



Pediatric surgery as an essential component of global child health

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ABSTRACT

Recent initiatives in global health have emphasized universal coverage of essential health services. Surgical conditions play a critical role in child health in resource-poor areas. This article discusses (1) the spectrum of pediatric surgical conditions and their treatment; (2) relevance to recent advances in global surgery; (3) challenges to the prioritization of surgical care within child health, and possible solutions; (4) a case example from a resource-poor area (Uganda) illustrating some of these concepts; and (5) important child health initiatives with which surgical services should be integrated. Pediatric surgery providers must lead the effort to prioritize children's surgery in health systems development.

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Introduction

Child health is an important part of health care in all countries, but is especially important in less developed countries where the proportion of the population under 20 is nearly 50%, compared to an average of 35% globally.¹ Pediatric surgical conditions play a significant role in child health in these settings. In this article, we will discuss

- 1) the spectrum of pediatric surgical conditions and their treatment,
- 2) their relevance to recent advances in global surgery,
- 3) challenges to the prioritization of surgical care within child health,
- 4) a case example from a resource-poor area (Uganda) highlighting some of these points, and
- 5) important child health initiatives with a need to integrate with surgical initiatives.

What is pediatric surgery, and its role within global surgery

Global surgery has recently been defined as “an area of 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. It uses collaborative, cross-sectoral, and transnational approaches and is a synthesis of population-based strategies with individual surgical care.”² Global pediatric surgery has a similar definition, with the focus on the care and prevention of surgical disease in childhood.

Pediatric surgical conditions cross a broad range of disease categories, namely infections, injuries, cancer, and congenital anomalies. A significant proportion of the burden, perhaps upwards of 50%, may be attributable to emergency conditions that require time-critical interventions, in the order of hours, rather than days. They also span the breadth of childhood, with some conditions requiring life-saving interventions in the neonatal period, while others may not present until the teenage years. Furthermore, while some conditions may require a single intervention, others ideally require follow-up through childhood. Analysis of mortality of specific conditions emphasizes the significant disparity in outcomes between high and low-income countries.³

Recent advances in global surgery and their relevance to child health

Millennium Development Goals

In the past 3 decades global health priorities and significant health policies have recognized and started to address the particular needs of children, with the United Nations Millennium Development Goal (MDG) 4 aiming to halve child (under 5)

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mortality by 2015.⁴ As the time frame of the MDG's have come to an end, significant debate in the last year has surrounded the adoption of a new set of Sustainable Development Goals (SDGs) as a guide for LMICs.⁵ Surgical care of children will be critical to meeting these goals, and defining this contribution as the SDGs are defined, will be important for advocacy and recruitment of resources.

Lancet Commission on surgery (LCOS)

While communicable diseases and malnutrition continue to be leading causes of death for children under 5 years, surgical illnesses including congenital anomalies, surgically treated infections, trauma, and burns also contribute to the burden of disease (BoD) in children.⁶

Estimates from the LCOS were that approximately 30% of the global burden of disease is amenable to surgical intervention.⁷ A finer analysis of burden by surgical disease categories in children has not been performed to date. Overall analysis of BoD data confirms the broad range of diseases in which surgical care plays a role, and emphasizes that even within a selection of congenital disorders (congenital heart defects, cleft lip/palate, and neural tube defects), there is a significant proportion of avertable disease.⁸

The 5 key messages of the LCOS warrant further exploration relative to the surgical conditions that affect children⁹:

- 1) *An estimated 5 billion people globally lack access to surgical care*—yet the proportion of these that are children, and the distribution and scale-up needs for pediatric procedures are unknown. The Commission proposed a group of 3 “bellwether” procedures (cesarean section, laparotomy, and treatment of open fracture) as those that signify a system operating at a sufficient level of complexity to do most other surgical procedures; a similar group of children's surgical procedures has not been as formally proposed.
- 2) *143 million additional surgical procedures are needed each year to save lives and prevent disability*—more information is needed on how many of these procedures are needed in children.
- 3) *33 Million people face impoverishing expenditure related to surgical care yearly*—we need more information on the costs associated with care for children's conditions.
- 4) *Investment in surgical and anesthesia services is affordable, saves lives, and promotes economic growth*—although some cost-effectiveness studies on pediatric surgical procedures have recently been published precise estimates of savings from scale-up of children's surgical care are still lacking.^{10–12}
- 5) *Surgery is an indivisible, indispensable part of health care*—specifically, universal health coverage is an essential component of the global health agenda after 2030, but the roadmap to ensure coverage for children's surgical conditions has not yet been well defined.

