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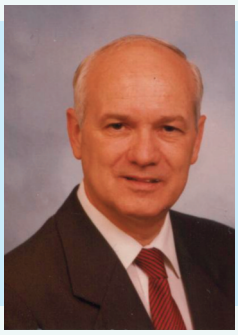
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The Importance of Surgical Care to Achieve the United Nations Sustainable Development Goal for Healthy Lives by 2030



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Abstract

This paper discusses the importance of surgical care to achieve the United Nation's Sustainable Development Goal for Healthy Lives by 2030. In this sense, trauma and stroke centers, proven to improve outcomes, can be adapted to the particular conditions of each region or country around the globe. This would result in significant progress in surgical care worldwide. Maximal efficiency with limited resources requires integrating all healthcare programs – civilian, military, NGO – in the region, plus collaboration with international organizations (UN, WHO). As both sub-acute mass casualty events (e.g., the COVID-19 pandemic) and acute mass casualty events (e.g., earthquakes, terrorist incidents) have made it clear, the healthcare infrastructure needs to be more resilient and mobile. In addition to technological advances like telemedicine and smartphones, resilient infrastructure requires equipment like mobile battery-powered computerized tomography (CT) scanners, portable operating rooms, and creative solutions to unreliable electricity and water supplies. Sharing global surgical personnel (between LMICs and HICs) is another key to innovative and collaborative solutions to barriers impeding surgical progress worldwide.

Keywords: trauma and stroke centers, resilient surgical care, telemedicine

The Lancet Commission on Global Surgery 2030 estimated that one-third of all deaths worldwide in 2010 were due to lack of surgery. It is roughly five times the number of deaths from HIV/AIDS, tuberculosis, and malaria combined.[1] In low- and middle-income countries (LMICs), 90% of the population lacks timely access to basic surgical care – 2/3 of the world's entire population – contributing to roughly 80 million disability-adjusted life years, annually.[1]

In 2015, the United Nations (UN) General Assembly adopted the 2030 Agenda for Sustainable Development. Goal 3 of the 17 Sustainable Development Goals (UN SDG 3) states: to "ensure healthy lives and promote well-being for all".[2]

In addition to the avoidable morbidity and mortality from lack of surgery, disasters – mass casualty disasters both natural (earthquakes, storms, flooding) and "un-natural" or caused by humans (infrastructure failures, terrorist events, armed conflict) – require urgent surgical care for hundreds of thousands of people, annually.[3,4]

The UN Sendai Framework for Disaster Risk Reduction[5] and the National Surgical, Obstetric, and Anesthesia Plan (NSOAP) – developed by the Harvard Program in Global Surgery and Social Change (PGSSC) and by the World Health Organization (WHO) – noted the importance of surgery for both

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mass casualty disasters and day-to-day healthcare.[6] A recent publication has reinforced this point.[3] Resource integration is essential for the resilient healthcare systems that are necessary to address global surgery needs for both surgical and disaster planning. Emergency response resources (e.g., UN, WHO, Red Cross and other NGOs) arrive too late – from days to a week or more – to attend to acute injuries that require surgical care within minutes or hours.

Trauma and stroke centers have been shown to reduce morbidity and mortality. Such centers improve outcomes for a wide range of conditions, including major trauma, cardiovascular events, complicated childbirth, and acute abdominal conditions.[4] A full-service trauma or stroke center provides community prevention programs, enhanced pre-hospital transport, immediate surgical and intensive care, rehabilitation, personnel training, and research. These are all integral parts of the established healthcare system.

Trauma accounts for nearly half of all deaths among those under the age of 50 in the US. Integration of civilian and military resources to improve trauma outcomes has, therefore, been proposed.[7] Integration of civilian and military personnel and infrastructure also impacts mass casualty events.[4] Expanding the models of trauma and stroke centers to an integrated civilian and military (or security), mass casualty system improves both day-to-day and mass casualty care.

