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Entrepreneurial Surgical Programs to Achieve the UN Healthcare Sustainable Development Goals for 2030

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Introduction

The 2015 Lancet Commission on Global Surgery documented that one-third of all deaths worldwide are due to conditions amenable to surgery.^{1,2} This is nearly five times the number of deaths due to HIV/AIDS, tuberculosis, and malaria combined.¹ The number of deaths each year globally is estimated to be 69 million.³ Thus the number of deaths due to lack of surgery may approach 23 million – greater than the population of megacities such as Beijing, Mexico City, and Mumbai (all 21 to 22 million), and exceeded only by Tokyo, Delhi, and Shanghai.⁴ Or to put 23 million in a European context – that is greater than the populations of Norway, Sweden, and Finland combined (less than 22 million).

More specifically for surgery, a nationwide study in India of deaths due to acute abdominal conditions determined that 50,000 deaths each year in India could be avoided if everyone lived within 50 km of a facility with surgical resources.⁵ The annual number of deaths globally due to trauma is estimated to be 4.4 million; for stroke the number is 5.5 million; for heart disease the number is 18.6 million.⁶⁻⁸ For all of these conditions, the risk of mortality and morbidity is markedly increased where there is more limited access to surgery.

In 2015 the United Nations General Assembly adopted 17 Sustainable Development Goals (SDGs) for 2030 (Figure 1).⁹ SDG #3 (Good Health and Well-Be-



Source: UN in collaboration with Project Everyone

Figure 1: United Nations 17 Sustainable Development Goals for 2030. (ref #9 open access)

ing) is intimately connected with many other SDGs, e.g. SDG #1 (No Poverty), SDG #4 (Quality Education), SDG #6 (Clean Water and Sanitation), etc. Recent events – notably COVID-19 and the invasion of Ukraine by Russia – have stalled if not reversed progress toward the 2030 SDGs.¹⁰

Again more specifically for surgery, the World Health Organization (WHO) has developed the National Surgical, Obstetric, and Anaesthesia Plan (NSOAP) as a set of six goals for a country to achieve by 2030 (Figure 2).¹¹

The goals address not only surgical resources in terms of time to surgical care (2 hours), ratio of surgical personnel per 1000 population, and ratio of surgical procedures per 1000 population – but also quality and economic issues such as surgical mortality tracking and affordability of surgical care.

For those who are not persuaded by healthcare arguments for improving global surgery, it is estimated that the global Gross Domestic Product (GDP) loss due to lack of surgery is already greater than US\$600 billion annually and will exceed twice that amount – US\$1.2 trillion – by the year 2030 unless progress

is made. The former WHO Lead for Emergency and Essential and Essential Surgical Care, Walter Johnson, noted that if investment in global surgical care is not undertaken – the cost later on in terms of disability and lost productivity will be more than 20 times as great. In his words:

“We need to see surgery as an investment, not a cost. It is an important distinction.”

The need to expand surgical care worldwide has been well-documented. The need now is for programs and technologies to augment surgical care in the few years that remain before 2030.

Methods

We will consider two quite different but equally effective programs to expand surgical care in low- and middle-income countries (LMICs) – one in Pakistan, the other in Indonesia. Both are the result of sustained entrepreneurial efforts spearheaded by a single individual: Tariq Khan in Pakistan, Eka Wahjoepramono in Indonesia.

| Category | Indicator | Definition (WHO/LCoGS/World Bank) | Target by 2030 |
|---------------|--|---|---|
| Timeliness | 2-hour access | Percentage of population that can access a surgical facility capable of performing the Bellwether procedures within two hours | Minimum 80% coverage |
| Capacity | Surgical, anaesthetic and obstetric (SAO) provider density | WHO: Number of licensed SAO providers per 1000 population | WHO: 0.2 per 1000 population |
| | | LCoGS/World Bank: Number of licensed SAO providers per 100 000 population | LCoGS/World Bank: 20 per 100 000 population |
| Capacity | Surgical volume | WHO: Number of procedures done in an operating theatre per 1000 population | WHO: 50 per 1000 population |
| | | LCoGS/World Bank: Number of procedures done in an operating theatre per 100 000 population | LCoGS/World Bank: 5000 per 100 000 population |
| Quality | Perioperative mortality rate (POMR) | Rate of death prior to discharge after undergoing surgical care | 100% tracking POMR |
| Affordability | Protection against impoverishing expenditure | Percentage of population protected from impoverishing expenditure from accessing surgical services | 100% protection from out-of-pocket payments |
| Affordability | Protection against catastrophic expenditure | Percentage of population protected from catastrophic expenditure from accessing surgical services | 100% protection from out-of-pocket payments |

Figure 2: World Health Organization National Surgical, Obstetric and Anaesthesia Plan. (ref #11 open access)

Common Themes

Two themes are common to the programs in both Pakistan and Indonesia:

1. The population was educated – through various media channels and community outreach programs – of the need for, and benefits from, augmenting surgical care. This aspect occurred before the program itself was initiated so the community as a whole supported the program to expand surgical care.
2. The various healthcare stakeholders – from hospital and public health administrators to investors supporting healthcare – were persuaded (through diplomatic but persistent logic) to support the expansion of surgery.

