AN ESTIMATED 16.9 MILLION LIVES WERE LOST IN 2010 FROM CONDITIONS REQUIRING SURGICAL CARE

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A WORKFORCE IMBALANCE

September 2018

Dearest Readers,

Low and middle income countries, representing 48% of world population constitute just 20% of the global surgical workforce, including 19% of surgeons, 15% of anaesthesiologists, and 29% of obstetricians. This workforce is grossly inequitable, inadequate and undertrained in several regions of world, particularly in Africa and South-East Asia. Low-income countries have just 0.7 surgical care providers per 100 000 population compared to 56.9 in high-income countries.

Surgical care providers across the world face considerable geographical, financial and cultural barriers to providing care. Surgeons working in low-resources settings have to make-do with insufficient infrastructure, untrained workforce and outdated practices. Surgeons working in high-volume urban centers are overworked with minimal administrative support. Most of the national health policies continue to ignore surgical care in their budgeting and planning. In most settings, conditions are worsened by an unreliable supply chain and non-realistic government and public expectations. Inequity in training, paucity of surgeons and inability to retain skilled surgeons are the biggest challenge to adequate surgical capacity building in low and middle income countries.

Yet surgical teams across low and high resources settings equally, continue to deliver outcomes, inspire others and strive to improve the care they offer. Several programs and policies have provided alternative and innovative solutions such as task-shifting, telemedicine and hub-and-spoke service delivery models. Outreach camps, health agencies and non-governmental organizations have filled in gaps in geographically-remote, disaster-prone and war-torn areas with hugely disproportionate workforce imbalance. Organizations led by motivated and genuine surgeons have paved way for safer, affordable and timely access to surgical care.

One.Surgery aims to address these issues, share stories and offer solutions on surgical workforce imbalance. Our goal is to share the unheard voices, advocate for unheeded issues and support our heroes at the frontiers of surgical delivery.

With love always,

Ankit Raj
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A Craniotomy In Conflict

NEUROSURGERY IN A BESIEGED CITY

OMAR ABDALLAH

The on-going and devastating war in Syria has already claimed the lives of an estimated 500,000 people and left over 10 million people displaced from their homes and livelihoods. Amidst the bombs and the blasts, a handful of brave and dedicated healthcare workers continue to risk their lives to provide emergency care to the injured civilians. One.Surgery is truly humbled and honoured to have an account of the tumultuous and unimaginable surgical scenes during the conflict, written by Dr Omar Abdallah, a neurosurgical trainee and volunteer with the Syrian American Medical Society (SAMS - https://www.sams-usa.net/)
Aleppo is one of the oldest continuously inhabited cities in the world. With an official population of 4.6 million in 2010, Aleppo was the largest Syrian city before the war; however, now, it is difficult to define Aleppo at all.

In April 2016, a military campaign to control the eastern half of Aleppo city began. 200,000 people were suddenly trapped by the fighting and between us, only 12 doctors remaining within our hospital to treat the inevitable influx of casualties. The campaign started with a complete siege of the city, cutting off all supplies and blocking the roads for patients to evacuate, followed by intense airstrikes and barrel bombs being dropped by helicopters on civilians neighbourhoods.

Our hospital was a field hospital serving eastern Aleppo, supported by the Syrian American Medical Society (SAMS). We had one overground floor, containing a laboratory and x-ray room, and a basement with an emergency room, three operating rooms, four ICU beds and a dorm for hospital staff. Our electricity came from two generators in the hospital backyard.

Hundreds of civilians were injured on a daily basis (far exceeding the work capacity of all the remaining hospitals) and our hospital began receiving the largest number of injuries. Neuro-trauma (mostly penetrating brain injuries) represented about 25% of the cases. Penetrating brain injury (PBI) is a traumatic brain injury (TBI) caused by low-velocity sharp objects (e.g., a knife) or high-velocity projectiles (shell fragment or bullets).
FIELD HOSPITAL ENTRANCE. SAND-FILLED BARRELS USED AS A SHIELD AGAINST NEARBY BOMBINGS.

BOMBING OF ALEPPO – PHOTO FROM 2014
In modern and equipped hospitals, most patients with a traumatic brain injury will undergo a CT scan. Prior to CT scans, in a bygone era, neurosurgeons would need to use exploratory burr holes, making a window to the skull to evacuate bleeding and relieve cranial pressure.

