

## Study underscores huge gap between rich, poor in global surgery

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The number of surgeries performed worldwide has grown steadily, particularly in the developing world, yet there remains an enormous gap in surgical care between rich and poor nations, according to a new study led by a Stanford University School of Medicine researcher.

Between 2004 and 2012, the estimated annual number of operations around the globe rose 38 percent, from about 224 million to nearly 313 million, the researchers found. The biggest increase, 114 percent, occurred in relatively poor countries.

Yet these developing countries still account for a small percentage of operations overall. Only 6.3 percent of surgical procedures were done in the very poorest nations, which account for nearly 37 percent of the world's population, suggesting a vast unmet need for care, the researchers report.

"Surgery is being provided with increasing frequency in countries with very low expenditure on health care. Yet there is still a huge disparity between what is being offered in high health-expenditure countries versus the low-resourced countries," said Thomas Weiser, MD, an assistant professor of surgery at Stanford and lead author of the study.

Moreover, the most frequently performed operation in poor countries was cesarean section, which accounted for 30 percent of the total, suggesting other significant surgical needs, such as [traumatic injuries](#) and cancer care, are being given low priority, Weiser said.

The study will be published online March 1 in the *Bulletin of the World Health Organization*.

## Quality, safety concerns

In addition to issues of access to surgery, Weiser said there is concern about the quality and safety of care provided in developing countries, where inadequate equipment and training, and a lack of sterile environments, can put patients at risk. These concerns are the focus of a separate study, published Feb. 22 online in the *Lancet Global Health*, in which he and his colleagues found high mortality rates and great variability in outcomes among patients undergoing three common procedures—C-section, appendectomy and hernia repair—in low- and middle-income countries.

"Surgery is a high-risk intervention," Weiser said. "We are talking about millions of operations a year, so a lot of patients are at risk. Safety is an important part of a care delivery strategy."

In the past, he said, health systems in low- and middle-income countries have put a priority on managing infectious diseases and on maternal and child health. While these are still significant health issues, industrialization and aging populations have contributed to greater prevalence of other, noncommunicable conditions, such as heart disease and cancer, as well as traumatic injuries, Weiser said. These medical conditions often require surgical intervention, yet little is known about the availability of [surgical care](#) in many parts of the world, he said.

## Hunting for accurate numbers

In the study, he and his colleagues at two Boston hospitals set out to obtain up-to-date and accurate figures on global trends in surgery, and

country-by-country estimates of surgical volume for all 194 member nations of the World Health Organization. The study is an update of research they originally conducted on data from 2004.

They scoured recently published literature, queried individual ministries of health and obtained data for some countries from the Organization for Economic Co-operation and Development. For many countries, however, there was no information available on surgical volume, so the investigators developed estimates based on multiple imputation, a statistical technique to extrapolate data based on existing information.

For purposes of the study, they categorized countries as very-low-expenditure (less than \$100 per capita spent annually on health care); low-expenditure (\$100 to \$400 per capita annually); middle-expenditure (\$400 to \$1,000); and high-expenditure (more than \$1,000).

They found that the greatest increase in surgical availability occurred in very-low- and low-expenditure countries during the eight-year period since the last analysis was performed. In the poorest nations, the number of operations rose 69 percent, from 394 to 666 procedures per 100,000 people each year. In low-expenditure countries, the increase was 114.6 percent, from 1,851 to 3,973 operations per 100,000 people per year.

## **Focus on high-impact procedures**

Still, they found a huge disparity in surgical offerings between rich and poor nations. In 2012, for instance, only 30 percent of surgical procedures were done in very-low- and low-expenditure countries, though these nations comprise 71 percent of the world's population. And the bulk of these procedures were C-sections.

"In resource-poor settings, they don't have the capacity to provide the full repertoire of services," Weiser said. "So they focus on the high-

impact services—the ones that are given priority, like maternal health."

The results are in keeping with the 2015 report from Lancet Commission on Global Surgery, which found that some 5 billion people lack access to safe, affordable surgical care and that an additional 143 million operations were needed to meet emergency and essential needs.

Weiser said the latest study reinforces the need to invest in both human and physical capital to help build effective surgical capacity in the developing world.

"One is a skills issue. There aren't enough providers, and there's obviously a brain-drain issue, as trained providers leave their home countries to practice elsewhere," he said. "Surgery is a very unsupported discipline in some parts of the world, in terms of infrastructure, and it's high-risk. ... A lot of those fundamental issues need to be addressed."

Provided by Stanford University Medical Center

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