

# The Neglected Component of Cardiovascular Care

## Dispelling the Myths

Dominique Vervoort  
Boston, MA, USA



We live in a world subject to rapid globalization, dramatically affecting low- and middle-income countries' (LMICs) development. Amid the epidemiological transition occurring, by which infectious diseases gradually decline, but noncommunicable disease rapidly increase, LMICs are faced with a double burden of cardiovascular disease (CVD). Today, in 2019, LMICs are not capable of handling an isolated CVD burden; a double one is a fatal hit.

Nearly 18 million people die every year as a result of CVD, of which the far majority—4 in 5—takes place in LMICs [1]. Prevention is ever so important: rheumatic heart disease is a disease of poverty due to a lack of timely detection of or treatment for rheumatic fever, and ischemic, hypertensive, and other types of heart disease are closely tied with a sedentary and unhealthy lifestyle. However, amid that “straightforward” change, we, the cardiovascular community, quickly dare to forget that it is only a means to an end.

Many cardiovascular conditions are not preventable or will occur regardless at a later stage or age. Congenital heart defects will continue to occur in 1 in every 100 live births [2]. A significant proportion of ischemic heart disease will affect people with healthy lifestyles. Several conditions have an ethnogenetic component influencing disease incidence and history. Even in a utopian world in which poverty is eradicated and people exercise, eat healthily, do not smoke or drink, and keep stress at bay, CVD will occur to some extent. And yet, we seem to forget—or at least seem to not be willing to talk about it. The aversion to inclusion of surgical care in the global health discourse has led to an analytic vacuum. One with severe adverse consequences becoming increasingly visible in the modern day and age.

A total of 93% of the population in LMICs does not have access to cardiac surgical or interventional care when needed [3]. At today's population, this equals 6 billion people living without. Their access is impeded due to barriers roughly falling under the following 4 categories:

- Geographical barriers: lack of pre-hospital services (e.g., ambulances and referral systems), large distances, poor road infrastructure, mountainous areas, and island communities
- Infrastructural limitations: limited or absent cardiac facilities, operating theaters, or blood banks; no or dysfunctional equipment; lack of disposables and medicines; low numbers of specialists and ancillary health workforce

- Low-quality care: lack or limited use of surgical safety checklist, sterility issues, informal task shifting, potential inadequate training of specialist or ancillary health workforce
- Financial barriers: no insurance schemes, high out-of-pocket payments for surgical care, opportunity costs due to not being able to work, high nonmedical costs (e.g., transportation, food, lodging)

Where other surgical specialties, including complex subspecialties as pediatric surgery and neurosurgery, make steady progress, the cardiac community has remained stagnant [4]. Surgery is no longer the neglected stepchild of global health, yet cardiac surgery still is the invisible child [5,6]. The lack of a societal umbrella organization, unlike that which exists, for example, for neurosurgery, pediatric surgery, obstetrics, and anesthesia, minimizes intersocietal collaboration and comprehensive global baselining and needs assessments. Moreover, few dedicated academic global surgery centers and departments exist; those that do lack a cardiac surgeon or cardiac anesthesiologist bringing this issue to the table. With the lack of attention on the academic, public, and policy levels, myths surrounding cardiac surgery in LMICs persist; in reality, however, they do not hold true (Table 1) [7].

Today, the majority of cardiac surgical care provided to LMIC patients is through either fly-in, fly-out mission trips or sending patients abroad to high-income countries for treatment. A total of 80 nongovernmental organizations (NGOs) provide cardiac surgical care around the world [8]. Even with the best intent and an optimistic average of 100 cardiac surgeries per NGO, the global coverage is limited. Additionally, although important for capacity building and bidirectional partnerships, due to the short nature of visiting trips by academic institutions, their impact on total (needed) cardiac surgical volume is limited. In contrast, the burden is high and growing.

Every year, 1 million babies are born with congenital heart defects in LMICs, of which 70% will require medical or surgical care within a year [2]. A significant proportion will require surgery at least once in their lifetime; without, they are left disabled or gradually die. Rheumatic heart disease affects 33.4 million people worldwide and gradually progresses to a degenerated heart valve and consequent complications, including fatal heart failure [9]. The burden of ischemic heart disease is rapidly growing with

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From the Program in Global Surgery and Social Change, Department of Global Health and Social Medicine, Harvard Medical School, Boston, MA, USA. Correspondence: D. Vervoort (vervoortdominique@hotmail.com).

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**TABLE 1.** Myths and realities underlying global cardiac surgery.

Myth	Reality
There is no role for cardiac surgery or interventional cardiology in global health	Cardiovascular diseases are the leading cause of mortality, extensively treatable with surgical or interventional care.
Cardiac surgical or interventional services cannot be scaled	Existing high-volume centers in LMICs are able to provide cardiac surgery at much lower costs than and with similar quality as high-income countries. Example: Narayana Health in Bangalore, India
Cardiac surgery or interventional cardiology is only a luxury	Surgical care is widely observed as a cost-effective intervention, with cardiac surgery analyses showing cost effectiveness higher than common public health interventions [12].
Cardiac surgery or interventional cardiology is not feasible in settings of poverty	Several centers in low-income countries have been successful in providing low-cost or free cardiac surgeries. Example: Salaam Center in Khartoum, Sudan
Cardiac surgery is too isolated and specialized of an intervention	Establishing cardiac surgical services has an impact on the entire health system, requiring imaging, laboratory services, intensive care, dialysis, anticoagulation and medicines, and proper pre- and postoperative care pathways [7].