However, every neurosurgeon should be familiar with the procedure, because CT scans may be unavailable in some cases (e.g., during military campaigns or disasters).

In our field hospital, no CT scanner was available, and managing the increasing numbers of patients with brain injuries became increasingly challenging. I was the only neurosurgeon in the eastern half of Aleppo city. For diagnosing patients with brain haematomas (extradural or subdural), I used the classic exploratory burr holes method.

One day in September 2016, three airstrikes hit a crowded nearby neighbourhood, creating mass casualties with severe and multiple injuries. Within minutes, our emergency room was full of patients and their desperate relatives, overwhelming the hospital staff. Our operating rooms were suddenly full and beyond capacity, patients stretchered across corridors and whatever floor space was remaining, waiting for urgent medical attention and surgery.

I remember I was in the emergency room helping with triaging patients. One of the hospital workers rushed to me and said "Dr. Omar you have to see this man, looks like he is dying!"

The patient was just outside the hospital gate and the paramedics had already intubated him in the ambulance car.
I examined the patient, a 28 year old man who had clearly sustained a blast-induced severe brain injury. His right pupil was fully dilated and non-reactive (a sign of impending brain herniation and inevitable death) so he was rapidly carried by his relatives to our ICU. However, with the shortage of ICU beds and mechanical ventilators, the patient was simply put on the floor on a stretcher with an Ambu bag for ventilation.

As the patient was already under anaesthesia, I decided to make an emergency exploratory burr hole in the temporal area, right there on the hospital floor, with the patient on a stretcher. As I entered through the skull, no blood was found extradurally so I made a small snip in the tense dura and suddenly a gush of blood came out and I felt an immediate relief. As the blood was successfully evacuated, the brain thankfully started to pulsate with every heartbeat. I put a small drain under the dura and closed the small wound over the burr hole. Within minutes the left pupil start to regain its normal size and brain herniation was no longer endangering the man's life.

Two hours later, I re-examined the patient and the right pupil had now started to re-dilate - the patient was developing severe brain oedema (swelling) and needed a formal decompressive craniectomy. The patient was now urgently transferred to the operating room (luckily a free one had become available). I removed a large flap of the patient skull to relieve the pressure on the oedematous brain and identified a small bleeding vessel which was controlled with cautery.

The cranial flap was saved in the patient's abdominal wall (subcutaneous abdominal pocket) to be replaced when the brain oedema subsided. The patient was transferred to the ICU and extubated on the fifth day. Again, no CT scanner was available to detect what was the exact damage in the patient's brain but sadly the patient was left with a hemiparesis.

Due to the limited number of hospital beds, the patient was sent home on nasogastic tube feeding and amidst this chaotic war zone, it has been difficult to determine his current outcome.

We later learnt on that fateful day of the neighbourhood airstrikes, 25 people lost their lives and 75 were seriously injured. We were just a handful of doctors and dedicated healthcare professionals, but I know until the last bomb drops, we will continue to do our best to assist those injured in this tragic conflict.

The above account relates to a case in September 2016. Dr Omar continues to work in Syria and can be contacted via Twitter: @Neurosurg_Omar.
Since the introduction of a remote consultation network based on modern technologies, surgical care in Malawi has improved markedly.

There is enough evidence of enormous benefits resulting from this simple and almost cost-free intervention, introduced in early 2018 by the SURG-Africa project.

GERALD DALITSO MWAPASA

GERALD IS THE COUNTRY COORDINATOR AND RESEARCHER FOR THE SURG AFRICA PROJECT. HE HAS 8 YEARS EXPERIENCE IN RUNNING SURGICAL CAPACITY BUILDING PROJECTS IN MALAWI AND HAS WORKED IN MEDICAL RESEARCH, COORDINATING PROJECTS AS WELL AS MONITORING CLINICAL TRIALS FOR 16 YEARS.

