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## An investment in knowledge: Research in global pediatric surgery for the 21st century



Sarah L.M. Greenberg, MD, MPH<sup>a,b,\*</sup>, Joshua S. Ng-Kamstra, MD, MPH<sup>b,c</sup>,  
Emmanuel A. Ameh, MBBS, FWACS, FACS<sup>d</sup>, Doruk E. Ozgediz, MD, MSc<sup>e</sup>,  
Dan Poenaru, MD<sup>f,g</sup>, Stephen W. Bickler, MD, DTM&H, FACS, FAAP<sup>h</sup>

<sup>a</sup> Department of Surgery, Medical College of Wisconsin, 9200 W Wisconsin Ave, Milwaukee, Wisconsin 53266

<sup>b</sup> Department of Global Health and Social Medicine, Harvard Medical School, Boston, Massachusetts

<sup>c</sup> Department of Surgery, University of Toronto, Toronto, Ontario, Canada

<sup>d</sup> Department of Surgery, National Hospital, Abuja, Nigeria

<sup>e</sup> Department of Pediatric Surgery, Yale School of Medicine, New Haven, Connecticut

<sup>f</sup> Montreal Children's Hospital, McGill University Health Centre, Montreal, Quebec

<sup>g</sup> Bethany Kids at Myung Sung Christian Medical Center, Addis Ababa, Ethiopia

<sup>h</sup> Division of Pediatric Surgery, Rady Children's Hospital, University of California, San Diego, California

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### ABSTRACT

The body of literature addressing surgical and anesthesia care for children in low- and middle-income countries (LMICs) is small. This lack of research hinders full understanding of the nature of many surgical conditions in LMICs and compromises potential efforts to alleviate the significant health, welfare and economic burdens surgical conditions impose on children, families and countries. This article will evaluate the need for improved global pediatric surgery research by (1) presenting the current state of surgical research for children in LMICs and (2) discussing methods and opportunities for improvement within the political context of current global health priorities.

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### Introduction

The year 2015 marked a pivotal transition period for both global health and global surgery. The focus of the global health and development community transitioned from the Millennium Development Goals (MDGs) to a new set of Sustainable Development Goals (SDGs), commitments to Universal Health Coverage (UHC) and recognition of the critical need for resilient health systems. At the same time, multiple advocacy and policy efforts including the Third Edition of Disease Control Priorities (DCP3),<sup>1</sup> The Lancet Commission on Global Surgery (LCoGS),<sup>2</sup> and the World Health Assembly (WHA) resolution A 68/31 on Strengthening Emergency and Essential Surgical Care,<sup>3</sup> demonstrated the need for universal access to surgery and anesthesia in order to achieve these new health and development goals.

Until 2015, however, policymakers and funders had largely ignored the sizeable yet unmet need for surgical care—a treatment required for approximately 30% of the global burden of disease (GBD).<sup>2</sup> This lack of

attention has left two-thirds of the world's population without access to surgical services,<sup>4</sup> has rendered health systems ill-equipped to fully address the needs of the populations they serve, and threatens to cost countries trillions of dollars in lost economic output if not addressed.<sup>5</sup>

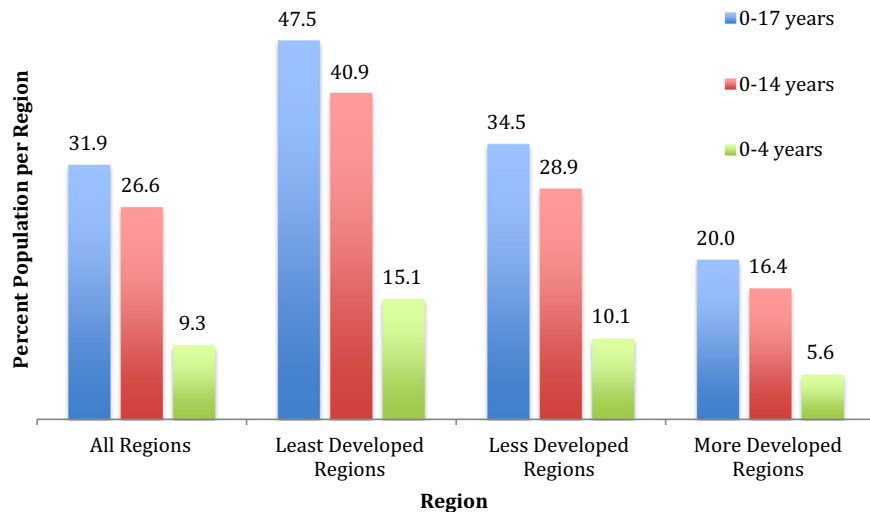
Although acknowledgment of the need for improved access to surgery is now slowly growing, data and knowledge about both the current state of surgical care, as well as best methods for delivering and improving such care, are largely lacking. This information gap is greatest in low- and middle-income countries (LMICs) and is particularly apparent surrounding the surgical care of children, who comprise nearly half of the population in the least developed regions<sup>6</sup> (Figure 1). Research is needed to help fill these knowledge gaps.

