizon was included in the analysis. Similar to previous work, this study implicitly assumed that one unit of DALYs (averted), QALYs (gained), and HALE (gained) represent equal economic value.[5 6]

To determine the cost-effectiveness of interventions, the costs per unit of benefit (QALY, DALY, or HALE) were compared against the respective country GDP per capita, in accordance with the suggestions of the WHO Commission on Macroeconomics and Health. Interventions with cost per unit of benefit greater than three times the GDP per capita were considered *not cost-effective*; less than three times the GDP per capita were considered *cost-effective;* less than the GDP per capita were considered *very cost-effective*.[15] The ACERs were further compared with costs per DALY for common traditional public health interventions, derived from the DCP2,[16] and inflated to 2022 United States Dollar equivalents.

Meta-analyses were not conducted due to heterogeneity in study population characteristics (eg, disease severity, gender, age and comorbidities) and model design (eg, model type, perspectives, cycle length and horizon). To facilitate data presentation, identified surgical procedures were clustered into countries of study, specialties and procedure groups. For example, open prostatectomies, photovaporisation of prostate, laparoscopic prostatectomies, transurethral resection of prostate and robotic-assisted laparoscopic prostatectomies were grouped into 'prostatectomies'. Distributions or spreads of costs per unit of benefit across country/specialty/procedure clusters were computed and presented using ranges and medians. A narrative synthesis was used in presenting the results of this study, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA).[17]

The study is registered on the international prospective register for systematic reviews (PROSPERO) under CRD42023372881.

Patient and public involvement

Patients or the public were not involved in the design, conduct, or reporting, or dissemination plans of our research.