SURG-AFRICA IS A 4 YEAR IMPLEMENTATION RESEARCH PROJECT TO SCALE UP SAFE ACCESSIBLE SURGERY FOR DISTRICT AND RURAL POPULATIONS IN TANZANIA, MALAWI AND ZAMBIA.
In Malawi, with 80% of the population living in villages and small towns, district hospitals are the primary source of essential surgical care for rural communities. Surgical services at district level depend almost entirely on clinical officers, non-physician clinicians trained to perform basic surgical procedures along with clinical services. Until recently clinical officers practiced unsupervised and did not often have timely access to surgical specialists for consultations. This had negative effects on the functionality of the surgical system and patient outcomes. District hospital surgical teams used to refer even simple cases, such as uncomplicated hernias, when unable to seek advice. This in turn caused unnecessary congestion at central level as well as avoidable risks for patients, due to late surgical interventions. Unnecessary surgical referrals increased costs for patients, as in Malawian culture, family members and relatives follow patients to provide support during their journey through the healthcare system; and care distant from home led to increased expenses for families, impacting especially on poorer rural households.

The referral system in Malawi also had several flaws. Traditionally, patients were referred to central hospitals without prior discussion with the receiving surgical teams, carrying only a referral form that usually missed basic information about patient history, investigations performed or reasons for referral. No feedback was provided to district surgical teams after after discharge from the central hospitals, leaving them ignorant regarding future patient management, hindering optimal follow up of patients.

The Scaling up Surgery for Rural Population in Africa (SURG-Africa) project works to improve surgical care in Malawi, Tanzania and Zambia. This is done through an innovative model of district level supervision and mentoring to build capacity of district hospitals in essential and life-saving surgery. The capacity building is delivered by teams of specialists (in surgery, obstetrics, anaesthesia and nursing) from central hospitals visiting district facilities on a two-monthly basis.

To fill the gap between visits and to support them the project developed a clinical network based on WhatsApp, which is widely used in Malawi and almost free of charge. The application allows users (in this case district hospital and central hospital clinicians) to share text messages as well as photos, videos and audio clips in real time, all of which can be essential to making clinical decisions.

The network was launched in the Southern Region in March 2018 and is managed by the SURG-Africa project coordinator. District medical officers from the ten district hospitals have administrative rights and control access to the WhatsApp network. Each officer was requested to add clinicians involved in surgery. To date, members include about 100 district clinicians and 15 specialists based at Queen Elizabeth and Zomba central hospitals,
The network facilitates consultations between district clinicians and experts at central level, provides education opportunities and space to exchange the latest medical knowledge, whilst helping to streamline surgical referrals from the district hospitals to central hospitals in Blantyre and Zomba. The network is progressively being integrated into standard practice, particularly in the case of referrals as it is now compulsory for district clinicians to post details of each case in text format, supported by images where necessary, and wait for specialist advice, unless urgency dictates immediate referral, before referring a patient onwards. At the least, a specialist must provide their opinion on the clinical management of the case, but other clinicians participate as required. The consultative process continues until a decision is made on immediate, later or no referral, with clear reasons for the decision. After the case has been treated centrally, feedback is provided to district teams.

The network has so far been a big success. During the 4-months April to July 2018, a total of 95 surgical cases were consulted on. Over a third of these were managed locally following advice from the specialists, avoiding unnecessary referral. 15% of cases received recommendation for a later referral and 52% resulted in immediate referral. Response rates were excellent, with 78% of requests for advice received a response within 1 hour, and in 68% of cases agreement on clinical management and referral was reached within an hour.
Instructions on cases and managing resources in the district hospitals.
With the scarcity of surgeons and anaesthetists in districts and rural areas, the WhatsApp network has proved to be a feasible way to provide rapid and free specialist surgical opinion to rural populations, when needed. Additionally, advice on the network is usually provided by more than one expert, as soon as the message is seen, which is not common even in normal clinical settings. Another benefit is that the network allows the sharing of images and enables specialists to ask referring clinician more information about the patient, a great advantage over the traditional way of referring patient through a paper-based referral form.

The open discussion of cases on the network and sharing of feedback after treatment provide continuing professional development not only to the clinicians directly involved but to all clinicians in the forum. The advice provided on how to manage a case pre-referral helps in improving case management and also streamlines management of referrals at the central hospital as the patient does not need to wait for other tests once they arrive. As evident from the percentage of referrals avoided or delayed, only appropriate referrals now happen, with significant cost savings implications for patients, their families as well as the wider health system.