Input from LMIC healthcare professionals is essential to identify and implement cost-effective programs – to improve global surgery and global healthcare.[8] Collaboration between LMIC and high-income country (HIC) healthcare professionals and institutions has led to long-term programs to enhance the training of surgical personnel for LMICs.[9] Twinning between Hawassa University in Ethiopia and the American College of Surgeons (through over a dozen US university medical centers) to train general surgeons in Africa is an excellent example.[9]

Technology is also key to meeting the UN SDG 3 for 2030. The accelerometer and Global Positioning System (GPS) capabilities of smartphones, which are now ubiquitous worldwide, make them uniquely suitable for the rapid localization of trauma victims. Smartphones are being used in Kenya to enhance prenatal and antenatal care, as well as expedite transfer to a hospital when a difficult childbirth is anticipated. Combined with drones, smartphones can reduce the delivery time of defibrillators to cardiac arrest victims as well as improve the response to various medical/trauma emergencies. For several years now, drones have been used in Rwanda and Ghana to deliver blood products, antibiotics/vaccines, and lab specimens to remote sites more rapidly and efficiently than ground transportation.[9]

Perhaps the greatest single technological contribution to global healthcare – highlighted by the COVID-19 pandemic – has been telemedicine. Nationwide telemedicine systems have improved triage of patients with various conditions, including neurotrauma, in Albania and Cabo Verde.[10,11] In addition to improved communication thanks to telemedicine, the savings in terms of reduced numbers of unnecessary patient transfers makes telemedicine very cost-effective.[11] Furthermore, telemedicine has been shown to be a valuable component of regional mass casualty emergency response – as evidenced by the Multinational Telemedicine System (MnTS) developed for the North Atlantic Treaty Organization (NATO).[12]

In addition to the UN SDG 3 for 2030, more specific global surgery goals for 2030 have been established by the NSOAP of the WHO and the PGSSC.[13] The goals include: (1) 80% of the population within 2 hours of a facility providing basic surgical care; (2) minimum provider density of 20 per 100,000 population; (3) annual surgical volume minimum of 5,000 per 100,000 population; (4) perioperative mortality rate documentation; (5) affordability metrics (100% of the population protected against impoverishing/catastrophic expenditure due to surgery).[13]

The question is: "how do we achieve the healthcare goals for 2030 set by the UN SDGs and the NSOAP program?" Trauma and stroke centers, proven to improve outcomes, can be adapted to the particular conditions of each region or country around the globe. This would result in significant progress in surgical care worldwide. Maximal efficiency with limited resources requires integrating all healthcare programs – civilian, military, NGO – in the region, plus collaboration with international organizations (UN, WHO). As both sub-acute mass casualty events (e.g., the COVID-19 pandemic) and acute mass casualty events (e.g., earthquakes, terrorist incidents) have made it clear, the healthcare infrastructure needs to be more resilient and mobile. In addition to technological

advances like telemedicine and smartphones, resilient infrastructure requires equipment like mobile battery-powered computerized tomography (CT) scanners, portable operating rooms, and creative solutions to unreliable electricity and water supplies.[9] Sharing global surgical personnel (between LMICs and HICs) is another key to innovative and collaborative solutions to barriers impeding surgical progress worldwide.

Two examples of early progress in improving healthcare through innovation and collaboration are to be found in Chile and Pakistan. The Chilean government has created a National Office of Emergency Response (ONEMI), enhancing collaboration among the nation's civilian and military emergency response resources.[9] In Pakistan, 20 years ago a neurosurgeon, Tariq Khan, began community education for trauma prevention, followed by a rehabilitation center focused on spinal cord injury. A general hospital was opened in 2009, followed by schools of nursing and medicine, a second hospital, and an ambulance service. In addition to improving coordination between civilian and military healthcare resources for better daily and emergency care, implementation of Pakistan's NSOAP program benefited both surgical care, in particular, and healthcare, in general.[9]

To achieve the NSOAP goals and the UN healthcare-related SDGs for 2030, a collaboration among all stakeholders (from local to international) can adapt the proven trauma and stroke center model to improve surgical care globally. Such innovative collaboration between LMICs and HICs is crucial to save the one-third of lives lost currently due to lack of surgical resources.

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