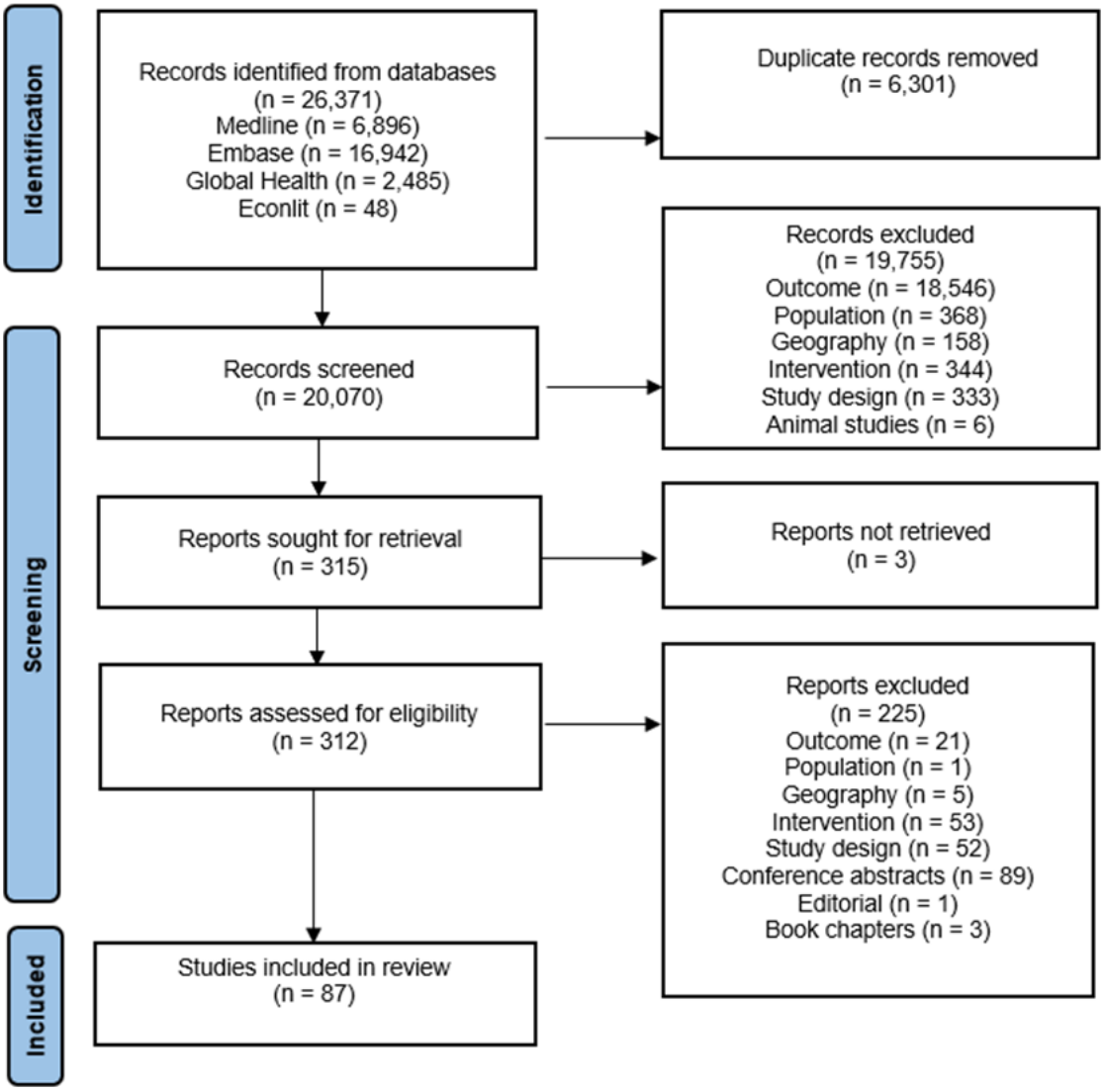

Figure 1 Preferred Reporting Items for Systematic Reviews and Meta-Analyses flow diagram.

RESULTS

The search identified a total of 26 371 articles comprising 20 070 unique articles following deduplication. A total of 315 articles underwent full-text review, with a total of 87 publications meeting the inclusion criteria (see figure 1). Included studies covered 23 countries, with China (n=20), Thailand (n=12), Brazil (n=8) and Iran (n=8) accounting for about 55% of the evidence. About 72% (n=63) of all the studies were from upper middle-income countries while 8% (n=7) were from low-income countries (all of which were in sub-Saharan Africa). Studies spanned a wide spectrum of specialties, but the largest volumes of evidence were related to general surgery (n=26), interventional cardiology (n=11) and ophthalmology (n=10). The majority of the included studies reported benefits in QALYs (n=71), followed by DALYs (n=13), and HALE (n=1).[18] An overview of all included studies and their characteristics is provided in online supplemental material 3.

Cost-effectiveness of surgical interventions

Across 49 procedure groups, 172 unique ACERs were computed. One hundred and fifty-three (153) ACER estimates (89%) were classified as *cost-effective*, with 130 ACER estimates (76%) classed as *very cost-effective*. In an income group disaggregated analysis, 75% and 85% of the estimates were *very cost-effective* and *cost-effective* in upper middle-income countries, respectively. In lower middle-income countries, 84% were *very cost-effective* as 95% were *cost-effective*. In low-income countries, 62% were *very cost-effective* while 92% were *cost-effective*. Overall, the most cost-effective surgical interventions relate to total dental prosthesis fixing in Brazil (I$8/QALY),[19] elective inguinal hernia repair in Zambia (I$10/DALY)[20] and exploratory laparotomy in Uganda (I$14/DALY).[21] The most expensive procedures were catheter ablation without atrial fibrillation treatment (I$1.45B/DALY) and catheter ablation with atrial fibrillation treatment (I$0.5B/DALY) in China.[22] Table 1 presents the median and range of costs per unit of benefit of surgical interventions assessed in each country. Across all the countries, the median ACERs

Table 1 Costs (I$) per unit of benefit by country

S/N	Country	Number of studies	Number of ACER data points	Median	Lower bound	Upper bound
1	D.R. Congo	1	1	19.43	19.43	19.43
2	Uganda	4	7	40.84	14.09	827.76
3	Zambia	2	9	41.02	10.13	45 734.33
4	Tanzania	2	5	140.01	71.93	172.95
5	Sri Lanka	1	3	280.33	199.49	294.57
6	Cambodia	2	3	378.20	148.39	1929.08
7	Haiti	1	1	424.74	424.74	424.74
8	India	6	11	1190.21	183.34	13 819.79
9	Guatemala	1	1	1506.49	1506.49	1506.49
10	Bulgaria	1	2	1595.21	1488.16	1702.26
11	Ghana	2	4	1974.55	816.15	2847.04
12	Brazil	8	17	2126.54	8.36	17 324.99
13	Turkey	1	1	2543.37	2543.37	2543.37
14	Iran	8	12	3116.65	504.03	20 681.06
15	Rwanda	1	1	3375.85	3375.85	3375.85
16	Indonesia	2	4	4103.72	245.29	8127.92
17	Malawi	1	4	4703.18	2926.10	7430.27
18	Colombia	7	13	7686.24	27.67	15 400 000.00
19	Kazakhstan	2	3	8505.45	8182.23	20 142.09
20	China	20	32	9327.39	470.67	1 460 000 000.00
21	Thailand	12	33	10 702.49	1030.10	64 162.13
22	Nicaragua	1	1	20 098.82	20 098.82	20 098.82
23	Argentina	1	4	121 271.10	103 067.50	140 169.00
	Total	87	172			