Therefore, using WhatsApp groups can improve access to safe surgery for remote population, improve patient care, reduce expenditure on surgery and is a medium to teach health personnel on appropriate management of patients.
upcoming global surgery events

OCTOBER

06  10th Annual Pediatric Global Health Conference - Philadelphia, USA
14  World Health Summit 2018 - Berlin, Germany

NOVEMBER

08  Women Leaders in Global Health Conference - London, USA
30  7th International Society of Obstetric Fistula Surgeons Conference - Karachi, Pakistan

DECEMBER

05  COSECSA Meeting - Kigali, Rwanda

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GLOBAL TRAINING IN MINIMALLY INVASIVE SURGERY

JORDAN BAECHLE

Jordan is a second-year medical student at Meharry Medical College, Nashville, TN and the founder of SurgeonBox

PHOTO BY PIRON GUILLAUME ON UNSPLASH
When I served as a hospital translator in Cusco, Peru, one of my major responsibilities was reassuring English-speaking tourists both before and after surgery. In doing so, I became well acquainted with the operating room staff and my ability to lift patients from their hospital bed to the operating table soon won me a ticket to shadow a variety of surgeries - performed by an extraordinarily versatile surgeon named Dr. Luis Montes.

Dr. Montes bounced around the entire city with his band of pupils, often performing several operations across multiple surgical specialties at different clinics in a single day. Aside from his ability to capitalize on every teaching opportunity, his drive to constantly do more was most admirable. Amongst his envious skill set, his minimally invasive laparoscopic techniques were most cherished by the clinics, residents and patients alike. His operations made for quite a sight as his maneuvers were mirrored by a room full of vicarious hands hoping to develop his smooth maneuvers reaffirming the terms “operating theatre” and “shadowing” into literal descriptions.

It wasn’t until attending medical school that I became aware of the global surgery initiatives and supportive organizations. Amidst the literature, five words that seemed to echo through the discussions were “lack of surgical training equipment”. Of course, other shortcomings and areas for improvement are also routinely mentioned, but this was one I found personally unsettling after witnessing the desire of surgeons to learn first-hand.

Laparoscopic surgery, also called minimally invasive surgery (MIS), bandaid surgery, or keyhole surgery, is a modern surgical technique in which operations are performed through small incisions elsewhere in the body.

In the United States, a vast majority of the most common operations (cholecystectomies, appendectomies, nephrectomies etc.) are performed using these relatively new methods due to their faster recovery, shorter hospitalizations, decreased wound infections and decreased use of narcotic medications. Patients in low and middle-income countries would benefit if not as much, but even possibly more so than those in high income countries. Reducing hospital stay and time away from work, as well relying less on pain medicine and prophylactic antibiotics may be critical outcome factors for patients in low resource settings.

However, the primary disadvantage of these procedures is the technical skills and surgical training, as the skills required are often non-intuitive maneuvers. Although these limitations can be overcome, they continue to inhibit the expansion of the practice within the developing world. Mastering these skills takes many years and although procedural education has become widely available through video streaming software, the accessibility of technical training equipment has yet to follow suit.

The fact is, modern surgical operations have long surpassed the “see one, do one, teach one” mantra.
This realization led to the development of SurgeonBox, an organization dedicated to furthering the advancement of laparoscopic fundamental training both domestically in the United States and abroad in developing nations. Through the collaboration with global surgery initiative programs, SurgeonBox aims to establish universal and low-budget laparoscopy education curriculums around the world, especially in areas in dire need of trained surgeons.

In order to establish this curriculum and grading protocol, SurgeonBox is currently pooling serial data between simulation labs and personal users to maximize the efficacy of these coordination exercises and the precision of scoring protocols. Using this online network, trainees will find these training protocols and communicate via open forums to allow further collaboration in relation to laparoscopic training. As the organization and online community grow, SurgeonBox hopes to transition the forum into a more structured and robust tele-tutoring platform through video streaming.

This would enable surgeons and trainees everywhere to not only improve themselves but foster the development of these unique skill thousands of miles away.

Laparoscopic training programs have now been implemented in Mongolia and Ethiopia and proved not only successful but sustainable. However insufficient training supplies and personnel continue to limit the expansion of minimally invasive surgical techniques in the developing world. Without access to adequate procedural and technical training, disparities in access to surgery and surgical outcomes will persist, if not widen. By providing low-budget laparoscopic training equipment and an online network for collaboration, we hope to do our part in bridging the intolerable gap in access to safe surgery and help eliminate the “lack of surgical training equipment”.