### Current picture of global surgery research

Application of research findings has the capacity to greatly improve health. For example, development of antiretroviral medications has helped to turn HIV from a fatal diagnosis to one with a fairly normal life expectancy with appropriate antiretroviral treatment.<sup>7</sup> Large scale improvements in maternal health over

\* Corresponding author at: Department of Surgery, Medical College of Wisconsin, 9200 W Wisconsin Ave, Milwaukee, WI 53266.

E-mail address: [sgreenberg@mcw.edu](mailto:sgreenberg@mcw.edu) (S.L.M. Greenberg).



**Fig. 1.** Percent of population per region that are children. \*Development designations of regions are from United Nations categories. More developed regions comprise Europe, Northern America, Australia/New Zealand, and Japan. Less developed regions comprise all regions of Africa, Asia (except Japan), Latin America and the Caribbean plus Melanesia, Micronesia, and Polynesia. Least developed regions are included within less developed regions and include 49 countries.<sup>41</sup> \*\*\*Data from the United Nations 2012 World Population Prospects.<sup>41</sup>

the last 20 years have come in part from adaptation, testing and rapid scale-up of service delivery models.<sup>8</sup> Similar research-driven improvements for global surgery, however, are largely lacking due in part to a deficiency of research priority, output, capacity, and funding in regions with the greatest need.

Capacity to do research in many LMIC settings is limited by lack of time, training and funding, as well as need to focus on other priorities such as direct care delivery. People trained to do research are clustered in higher-income regions. The United Nations Educational, Scientific, and Cultural Organization (UNESCO) estimates that only 2.2% of the world's researchers are in Africa and 3.5% are in Latin America and the Caribbean, compared to 21.9% in North America and 29.5% in Europe.<sup>9</sup> In addition, funding flows for global health research in general are small,<sup>10</sup> and funding flows to global surgery research are even smaller and declining.<sup>11,12</sup> There was a 50% decline in funding for surgical and anesthesia research in the United States (US) and the United Kingdom from the National Institutes of Health and Clinical Research Collaboration between 2005 and 2010; of the 12.35 billion US dollar (USD) annual budget of these two organizations, less than two million USD per year fund surgical research in underserved populations.<sup>12</sup>

Consequently, the highest volume of surgical research is not done by, nor in, countries with the greatest clinical need. Rather, research volume for surgery correlates with country gross domestic product (GDP). A bibliometric analysis found that of the 35 countries with the highest volumes of surgical research, high-income countries had the greatest presence at 85%, followed by upper middle-income countries with 12% and lower middle-income countries with 3%.<sup>2</sup> There were no low-income countries within the 35 countries with the highest research volumes. However, disease characteristics and subsequent research needs and findings from one region of the world are not necessarily transferable to another region, leading to a great unmet need for research to improve and advance the surgical care of people of all ages in many LMIC settings.

This problem of maldistribution of surgical research across different regions of the world is compounded by low volumes of research in surgery overall compared to its medical counterpart. Surgical research accounts for only 4.1% of all global health research activity, despite the fact that surgical conditions constitute one-third of the global burden of disease and surgical intervention is needed across all GBD subcategories.<sup>12,13</sup>

In order to better highlight the unique surgical needs faced by children in low-resource settings and to strengthen pediatric surgical research in LMICs, numerous efforts have been launched. For example, over the last decade, both the African Journal of Paediatric Surgery and the Annals of Pediatric Surgery were started and endorsed by the Pan-African Paediatric Surgical Association (PAPSA). The Journal of Pediatric Surgery, Pediatric Surgery International, and World Journal of Surgery have also progressively increased LMIC-specific pediatric surgical content in recent years. These journals allow pediatric surgeons in Africa and other LMIC regions to publish their results and highlight location-specific work and surgical needs. To create a common agenda for research, practice, education, and advocacy, the Global Paediatric Surgery Network launched a global collaborative in 2010 and published a roadmap of activities and future priorities in 2014.<sup>14</sup> Earlier this year, the first volume of DCP3 (published by the World Bank and funded by the Bill & Melinda Gates Foundation) included a chapter on congenital anomalies.<sup>15</sup> Finally, in 2012, *Seminars in Pediatric Surgery* brought together 23 pediatric surgeons from 9 different African countries to write and published a 10 paper issue on the challenges of pediatric surgical practice in Africa.<sup>16</sup> Now, 3 years later, they are bringing together another group of experts to look at pediatric surgery around the world.

### Suggested research agenda for global pediatric surgery

To help address low research volumes and disparate areas of focus, both DCP3 and LCoGS outlined suggested research agendas for global surgery based on data and knowledge gaps identified during the course of their work.<sup>2,17</sup> Using information gleaned from a review of the literature on research for global pediatric surgery, we adapted these research agendas for a pediatric surgery focus. This eight-point agenda is described below and summarized in panel 2. As with the agendas from DCP3 and LCoGS, this pediatric surgery research agenda is intended to help guide and unify research focus, funding and priorities at a global level to maximize potential research gains and minimize “siloes” work. However, research priorities for an individual setting should be driven by local clinicians, researchers, and change agents, and should be modified to fit the local context and needs of children and families affected by surgical conditions.

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