ACER, Average cost-effectiveness ratio.

ranged from I$19/HALE for caesarean section in Democratic Republic of Congo[18] to I$121 271/QALY for left ventricular assist device implantation in Argentina.[23] The median and range of ACERs across specialties are illustrated in table 2. Median ACERs ranged from I$16 per QALY/DALY in paediatric surgery, to I$20 947 per QALY/DALY in cardiothoracic surgery. Across all procedure groups, the median ACERs ranged from I$17 per QALY/DALY for laparotomies[20 21] to I$170 186 per QALY/DALY for bariatric surgeries[24] (see figure 2). A detailed overview of ACERs by surgical procedure and country is available in online supplemental material 3.

Common traditional public health interventions are generally considered *very cost-effective*, with costs (among the services included in this study) ranging from I$11/DALY for expanded programmes on immunisation, to I$3908/DALY for the enforcement of seatbelt laws. However, compared with oral rehydration therapy, tuberculosis vaccination, expanded programmes on immunisation, school feeding programmes, family planning services and HIV antiretroviral therapy, many low- and moderate-complexity surgical interventions (ie, laparotomy, caesarean section, glaucoma surgery, amputation, inguinal hernia repair and appendectomy) are as cost-effective or more cost-effective (see figure 2).

Quality of included studies

There was significant variation in the quality of the included studies with adherence to Drummond checklist[3] differing widely across specific items. For instance, nearly all the studies (97%) clearly described the research question, and over 80% clearly stated the primary outcome measure for the economic evaluation. However, only 66% of studies described the method of estimation of resource quantities and unit prices, and fewer than 30% of studies reported the quantities of use separately from the unit prices. Online supplemental material 4 presents an overview of the rates of adherence to the checklist items across the studies.

DISCUSSION

Many LMICs are currently undergoing the development and implementation of national surgical plans, which intend to offer a strategy for surgical care strengthening. Evidence on the comparative value in costs and benefits

Table 2 Costs (I$) per unit of benefit by surgical specialty

S/N	Country	Number of studies	Number of ACER data points	Median	Lower bound	Upper bound
1	Paediatric surgery	1	1	16.11	16.11	16.11
2	Maxillofacial surgery	1	2	17.92	8.36	27.47
3	Obstetrics	1	3	19.43	17.23	47.62
4	Multispecialty	1	1	378.20	378.20	378.20
5	Gynaecology	6	10	928.93	199.49	14 696.26
6	Ophthalmology	10	15	1422.81	27.67	45 734.33
7	Neurosurgery	3	5	1929.08	148.39	6388.88
8	Urology	4	8	1946.48	735.10	12 362.57
9	Interventional neuroradiology	3	4	2602.11	1022.05	48 493.04
10	General surgery	26	51	2803.58	10.13	15 400 000.00
11	Cardiovascular surgery	2	7	3018.01	655.59	5483.32
12	Transplant surgery	2	4	4136.14	35 947.31	37 736.47
13	Ear/nose/throat	3	4	5785.29	470.67	20 098.82
14	Interventional cardiology	11	20	6509.31	1506.49	1 460 000 000.00
15	Orthopaedic surgery	9	23	6906.00	51.99	175 339.90
16	Cardiothoracic surgery	4	14	20 946.75	1190.21	44 017.63
	Total	87	172			

ACER, Average cost-effectiveness ratio.

of surgical interventions will be crucial to inform such plans, supporting the development of UHC benefit packages, and informing the allocation of limited resources to maximise societal welfare. This review synthesised the most recent evidence on the cost-effectiveness of surgeries in LMICs published over the last decade and provided information on the comparative cost-effectiveness between surgical and common public health interventions. Based on the WHO recommended cost-effectiveness threshold linked to a country's GDP per capita, most surgeries (assessed) can be classified as *very cost-effective*. Moreover, many low-complexity surgical interventions compared favourably with common public health interventions, making them a best-buy consideration for policy-makers aiming to improve population health. Our review consolidates critical information dispelling the economic myths around surgery. This further adds to the wider evidence on the value of surgical care to address a large unmet surgical need across many parts of the world, and its implications for individuals, communities and societies.[3 25 26]