Further information can be found at https://www.surgeonbox.com/ Any organisations or surgeons wishing to connect with SurgeonBox, please contact SurgeonBox at info@surgeonbox.com
FINDING AN ORGAN

TRANSPLANTATION IN GLOBAL SURGERY

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For patients with fatal organ failure, organ transplantation can be a lifesaving solution. However, access to this treatment is unavailable or unaffordable to many patients across the globe. In 2011, 62% of the solid organ transplants were performed in high-income countries, while only 28%, 9% and less than 1% were performed in upper-middle-, lower-middle- and low-income nations respectively (1).

Organ transplantation in lower and middle income countries has many challenges, including lack of equipment and trained physicians, treatment cost, postoperative immunosuppressive therapy and a disordered political or legislative situation. Furthermore, within lower income countries, there is a wide variability in religious and cultural beliefs towards death, ethical standards or the tradition of the local population, resulting in a deficiency in both live and deceased donors.

The lack of available treatment and donor availability in low and middle income countries can often result in patients travelling to surgical centres abroad in search of a transplant.

BOSNIA AND HERZEGOVINA AS AN EXAMPLE OF A MIDDLE-INCOME COUNTRY

In Bosnia and Herzegovina, there are two working transplant centres, one in Sarajevo and one in Tuzla - both university clinical centres. In 2016, 18 kidney transplants and 3 liver transplants were performed, with more than 220 patients still remaining on the waiting list at the same time. In comparison, 353 organ transplantation were performed in 2016 in nearby Croatia (5).

As an illustration of the difficulties in obtaining an organ transplant, we present a case of a patient who needed a liver transplantation in Bosnia and Herzegovina. At the age of 40, a male patient underwent emergency surgery for peritonitis secondary to a bile duct rupture. After his gallbladder and part of his liver removed, the patient developed progressive liver cirrhosis, eventually leading to liver failure at the age of 57. His only chance of longer term survival was to undergo a liver transplant. Unfortunately, he had no opportunity for this to be done in Bosnia and Herzegovina. He was advised to either travel to Zagreb in Croatia or Istanbul in Turkey, to have any chance of a liver transplant.

Since Zagreb is a regional centre, he first visited there but was unable to stay at the top of the donor list long enough to obtain a liver from a cadaveric donor.

His condition began to deteriorate, and was now considered as a high-risk surgical patient. It became increasingly difficult to find a surgeon willing to perform the surgery in Croatia.
He subsequently went to Istanbul and after multiple examinations and tests, it was determined the patient could actually receive a liver from a living donor - his 27-years old son. The legislative requirements to undergo the procedure were complex and arduous, the patient requiring assistance from friends to navigate the language barriers and multiple administrative hurdles. After successfully completing the mandatory pre-surgery requirements, one year later, the patient received a transplanted part of his son's liver. He is now 18 months post surgery, currently receiving the necessary immunosuppressive therapy and doing well.

The case highlights the desperate struggles in obtaining an organ transplant for many patients within many parts of the world. It was only the ability to travel, having the appropriate amount of funds and the dedicated assistance of many friends and healthcare staff that a successful transplant possible. Although transplants are technically possible within Bosnia and Herzegovina, structural reorganisation and resources are needed to improve public access to the service.

**INTERNATIONAL COOPERATION**

Recent international projects have demonstrated successful co-operation in transplant surgery, expanding the patient and donor databases, decreasing waiting times for surgery and reducing illegal organ trafficking.

**Eurotransplant** is an organization which includes 8 central European countries. Its aim is to optimise use of available donor organs, with the assignment of organs based on medical and ethical principles. Three principles are relevant for allocation: first, maximising the expected results after the transplantation, secondly, the emergency level detailed by both experts and patient waiting time and finally, nationality balanced distribution of organs.

**Scandiatransplant** is a similar project, covering the population of 28.2 million inhabitants living in Nordic countries and Estonia. Founded in 1969, this multipurpose organization contains one common list of patients suited for a transplant operation within the region. Its Council of Representatives ensures that all necessary data is collected in order to provide effective transplant services.

These examples have highlighted how international collaboration and communication can work effectively to improve outcomes of transplant surgery, and a possible template for improving access to similar services in low and middle income countries throughout the world. Inclusion in these supranational organisations would require establishment of local laws that will ensure transparency and equity in organ distribution as well as investment in education, infrastructure and effective organ donating campaigns. It’s a long way to go but it could be a good model for the future of global transplant surgery.