LMIC = low- and middle-income country.

globalization, yet also affects patients at younger ages than in high-income countries. Road traffic incidents and injuries are among the leading causes of morbidity and mortality in LMICs and encompass aortic dissections and vascular injury, cardiac tamponade, and blunt and penetrating cardiac injury. And all of these do not yet include the unique unmet burden of endomyocardial fibrosis, cardiomyopathies, arrhythmias, and more.

What is the way forward, one may ask? The field of global cardiac surgery—systematically studying and addressing the global state of access to cardiac surgical and interventional care through research, policy work, and advocacy—has only just been born [7]. The needs are manifold, but a comprehensive baseline knowledge of the availability—and gaps—of cardiac surgical and interventional services around the world is paramount.

1. Data collection: we cannot manage what we don't measure

Health information management systems and cardiac surgery specific data collection platforms are limited in LMICs, impeding efforts to correctly estimate the current met and unmet burden of cardiovascular disease, workforce availability, infrastructural capacity, and granular patient outcomes. To address this, standardized surveys (e.g., Demographic Health Survey or nationally implemented surveys) and efficient reporting mechanisms linked with comprehensive data registries will take an important role.

2. Infrastructural development: setting the stage

Where North America and Europe possess 1 cardiac center per 120,000 population, sub-Saharan Africa

(1 per 38 million) and Southeast Asia (1 per 25 million) trail far behind [10,11]. Many LMICs, even larger ones, lack cardiac centers and surgeons, completely impeding any efforts to provide cardiac surgical care. Centers that do exist are subject to dysfunctional equipment or lack of disposables. Without, surgery cannot take place, calling for effective supply chains to cover this rate-limiting factor. Notably, countries should avoid building multiple smaller, low-volume centers, which require a distribution of the already limited amount of resources; in contrast, high-volume centers can centralize care, improve quality through a learning process, reduce costs through economies of scale, and grow to become centers of excellence and teaching hubs for a country or region. However, it is important to note that centers and supporting pharmacies ought to have disposables and medicines (e.g., anticoagulation) well in stock to prevent postoperative or long-term complications.

3. Capacity building: gathering the players

Perhaps the largest barrier, at least in terms of timeline, will be the issue of adequate numbers of fully qualified cardiac surgeons, interventional cardiologists, cardiologists, (cardiac) anesthesiologists, nurses, technicians, and perfusionists. Entire cardiac teams are required to provide holistic cardiac care within and beyond the operating room. Training individual health professionals and full cardiac teams takes years; today, however, the cardiac surgical and interventional workforce in many LMICs is far less than 1 per 5 million population, if any cardiac surgeons or interventional

cardiologists are present at all. Neglecting this issue any longer will have severe consequences down the road. North-South and South-South bidirectional partnerships between countries are an important component of training LMIC health professionals to become skilled cardiac team members. Formalized curricula to train allied health professionals (e.g., technicians and nurses) ought to support this endeavor locally. As the workforce grows regionally, training programs can gradually be increased in terms of numbers and volume to populate regions more diffusely.

#### 4. Regulation of NGOs and foreign aid: putting oil onto the machinery

Amid hundreds of NGOs, academic institutions, individuals, and foreign aid organizations present in LMICs to support health systems and facilities, a regulatory framework is necessary to prevent overlap and redundancy of work and resources. Although not a sustainable solution in and of itself, the impact of visiting teams in providing clinical care, capacity building, and donations cannot be underestimated. To maximize their impact, interorganizational communication and overall regulation is essential. An African proverb best describes this: “If you want to go fast, go alone. If you want to go far, go together.”

#### 5. Universal health coverage: establishing a thriving environment

Although the absolute costs of cardiac surgery are lower in LMICs, the relative financial burden for the population is higher due to lower income and lack of financial coverage. Developing a model of social or tax-based insurance to provide populations with comprehensive insurance schemes covering life-saving and life-changing interventions, including cardiac surgery and interventional cardiology and their postoperative care pathways, significantly increases accessibility of care and reduces catastrophic and impoverishing expenditure due to cardiac care. Increasing governmental health expenditure is necessary, and has large potential in LMICs, where many countries spend far less than 5% on health. Once done so, countries can resort

to innovative financing mechanisms (e.g., levies on international trade, taxes on alcohol) and external aid (embedding cardiac surgical care within health systems strengthening, to increase likelihood of funding by, for example, the Global Financing Facility or international development agencies).

Health is a basic human right and its constituents should be no less. Having access to interventions able to save the lives of millions and prevent disability for millions more around the world, while being cost effective and having a dramatic socioeconomic potential, should not be reserved to those born in specific parts of the world. In the 21st century, everyone deserves to live their life to its fullest potential.

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