Global Surgery: A Forgotten Piece of the Health Puzzle

Published by **Hugh Shirley** on December 30, 2019

In the world of global health, it's pills, vaccines, and other preventive measures often at center stage. Most conversations in a global or public health classrooms center on reducing child mortality rates and the burden of neglected tropical diseases in low- and middle-income countries (LMICs) around the world. Those issues are vital in global health and major strides have been made in the past decades, but there has been an important topic missing in these conversations: global surgery.

Surgical care is a necessary part of a complete health package. Without access to surgery, you lose access to life-saving Caesarian sections, cataract removal, repair of open fractures, and more. This all might seem obvious; but being obvious doesn't get you on the agenda. If you don't include a key aspect of human healthcare in the conversation, then pieces get lost, systems breakdown, and people get left behind.

I'll illustrate this with some numbers, but first we need to understand some global health jargon. The **"burden of disease"** is a catchall used to describe the collective human productivity lost because of specific diseases or disease categories, such as **noncommunicable diseases** or injuries. Often, this might be measured as a **disability adjusted life year (DALY)**, which tries to capture the average years of healthy life lost because of disease. Each year, over 77.2 million DALYs can be attributed to causes that are treatable with surgical care. Essentially, 77.2 million years of healthy human life are lost around the world annually because people can't access the surgical care they need.

For one of the most prevalent causes of surgically treatable conditions, road injuries, access to timely care can mean the difference between a life of relative comfort or economic insecurity. Even if

surgery isn't necessary for all cases, setting a broken bone, testing for any neurological symptoms, and preventing infection are all necessary functions that doctors can perform for the victims of road traffic accidents. Without proper care, an easily treatable injury could become a debilitating life-altering event and contribute significantly to the global burden of DALYs.

How could 28% of all deaths be caused by diseases and conditions that need surgery? Many of these deaths occur in the same communities that need the most aid for diseases like cholera or HIV. In fact, only around 6% of all surgical procedures worldwide are undergone by the poorest third of the world's population. In countries with high maternal mortality rates, access to safe surgery can reduce that burden by 90%. Rates of cancer and heart disease are on the rise in LMICs, further straining surgical systems that are ill-prepared to handle complex cases.

Surgery in Baringo County, Kenya: An Infrastructural Issue

A view of Chemolingot in Baringo County, Kenya

I spent two weeks traveling around Kenya studying capacity and need for surgical care. Most of my time was spent in Baringo County, where 2% of primary care facilities and 43% of hospitals are

prepared to provide surgical care. Tiaty, a sub-county in Baringo County where I spent most of my time, is hot, dry, and remote. It takes at least 90 minutes to get from Chemolingot, the only hospital in Tiaty, to the nearest operating theatre in Kabarnet. Kabarnet is the only town in Baringo County with any operating theatres. If a patient needs a C-section in rural Tiaty, they first must make their way to Chemolingot before riding the only ambulance to Kabarnet, where they must then wait for an operating theatre to become available.

There are two major operating theatres in Kabarnet serving a population of over 700,000 people, comparable to the population of Boston, spread over an area four times the size of Rhode Island. The number of operating theatres in Boston is staggering. There are approximately 6 specialized surgeons in Baringo County. You couldn't get on the T without bumping into a member of Boston's surgical cadre. While rural Kenya is a world apart from one of the foremost medical centers of the world, surgical injuries and disease does not spare people in either location.

The population of Baringo county lives without access to the necessary support for improving health. For example, snake bites are common in the region, but people will often delay seeking treatment for hours or even days, for various reasons including lack of information on treatment options. That delay can turn a simple procedure like stitches into a much more complicated one like an amputation. When a patient does seek care, they need to get to a health facility that can handle their case, ideally within two hours. In Baringo, roads are poor or nonexistent. Motorbike taxis (“*boda-bodas*”), or crowded buses, (“matatus”), are often the only means of transit. It can take over two hours to reach a health facility of any kind, let alone the one facility in the county that can handle the increasingly complicated snake bite case.