Building Healthcare Infrastructure in Pakistan

Tariq Khan returned to his hometown of Peshawar, Pakistan, in 1990 following his neurosurgery training in Ireland. At that time, he was only the second neurosurgeon in a city of about 750,000 population.¹² In 1997 he began public awareness events for trauma prevention, including programs to educate school children. During the 1990s, the International Committee of the Red Cross also established a spinal cord injury rehabilitation

facility that was later turned over to the provincial government.

In the early 2000s it became clear to Tariq Khan and others that full-service healthcare would not be established by the provincial government alone. He persuaded fellow doctors to pool resources and form a company (Alliance Health Care); they finally convinced a bank to loan them the equivalent of US\$6 million for construction of a full-service general hospital. Northwest General Hospital began providing care in all specialties for residents of both Peshawar and other regions of the province – now known as Khyber Pakhtunkhwa (KP), population 40 million – in 2008. The hospital was quickly expanded from 130 to 300 beds. In 2016 a second hospital with an additional 300 beds was opened. These beds were not-for-profit and supported by an endowment fund to which the company and the shareholders contribute regularly.

In 2015 a School of Nursing and Allied Health Professions (Anesthesia, Radiology, Laboratory technology, Physical Therapy) was established. The College of Physicians and Surgeons of Pakistan approved a School of Medicine, initially graduating 100 doctors per year – and in 2021 increased by an additional 50 doctors per year.

Given the need for prompt and effective pre-hospital care, an ambulance service with trained paramedics and transport ventilators was established in 2017. In the same year Tariq Khan was selected to be Chair of the World Federation of Neurosurgical Societies (WFNS) Neurotrauma Committee. The following year a conference on Pakistan’s “National Vision for Surgical Care in Pakistan” paralleled Pakistan’s adoption of the NSOAP goals for 2030. In 2019 Peshawar hosted the WFNS Neurotrauma Conference as well as the Peshawar chapter of ThinkFirst (injury prevention education organization) receiving the International Chapter of the Year Award. In March 2023 Peshawar will be the site of the first WFNS Global Neurosurgery Symposium.

To quote Tariq Khan:

“For over 25 years now, I have dedicated myself to improving both neurosurgical care and general health care for the people of Peshawar and the KP province. Thanks to the many others who have shared this vision, we have made significant progress.”¹²

Establishing Neurosurgical Care Across Indonesia

The challenge of establishing neurosurgical care (or basic surgical care) across Indonesia – a nation of nearly

300 million population spread across an archipelago of 17,000 islands stretching over 5,200 km from east to west – should not be underestimated.¹³ Unlike some countries where the vast majority of the population lives within a short distance of the major population center, Indonesia is confronted with a population in many cases hours if not days from a major healthcare facility; highly trained surgeons often prefer to remain in the major cities where they have undergone training rather than return to a smaller hospital in their home region.

Eka Wahjoepramono began, with only one other neurosurgeon, at the flagship Siloam Hospital in Jakarta in the late 1990s. Like Tariq Khan, he quickly realized that community support would be essential in building neurosurgical care beyond Jakarta (population over 8 million then, population 11 million now). They used the media to raise public awareness of neurosurgery and invited experts from outside Indonesia to assist with neurosurgical procedures in order to obtain excellent results – further building confidence in neurosurgery in Indonesia. One aspect was expanding the neurosurgical service so that individual neurosurgeons could subspecialize, enhancing the range of neurosurgical conditions that could be treated in Jakarta with “world class” outcomes. In 2001, he created the Indonesia Brain Foun-



Figure 3: Siloam Hospitals in Indonesia with Neurosurgery – 2021. (ref #13 open access)

dation, a charity to fund neurosurgical cases for patients with insufficient means – with neurosurgeons waiving their fees. All these actions increased the confidence of both the public and healthcare stakeholders in neurosurgery.

In 2006 the Siloam Hospitals began expansion across Indonesia – eventually to 40 hospitals in 2021. Nearly 30 of these hospitals now have neurosurgical capabilities (Figure 3). Eka Wahjoepramono again has been instrumental in building neurosurgical personnel across the nation. Neurosurgeons-in-training have been recruited from regions where the far-flung Siloam Hospitals are located. Following training, doctors from these regions are more likely to practice to their home regions than neurosurgeons who come from Jakarta. Furthermore, the tradition was established that a senior neurosurgeon would travel to the regional hospital – with specialized equipment if necessary – to assist their junior colleague with a difficult case. This support has not only built confidence in neurosurgeons-in-training to join the Siloam hospital team but has also built public confidence in neurosurgery throughout Indonesia thanks to consistently excellent outcomes.

To quote Eka Wahjoepramono:¹³

“In developing countries, we must look for opportunities to grow, take calculated risks, and help each other so we can move forward. We need to have good communication with hospital stakeholders. Having a solid team helps to increase subspecialty skills and increase our bargaining power. I believe this is a good way to develop global neurosurgery, so we can serve more patients.”

Conclusion

What works for surgery in Pakistan and Indonesia can work for surgery in many other locations worldwide. It only requires entrepreneurial foresight, savvy interpersonal skills, and unflagging persistence to expand global surgery.

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