**REFERENCES**

GLOBAL SURGERY
LATEST PUBLICATIONS


3. The Cape Town Declaration on access to cardiac surgery in the developing world.

The International Student Surgical Network (InciSioN), which advocates for meaningful youth participation in Global Surgery, affirmed its commitment by releasing a policy statement on “Youth Participation in Global Surgery”. http://incisionetwork.org/YouthGlobalSurgery.pdf
GLOBAL SURGERY LATEST OPPORTUNITIES

1. Global PaedSurg Research Collaboration:

Management and Outcomes of Congenital Anomalies in Low-, Middle-, and High-Income Countries: a Multi-Centre, International, Prospective Cohort Study. Collaborators involved in the care of infants presenting primarily with congenital anomalies are invited to participate in the study. If you are interested in participating, visit: http://globalpaedsurg.com/

2. Paul Farmer Global Surgery Fellowship:

Accepting Applications for Research Fellow (Deadline: September 23, 2018) and Research Associate (Deadline: October 7, 2018). For more information, visit: https://www.pgssc.org/paul-farmer-global-surgery-fellowship

3. Fellowship of the International Society of Surgery (FISS)

The International Society of Surgery invites applications from surgeons and anaesthetists for its prestigious fellowship. Application is evaluated on the basis of the applicant's clinical judgment and experience, professional competence, ethical conduct, and professional standing in the local community. For more details, visit: http://iss-sic.com/membership/fellowship.html
GLOBAL SURGERY LATEST INNOVATIONS

1. WHO- Global Burn Registry


2. InterSurgeon- Partnership in Pediatric Neurosurgery

InterSurgeon is an interactive website, designed to act as a platform to collaborate in terms of clinical treatment, education, training, exchange of personnel and donation of equipment. Currently in its pilot stage in Paediatric Neurosurgery, it plans to soon expand to other surgical specialties. https://intersurgeon.org/

3. WEO Clinical Endoscopy Atlas

Launched by World Endoscopy Organization, WEO Clinical Endoscopy Atlas is a database of endoscopic and radiological images for educational, scientific and consultation purposes. Compiled by personal contribution from surgeons across the world, it is especially useful for educational and reference purposes for surgeons working in lower and middle income countries. http://www.endoatlas.org/index.php?page=home

4. WHO- Surgical site infections tools and resources

CONNECTING THE GLOBAL PLASTIC SURGERY WORKFORCE

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Similar to many other surgical specialties, plastic surgery is currently facing an important workforce shortage and inequitable distribution of present workforce around the world. For example, in India, there are 1400 plastic surgeons serving a population of 1.25 billion people, much lower than the suggested ratio of 1 plastic surgeon for every 100,000 people (1). While this ratio is attained in the United States, the uneven distribution of the plastic surgery workforce across the country has left more than 25 million Americans without access to a plastic surgeon (2).

Although intuitively plastic surgery may not always be considered as emergency and essential surgical care, the World Bank’s Disease Control Priorities have identified 44 essential surgeries, which include several surgical procedures that plastic surgeons have the expertise to perform, such as skin grafting, cleft lip and palate repair, escharotomy, and fasciotomy (3).

"A LACK OF ACCESS TO PLASTIC SURGERY IN BOTH LOW- AND MIDDLE INCOME COUNTRIES AND HIGH INCOME COUNTRIES REPRESENTS A SIGNIFICANT PROBLEM FOR THE HEALTH OF OUR POPULATIONS TODAY AND TOMORROW."

Telemedicine, or the use of electronic communication in providing medical care, has been an increasingly interesting option to resolve limitations of geographically-remote communities.

Telemedicine can be exploited in various forms, whether for direct patient care, for teaching at all levels, or for consultations between health care workers. Examples of services that can be provided include direct consultations with patients through telecommunication or remote monitoring of patients’ vital signs, medications, and evolution. According to the American Telemedicine Association, telemedicine is employed in more than 50% of US hospitals, which translates to 3500 services sites provided by over 200 networks (4).