The Right People and Places for Surgery

A chart of out-of-pocket expenses at Chemolingot Sub-county Referral Hospital

When you don't have an operating theatre available to perform a necessary surgical procedure, what happens? You must prioritize. Say a patient with a hernia in Baringo County is scheduled for surgery one day. The surgeon is ready, the theatre is prepped, the patient is waiting. An ambulance races up to the hospital and drops off a woman in prolonged labor. She's been referred to the only hospital in the region that can perform a C-section. In an emergency situation, where the mother and baby's lives are in immediate danger, the C-section will take priority over the hernia repair. The man with the hernia will just have to wait because there's not another available operating theatre, or surgeon, for his surgery.

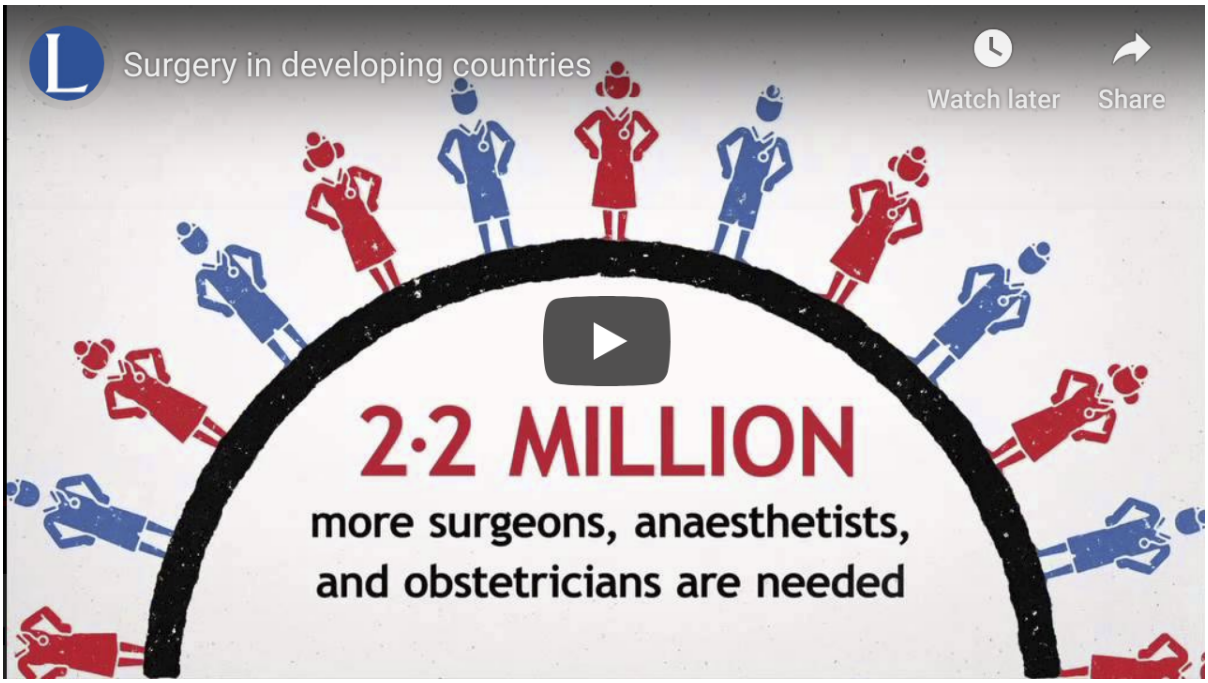
Emergency surgeries are prioritized over elective or non-emergency surgeries across LMICs where the infrastructure doesn't exist to support the surgical needs of the community. Since there aren't enough operating theatres or medical personnel to handle the caseload, this is one of the primary drivers for the high burden of surgically preventable deaths and DALYs. An increase of just 10 surgeons, anesthesiologists, and obstetricians in a given area is correlated with a 13% decrease in maternal mortality rates, and as the density of these clinicians increases, maternal mortality continues to drop. The challenge is to bring this type of highly specialized care to regions that lack it.

Two hours to the nearest surgically equipped health facility is the standard that global health leaders are pushing to achieve for surgical access worldwide. In 2015, five billion people lived over two hours away from an operating theatre that could perform the **three bellwether procedures**, which are: C-section, laparotomy, and open fracture repair. These procedures signal that a hospital will be capable of performing the majority of procedures that the population it serves will require.