However, overall, there remains paucity of evidence that would allow decision-makers to assess the cost-effectiveness of surgery and determine best buys across a wide range of specialties and interventions. Nearly 40% of the included studies focused on eight surgical procedures, and except for inguinal hernia repair and cataract surgery, evidence focused mostly on advanced surgical procedures (eg, cardiac valve replacement, catheter ablation, and bariatric surgeries). Consequently, only few studies cover evidence on high-volume, life-saving procedures (eg, appendectomy, caesarean section and long bone fracture fixation). In addition, the available evidence is skewed towards information from a small number of upper middle-income countries, while lower-income settings particularly sub-Saharan Africa, where many countries are currently engaging in the development and implementation of surgical plans, appear under-represented. Since cost-effectiveness evidence is driven by contextual dynamics, the existing evidence limits direct applicability beyond the healthcare system studied and it indicates that cost-effectiveness evidence still plays a marginal role in surgical resource allocation and planning across many LMICs. A concerted effort is needed to advance the generation and utilisation of economic evidence in the drive towards scale-up of surgical care.

Strengths and limitations

This review benefitted from adherence to standard guidelines, including the Cochrane Handbook of Systematic Reviews, CRD Guidance and PRISMA. A comprehensive search strategy was employed to identify all eligible articles across all LMICs published in any language. The screening and extraction process was conducted by two independent reviewers and checked by a third reviewer. However, there are several limitations. First, due to the heterogeneity of cost-effectiveness data presented in the included articles, it was not feasible to perform meta-analyses across surgical specialties, or for specific surgical interventions across different LMICs. In line with previous work, the median ACER was presented

