

Problems and solutions in delivering global surgery in the 21st century

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Background: Surgery has had low priority in global health planning, so the delivery of surgical care in low- and middle-income countries is often poorly resourced. A recent Lancet Commission on Global Surgery has highlighted the need for change.

Methods: A consensus view of the problems and solutions was identified by individual surgeons from high-income countries, familiar with surgical care in remote and poorer environments, based on recent publications related to global surgery.

Results: The major issues identified were: the perceived unimportance of surgery, shortage of personnel, lack of appropriate training and failure to establish surgical standards, failure to appreciate local needs and poor coordination of service delivery.

Conclusion: Surgery deserves a higher priority in global health resource allocation. Lessons learned from participation in humanitarian crises should be considered in surgical developments.

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Introduction

Global health involves the development of effective and sustainable healthcare programmes around the world. These health systems must have strong foundations based on broad social, political, educational and economic infrastructures to provide stability and security in times of recession as well as growth¹. Around 234 million major surgical procedures are performed worldwide each year, with enormous discrepancies between surgical need and supply in poorer countries. Surgery has been overlooked in global health planning² and described as the 'neglected stepchild'³.

Global surgery has been defined as 'an area for study, research, practice and advocacy that seeks to improve health outcomes and achieve health equity for all people who require surgical care with a special emphasis on underserved populations and populations in crisis'^{4,5}. Global surgery inequalities are most apparent between high-income countries (HICs) and low- and middle-income countries (LMICs). HICs seek to assist medical providers and patients in LMICs, although

marginalized communities within HICs often have poor access to surgical care.

Collaboration between clinicians, scientists, educators and policy leaders has led to recommendations under an umbrella term the Lancet Commission on Global Surgery⁶. Key objectives include promoting surgery within the global health agenda, identification of barriers and how to overcome them⁶. This review focuses on the challenges and potential solutions to delivering a global health strategy.

Perceived unimportance of surgery

Three-quarters of surgical procedures are performed on only one-third of the world's population⁷. The millennium development goals⁸ developed by the United Nations outlined inequalities that required urgent effort to improve global healthcare. Areas requiring immediate focus included maternal health, human immunodeficiency virus (HIV) and malaria. Surgery was highlighted poorly, being considered only alongside 'other diseases'. Although some argue that promoting global surgery is laborious,