Besides the possibility of providing tertiary level care and continuing medical education in remote regions, telemedicine has several other benefits. The use of telecommunication reduces the need to be physically present at the health care centre, which can significantly diminish problems created by overcrowding and the consequent costs (5). Similarly, it minimizes the need to displace patients who have mobility issues, and allows those who feel uncomfortable in a hospital setting to receive high quality care without the stress of being in an anxiogenic environment. Health care professionals may also increase their work efficiency by handling multiple cases simultaneously or collaborating with multiple other professionals at the same time.

Telemedicine is also interesting as the lack of physical contact eliminates the possibility of iatrogenic infectious transmission caused by the hospital environment.
The use of telemedicine in plastic surgery is gradually becoming emergent. 23 independent studies have predicted or validated the usefulness of telemedicine for various plastic surgery procedures, including burn care management, trauma, free flap care, and cleft repair (6).

Telemedicine allowed for better monitoring of post-operative patients, improved wound care management, increased collaboration between health care professionals, and more accurate and timely care provided (6). As an example, the Touch Surgery platform, a free app-based surgical simulator, is an innovative example of how the use of mobile devices can provide quality educational tools for students and plastic surgeons alike to perfect their skills. Touch Surgery has been validated to be a reliable tool to practice step-by-step surgery for both novices and experts (7).

Other telemedicine initiatives in plastic surgery relate to the use of visual support to diagnose or monitor patients’ conditions. For instance, plastic surgeons have explored the use of smartphones images to distinguish remotely between minor burn patients who actually required plastic surgery services from those who may be treated more conservatively. 94.4% of the time, these images allowed plastic surgeons to correctly evaluate the need for surgery in these patients (8).

Another example would be the use of Google Glass to livestream surgeries performed for educational purposes. The majority of the surgeons who participated in the pilot viewing agreed that this method was beneficial to their education and would actively seek similar opportunities in the future (9).
Telemedicine has its limitations. First, its use requires the availability of a quality electronic communication system which can be reliable at all times, along with the technical support that will be needed should the established system fail. In other words, if we want telemedicine to provide the same quality care as a physical encounter, it needs to be able to successfully transfer messages, images and videos in a timely manner. This can become a challenge to regions where such technology is yet widely available at a reasonable cost. Fortunately, the increasingly widespread use of cellphones, even in many resource-limited locations in LMICs, is gradually making this challenge less of an issue. Second, the use of virtual platforms to examine and communicate takes away an important human aspect of physician-patient care, especially when it comes using touch to better assess health and disease. For example, the use of our hands to palpate a mass, to feel the texture of a lesion or simply to reassure a distressed patient all represent crucial elements of a clinician’s work.

Third, the exchange of confidential patient information over a virtual network can also raise significant questions on the laws and ethics of these practices.

In conclusion, while the global surgical workforce shortage is and will unfortunately remain a challenge for the years to come, the exciting and rapidly progressive developments in telemedicine show promise in bringing expertise and care those who need it the most.

"In plastic surgery, while improvements are still to be made, telemedicine has already proven to be of utmost importance in ensuring better care and monitoring of patients in remote areas."

REFERENCES
In a world of increasing globalization and disparities, equality seems to become more of an idealistic dream, rather than an achievable feat. And yet, in the realms of global surgery, hope sparkles, with future generations of doctors not taking anything else but equality for an answer.
InciSioN (International Student Surgical Network) is an organisation founded in 2016, built by a group of passionate students from different corners of the world, being formally established as a registered international non-profit organization in 2017. In a matter of little over 2 years, the group has expanded quickly to almost 3,000 members in over 70 countries, as well as 26 fully established National Working Groups across all world regions. InciSioN’s main work is driven by an international team consisting of 42 people (24 female, 18 male) from 30 different countries, speaking a total of 28 different languages, showing the importance and strength of diversity and equity.

Accordingly, InciSioN has made its name as the world’s leading organization for students, residents, and young doctors in global surgery, providing a platform to contribute to the development of future generations of global surgeons, anaesthesiologists, and obstetricians around the world. InciSioN’s work is divided into three pillars, being advocacy, education, and research.

**ADVOCACY**

On May, 25th 2015, with the passing of the resolution, “Strengthening emergency and essential surgical care and anaesthesia as a component of universal health coverage” by the WHO and its member states, Global Surgery Day was enacted by InciSioN to fill up the lack of an awareness day for surgery. Uniting the voices and leaders of and in global surgery, Global Surgery Day tries to increase awareness regarding the global situation.