One of the early priorities since the Commission launch has been the promotion of surgical indicators amongst other health-related development indicators, and the documentation of country-level “dashboards” to profile these priority areas above as a component of public health. Zambia has created such a dashboard as a sample, and the pediatric surgery community may develop similar indicators most appropriate for the specialty and context, so that country-level profiles can be made.¹³

Disease control priorities, 3rd edition (DCP-3)

As another guide for policymakers, health planners, and donors, a 3rd edition of the Disease Control Priorities in Developing Countries was launched earlier in 2015, including a volume on Essential Surgery.¹⁴ Key messages from this group also have direct implications for pediatric surgery as a key component of child health:

- 1) *1.5 Million deaths could be averted each year through essential surgical procedures*—though the proportion in children is unknown.
- 2) *Essential surgical procedures are cost-effective, and 28 of 44 procedures can be provided at a first-level hospital.* The essential surgical procedures applicable to children include:
 - a) Cleft lip and palate repair
 - b) Club foot repair
 - c) Shunt for hydrocephalus
 - d) Repair of anorectal malformations and Hirschsprung's disease
 - e) Appendectomy
 - f) Bowel obstruction
 - g) Colostomy
 - h) Inguinal hernia
 - i) Trauma laparotomy
 - j) Fracture management
 - k) Skin grafting and escharotomy for burns

While this specific “package” of conditions and required procedures has not been evaluated in LMICs, several studies have examined the capacity of selected facilities in LMICs to treat these conditions, showing numerous gaps and a limited coverage for both emergency and elective procedures.^{15–17} While surgical care of children is a well-developed component of child health in high income countries (HICs), the only policy, to our knowledge, in global pediatric surgery is one promoting male circumcision to prevent HIV transmission.¹⁸

- 3) *Strategies such as “task shifting” (performance of a range of procedures by a cadre of non-physicians) have expanded coverage, especially in rural areas, for numerous countries that have adopted this policy* (such as Malawi, Mozambique, Tanzania, and Zambia). Studies of overall outcomes have been encouraging, but such analysis for children's surgical conditions specifically, is limited.¹⁹
- 4) *Substantial disparities remain in perioperative mortality rates between HICs and LMICs, thus underscoring the need for safe perioperative care.* The provision of safe pediatric anesthesia care remains a critical step for any scale-up effort. Workshops such as the SAFE pediatric anesthesia course disseminated by the World Federation Societies of Anesthesiologists (WFSA) are critical in this regard, as are programs such as the Global Pulse Oximetry Initiative, and those training more providers for safe anesthetic care in children.^{20–22}
- 5) *The cost-effectiveness of essential surgical procedures supports the need to invest in surgical care to achieve universal coverage*—a very similar message to the LCOS and one that highlights the need for providers of children's surgery to continue estimating the cost-effectiveness of the interventions we currently provide or scale-up (by adding providers, infrastructure, services, etc).

World Health Assembly (WHA) Resolution on Emergency and Essential Surgical Care

Another recent critical development is the passage of the WHA Resolution 68.15 to “Strengthen Emergency and Essential Surgical Care as a component of universal health coverage.”²³ This was a key event in terms of advocacy for surgical providers and groups focused on care in LMIC settings. The resolution suggests many critical areas of action, including the integration of emergency and essential surgical care within primary care facilities and first-level hospitals as a key element to reaching universal health coverage. This resolution thus lends even greater urgency to adapting locally endorsed “packages” of pediatric surgical care that can be integrated through health facilities and other elements of the health system. The Amsterdam Declaration has proposed a similar

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