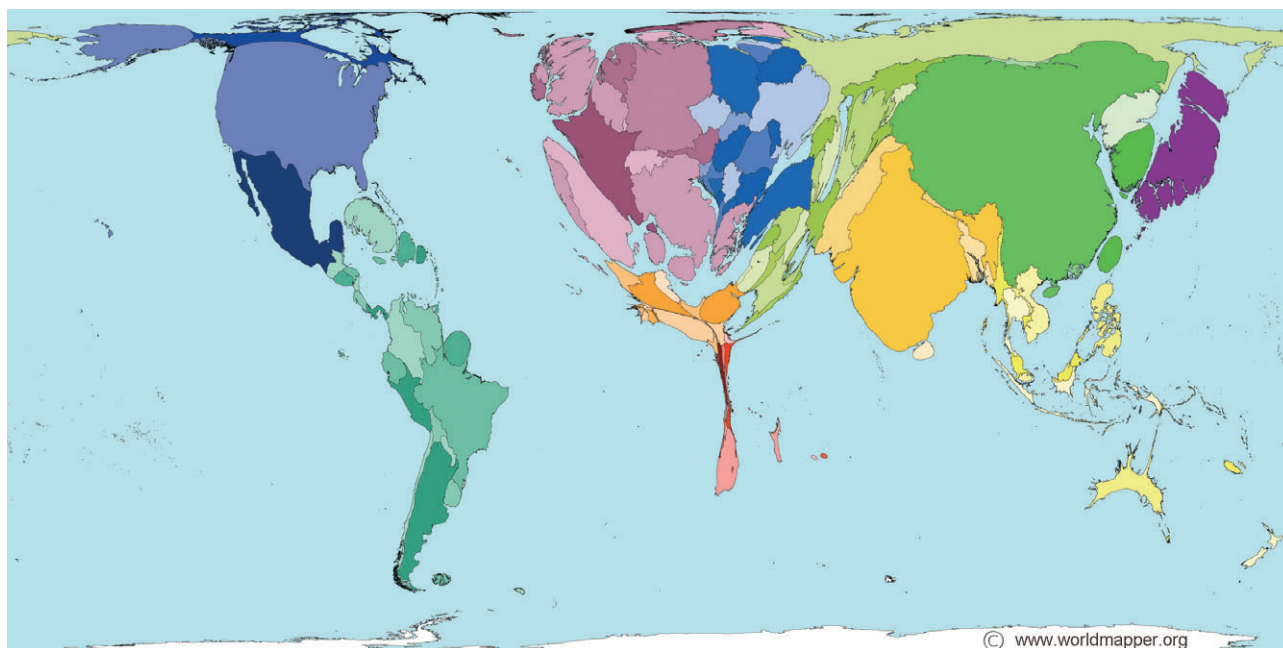


Fig. 1 World map in which territory size demonstrates the relative number of physicians working in that territory. (Creative Commons Licence © SASI Group (University of Sheffield) and M. Newman (University of Michigan, www.worldmapper.org))

because of time delays in creating facilities, ensuring surgical competency and establishing networks, evidence suggests that surgery is cost-effective⁹. Disability-adjusted life-year (DALY), defined as ‘one lost year of healthy life’, is an accepted surrogate for assessing cost-effectiveness¹⁰. The cost of treating malaria is €1–5 per DALY and antiretrovirals for HIV treatment €300–500 per DALY, whereas ‘basic’ surgery such as hernia repair lies in the range of €7–200 per DALY. Evidence suggests that an estimated 11 per cent of DALYs are correctable with surgery¹¹. The cost-effectiveness of surgery is not yet acknowledged by the media or in political circles¹².

Shortage of surgeons in low- and middle-income countries

This is not simply the provision of operative skills. Creation of the surgical team along with anaesthetic care and a focus on patient safety are paramount¹³. There is, nevertheless, a substantial shortage of surgeons in LMICs (Fig. 1). In Malawi, for example, there is approximately one specialist surgeon per million of population¹⁴, which reflects the lack of training opportunities in many parts of the world¹⁵. Initiatives to provide clinical officers able to perform obstetric interventions (including surgery), supported by European Union funding, represent one way of overcoming this difficulty¹⁴. The programme aims to provide retainable, skilled healthcare across Africa.

Collaborations and partnerships between hospitals in HICs and LMICs can enhance knowledge and training. LMIC trainees can spend training time in a HIC setting to develop specialized skills. Several centres have partnered surgical training programmes with hospitals in low-income countries (LICs)^{16–18}. These training programmes should be initiated regionally through the surgical Associations or Colleges to avoid unsustainable interventions based on individuals. Ultimately, bidirectional programmes and exchanges undertaken generate culture change on both sides, and provide huge training opportunities to HICs.

The shortage of surgeons results in unacceptable pressures on the individuals, without the opportunity for second opinions and support. Providing structured support and opportunities for further training will improve their working life and enable the surgeon to provide good care. This may make it more rewarding to stay in their country and prevent the ‘brain drain’.

Lack of standards

Good clinical governance and continuous quality assurance are essential factors for the development of sustainable healthcare. The substantial shortage of surgeons in LICs can perpetuate an attitude that ‘anything is better than nothing’, with poor standards and stifled professional development.

Although many visiting surgeons are motivated altruistically, pressures (perceived or otherwise) to operate outside their skill specialty and training should be discouraged. A practice that exceeds familiar boundaries in a rural LIC is potentially more dangerous than if performed in a HIC hospital. Being the most qualified person present is not a justifiable reason for attempting a non-life-threatening intervention if not competent. A proposed solution to this is the development of international accreditation for surgeons wanting to practise in LMICs.

In 2012, Médecins Sans Frontières (MSF)¹⁹ published an international scoring template to help promote and improve documentation of surgical care, especially following large-scale disasters, with the aim of standardizing injury reporting and outcomes. In addition the World Health Organization (WHO) has created a Global Foreign Medical Teams Registry that ‘sets minimum standards for international health workers and allows teams to clearly outline their services and skills’²⁰.