This year, Global Surgery Day was themed around “Equity in Surgery”, advocating for equity across all levels of surgical care, ranging from accessing care to training and delivery of care. Through social media messages in 8 different languages, an interactive #EquityInSurgery Twitter Chat, the release of our first policy document on “The Role of Surgery in Beating NCDs”, and videos by global surgery leaders, #GlobalSurgeryDay roared online. With the establishment of 4 additional National Working Groups (in Canada, Australia, Somaliland, and Greece) and in-person events in Rwanda, Haiti, Bosnia & Herzegovina, Australia, Norway, Canada, and the United Kingdom, the words made its way in person all over the world.
Looking beyond May 25th, InciSioN annually supports International Women’s Day (March, 8th – women in surgery accelerate and improve access to and quality of surgical care), International Day to End Obstetric Fistula (May, 23rd), World Anaesthesia Day (October, 16th – there is no surgery without anaesthesia), and Universal Health Coverage Day (December, 12th - without surgery, “Health For All” will only ever be partial health for some). Accordingly, together with the wider global surgery community, we aim to raise our voices in unison for maximal impact, because alone we can’t do much, but together we can change the world.

RESEARCH

Although you cannot manage what you do not measure, starting or engaging with research is often daunting for students at first – if available at all. Lack of mentorship or a pre-defined framework in which individuals can learn and thrive are barriers holding off students from building up their own portfolio. Through so-called virtual internships, InciSioN members have the opportunity to contribute to international research projects and gain experience, whilst learning from, being trained by, and interact with experienced researchers and health professionals from a distance.

From the summer of 2016 to early 2017, InciSioN performed the second (2016) surgical data collection for the World Development Indicators for the World Bank database, following on the initial (2015) data collection by the Harvard Program in Global Surgery and Social Change. During the span of 4 months, 10 selected students from InciSioN -2 per world region- contacted all Ministries of Health to gather the WDI surgical indicators, after an 8-week virtual training period by researchers at King’s College London and Stanford University.

After the data collection and analysis, and finalizing data proxies provided by Stanford University, the surgical data were updated in the World Bank WDI database on July, 1st 2017.

Currently, InciSioN is embarking on several research projects in collaboration with partners and academic institution, but has also initiated its independent research collaborative to allow for increased individual and group ownership, respecting local ownership, and decreasing barriers for students and residents to engage in impactful global surgery research projects.
EDUCATION

Through workshops and symposia, on a national level or as visiting organization/guest speakers at other conferences, InciSioN aims to educate others – trainees and specialists – about global surgery and participants’ individual and joint impact on advancing surgical care for all. From Japan to Singapore, from Rwanda to Tanzania, from Romania to Belgium, from the UK to the USA, and from Mexico to Grenada, InciSioN has trained budding global surgery advocates to spread the word and develop their skills to become better advocates and future policymakers.

This year, InciSioN took its next big step by founding its own independent annual conference, the InciSioN Global Surgery Symposium (IGSS), providing an opportunity for students and residents to gather from all over the world and learn from leaders in the field in person. The first edition, IGSS2018, took place in Leuven, Belgium and attracted a total of 228 participants from no less than 50 different countries from Colombia, Nicaragua, and Haiti to Rwanda, Zimbabwe, and Ethiopia, to Palestine, Nepal, and Pakistan, including 12 fully funded travel scholars from 12 different low- and middle-income countries.

Next year, IGSS moves to Kigali, Rwanda, moving away from trends of high-income country based conferences to LMICs, truly aiming to centralise equity in surgery.

EQUALITY AND INCISION

As we move away from conservative ad hoc surgical missions to horizontal and sustainable surgical systems strengthening, equal inclusion of the future workforce gains importance. InciSioN aims to do just that. As newest member of and single student organization within the G4 Alliance (Alliance for Surgical, Obstetric, Trauma, and Anaesthesia care), InciSioN bridges the gap between leaders in the field and future leaders in the field, creating a continuum of leadership as generations move along. 2030 is just around the corner, but we – the future of the OR - are hungry and ready to take on the challenge of making surgical care accessible for everyone, to every last mile.

Dominique Vervoort is a founding member and co-Chair of InciSioN – International Student Surgical Network,