The cost of these expensive surgeries may seem like an insurmountable barrier for many people in LMICs. Without a sufficient national healthcare plan, the cost of surgery can be prohibitive for people with low incomes. Clinics that are supposed to be free often run out of supplies and drugs, and then patients must bring their own to guarantee their care. The cost of transportation to a health facility for a check-up or a referral can also limit access to care. Despite the expense of building surgical capacity, the cost of doing nothing is greater, morally and *financially.* An estimated $420 billion spent over 15 years is needed to scale up LMIC surgical programs, but the cost of surgically treatable conditions is in excess of $12.3 trillion for that same period.

There's been a significant push for surgery to be a part of the global health conversation in recent years. The 2015 Lancet Commission on Global Surgery compiled a significant body of research and demonstrated how surgery is an economical, social, and moral imperative for achieving equitable health for all people. They compiled a series of 6 key indicators that assess and define global surgical care. The World Health Organization has recognized the value of safe surgery and has implemented a safe surgery checklist. Including surgery in the health conversation, through a national surgery, anesthesia, and obstetrics plan (NSOAP), is a step towards building the necessary health systems in many LMICs. As more global health policymakers, providers, and activists include surgery in their agendas, we might see a transition in the face of global health from a focus on preventing individual diseases to capacity building for safe surgery.

Learn more about Surgery in Developing Countries from The Lancet!



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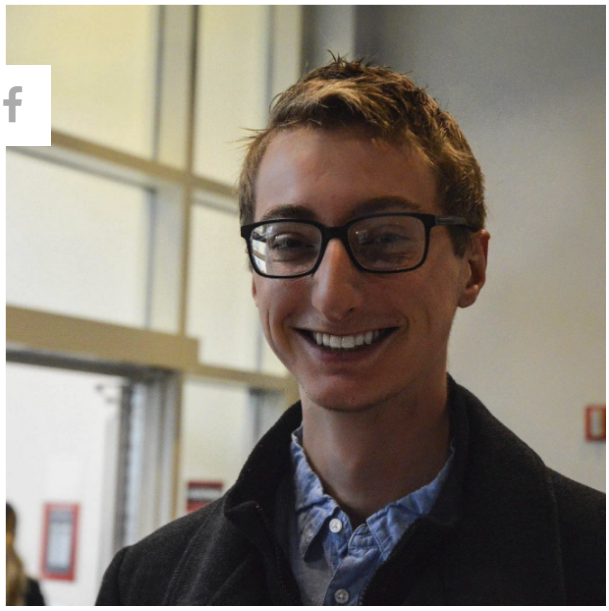

Hugh Shirley is a recent graduate from Northeastern University where he received a degree in Biochemistry with minors in Global Health and French. As a founding member of the Northeastern University Global Health Initiative, the largest undergraduate led global health conference in the country (Registration for the 2020 conference is free and open!), Hugh brought experts in global surgery to the university. It was working with these experts that Hugh learned about the burden of surgical diseases. He then spent a summer conducting research on rural global surgery, a project that culminated in a two-week trip to Baringo County to conduct interviews and gather data. In the future, Hugh will pursue a medical degree to prepare himself for a career of work at the intersection of climate change and clinical care for historically marginalized populations.

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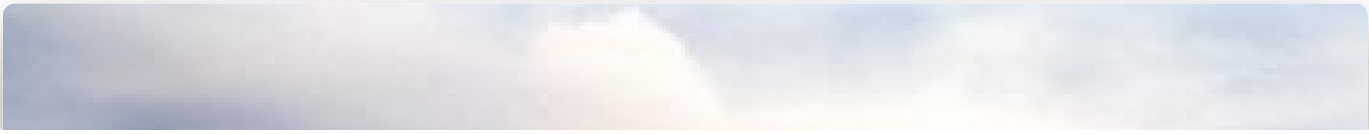

ENVIRONMENTAL HEALTH

Particulate Matters – Our Air, Our Laws, and COVID-19

A breath of fresh air might be just what we need right now. With COVID-19 lockdowns keeping us cooped up all day, a walk down the street can be a welcome change of scenery. During my walks, I've noticed the air in Boston feels cleaner, even during a time when my allergies would normally bring tears to my eyes. With the lockdown came lower levels of ambient air pollutants, which are known to exacerbate respiratory diseases such as COVID-19.

NINA MARTIN

Episode 79: Need to Know: COVID19 with Virologist Andy Pekosz

Learn about COVID19 directly from virologist Andy Pekosz. Andy is a professor in the Department of Molecular Microbiology and Immunology at Johns Hopkins School of Public Health and is the former President of the American Read more…

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