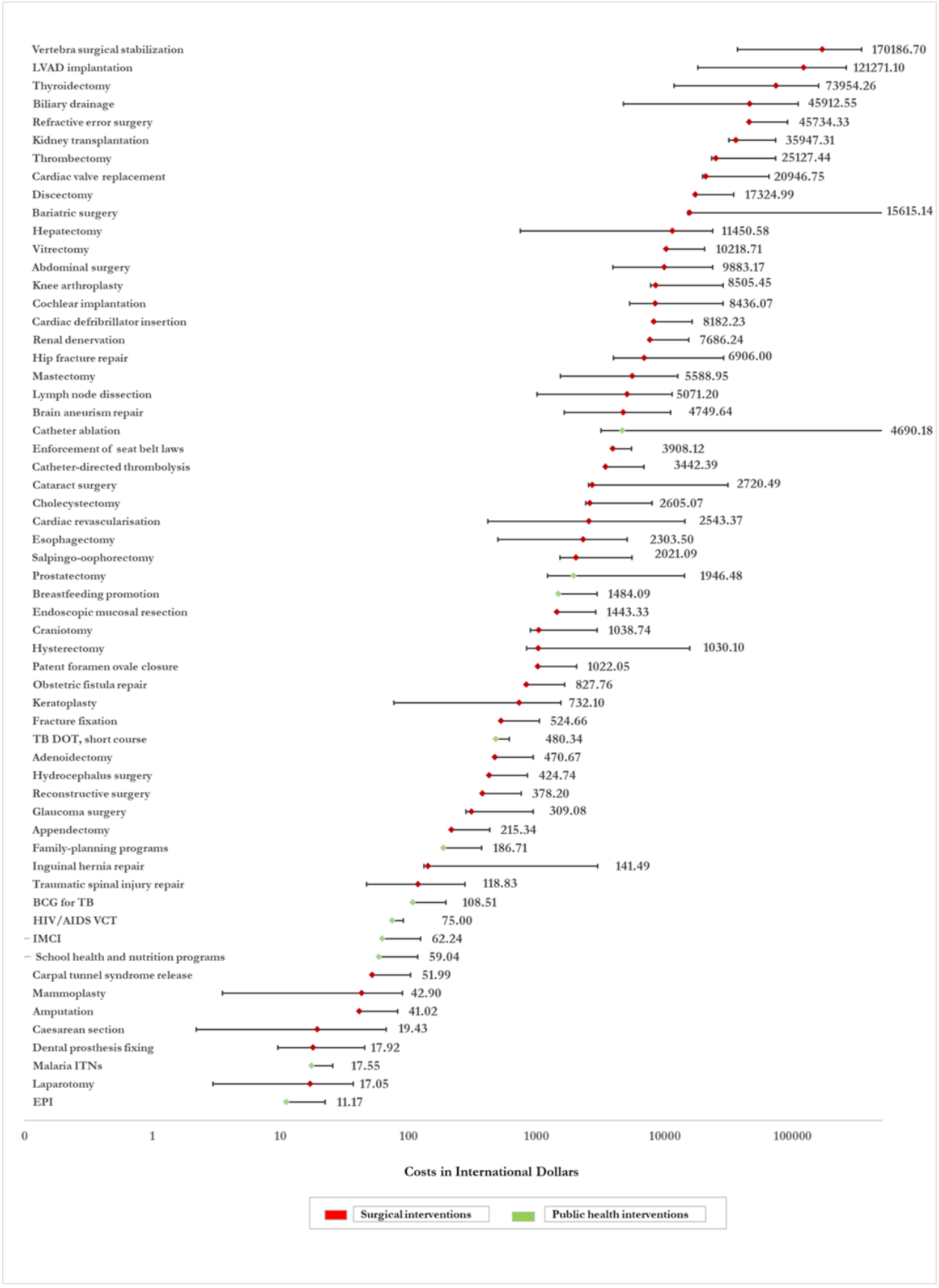

Figure 2 Comparison of median costs (I$) per unit of benefit between surgical interventions and common traditional public health interventions. DOT, Directly observed treatment; EPI, Expanded programme on immunisation; IMCI, Integrated management of childhood illness; ITN, Insecticide-treated net; LVAD, Left ventricular assist device; TB, tuberculosis; VCT, Voluntary counselling and testing.

irrespective of differences in population characteristics, time horizons and discounting methods. It is noteworthy that despite differences in underlying characteristics and methodologies, most surgical interventions fell within the cost-effectiveness threshold. Moreover, instead of confidence intervals, the dispersions of ACER estimates across studies were presented as ranges, which is in line with an approach employed by the DCP2[16] and previous reviews.[5 6] Second, the limited geographical spread of the identified studies restricts the extent to which the evidence could be used for broader decision-making, yet we may expect only small variation in the underlying costs associated with the production of surgeries across LMICs that would impact the country-specific cost-effectivess ratios. Finally, the findings in our review may be impacted by publication bias whereby identified procedures are skewed towards only the cost-effective interventions due to the lower tendency for studies with non-cost-effective outcomes to be published in the literature. To address this concern, we performed a grey literature search. Policy-makers and funding organisations must consider that the information presented (ranges and medians) across clusters (countries, specialties and procedure groups) represents only values among interventions that have been evaluated and published in those clusters in the last decade, and does not encompass the full breadth of possible interventions in those clusters.

Policy implications

To optimise efficiency, policy-makers must seek ways to maximise benefits and minimise costs, or at least in adopting new interventions, they should ensure that the marginal cost of a new technology attracts commensurate marginal benefit compared with current practice.[27] For example, based on our findings, investments in new expensive robotic technology for prostatectomy may not represent best value for money in a resource-constraint setting if the gain in clinical benefit is only modest compared with the standard laparoscopic prostatectomy.[28] Similarly, depending on the population health profile of a given country, allocative decisions must take into consideration the comparative effectiveness of curative interventions versus other worthwhile public health interventions that target disease prevention. Such considerations are not only instructive for country-level policy-makers but also important for international donors.

Most of the surgical interventions evaluated since 2013 are cost-effective. Despite this evidence, access to surgical care remains low across many parts of the world, with insufficient momentum for investment in surgical capacity due to a lack of political priority, even in countries with existing surgical plans.[29 30] Locally grounded evidence generation will be needed to guide political, policy and professional stakeholders towards achieving universal surgical coverage,[31 32] including the optimisation of surgical resource mobilisation, institutionalisation of sustainable financial protection mechanisms for patients requiring surgical care and maximising returns from investments through value-based purchasing practices.[29] Future studies should prioritise evaluation of high-volume low-complexity procedures in lower-income settings to facilitate evidence-informed surgical planning and benefit package design.

Most of the high-cost high-complexity procedures identified were evaluated in upper middle-income countries while the few low-complexity interventions identified were mostly from low-income and lower-middle income countries. Despite the differences in complexities of interventions studied across the income divides, surgeries were similarly cost-effective in both settings. This is not unexpected given that higher income settings also have higher GDP per capita against which cost-effectiveness of interventions was assessed. This further highlights the importance of contextualisation in interpretation of cost-effectiveness evidence, and by extension, the imperatives of explicit cognizance of contextual peculiarities in surgical policy formulation, implementation and evaluation.

Surgery represents a cost-effective buy in the broader spectrum of public health interventions but there remain fundamental questions about the evidence that underpins the development of surgical plans and UHC benefit packages, in the absence of sufficient cost-effectiveness studies. Given the scarcity of health resources, policy-makers ultimately must deal with the inherent trade-offs presented, not only in terms of the inputs to invest in but also what services to prioritise at different levels of the healthcare system. Cost-effectiveness evidence should inform plans with clearly ranked discrete investment bundles and service packages, possibly rendering the plans more economically navigable and sufficiently appealing to attract the support of political leaders and development partners.

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