Failure to understand the local situation

Context is important at team and individual-surgeon level. There is little value in local surgeons learning complex procedures that they do not have the resources to maintain²¹. The value of visiting surgeons performing operations that are already available locally is also questionable. Ideally, surgical missions should provide service to patients who have restricted access to affordable care, focusing on sustainability and training.

‘Frugal innovation’, such as the use of sterilized mosquito net for inguinal hernia repair²², adapts current medical technology to communities with limited resources. The innovative learning is bidirectional such that safe and cost-effective adaptations should be considered for crossover to HICs. If it is reasonable to use mosquito nets in developing nations, then why not in higher-income populations? If a surgeon travels to LMICs to perform low-cost innovative surgical solutions, is there not a moral imperative to use them back home?

Poor coordination of efforts

International agencies in LMICs support surgical services, but collaboration is often poor. Better coordination with local politicians and those responsible for health-care provision is preferable to agendas driven externally by a non-government organization. Increased partnerships and collaborations between training bodies in HIC and LMIC settings are important, and this mutual transfer of knowledge allied to personal contact seems the logical

Table 1 The seven surgical conditions that are the focus of essential surgical interventions

Appendicitis
Cataracts
Cleft lip
Club foot
Hernia
Obstructed labour
Trauma

way in which a surgical ‘mission’ will produce a sustained improvement in surgical outcomes.

The WHO has published a situational analysis tool to assess emergency and essential surgical care. This specifically identifies strengths, weaknesses and gaps in the four key aspects of good surgical healthcare systems (infrastructure, human resources, surgical interventions and equipment), and is now used in over 25 countries²³. In 2005, the WHO²⁴ launched the Global Initiative for Emergency and Essential Surgical Care, with the goal of strengthening health systems, promoting universal health coverage, and ensuring good safety and efficacy of surgical procedures.

The Royal Colleges of Surgery and Obstetrics and Gynaecology in conjunction with the International Collaboration for Essential Surgery^{25,26} identified 15 essential interventions that, if addressed appropriately, could provide 80 per cent of the most basic surgical needs that communities in low-resource settings require (*Table 1*). The 15 × 15 campaign aims to achieve this goal by implementing specific and narrow training programmes to medical and non-physician providers, especially in areas where doctors are scarce²⁷.

The Lancet Commission⁶ has proposed three bellwether procedures against which outcomes should be evaluated: caesarean section, laparotomy for intra-abdominal sepsis and management of complex open fractures. Common metrics to evaluate access could include time to surgical care and limitation of out-of-pocket expenditure. However, there is a view that defining essential surgical procedures is too limited. The defined bellwether procedures are to be used largely as indices of surgical access. The provision of surgical services should be competency-based and related to health system strengthening and not a list of procedures⁶.

Response to humanitarian crises

The provision of emergency surgery poses specific challenges for global surgery planning. Emergency projects set up by agencies such as MSF and the Red Cross strive

to provide rapid life-saving treatments for populations affected by armed conflicts or natural disasters²⁸. Local hospitals become overwhelmed in times of emergency, and external organizations may then provide essential assistance. There are inevitably times when multiple agencies working independently create an uneven distribution of care. Following the 2010 Haitian earthquake, thousands of international healthcare workers provided assistance, but lack of coordination resulted in differences in amputation rates, quality of postoperative care, provision of rehabilitation and follow-up²⁹. The development of trauma registries for emergency surgical and humanitarian crises has been advocated in an attempt to improve and coordinate responses in the future (UK International Emergency Trauma Register)³⁰. Ideally, this assistance should be structured for sustainable healthcare, particularly when overcrowding and infection exist alongside the need for surgical services^{31,32}.

It may be a utopian ideal that every human being will have basic healthcare within a decade, but rationalized, inexpensive, locally modified surgical services, accessible within reason to all habitants, is deliverable³³. Surgery is cost-effective, easily standardized, and should be seen as a priority for global resource allocation.

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