



# GLOBAL HEALTH: THE VIEW FROM MALAWI

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**Editor's Note:** Tom Gates, M.D., was on the faculty of the LGH Family Medicine Residency for 20 years. He was the 2015 recipient of the Henry S. Wentz, M.D., Award for "outstanding contribution to Lancaster General Hospital, graduate medical education, and the Lancaster County community." He left in September of 2015 to assume his current position, working for Boston-based Partners in Health ([www.pih.org](http://www.pih.org)) as Medical Director of Lisungwi Community Hospital in rural Neno District, Malawi. He expects to return to Lancaster sometime in 2017.

## INTRODUCTION

Over the last 20 years, the term *global health* has largely replaced the older term *international health*.<sup>1</sup> Although there is no commonly accepted definition of global health, the newer term connotes a concern that goes well beyond the traditional focus on individual diseases, and encompasses health care delivery and systems, health disparities, the social determinants of health (especially poverty), and health care as a human right. Thus understood, global health "disrupts the traditional boundary between public health and clinical medicine."<sup>2</sup> Above all, global health implies a close attention to the significance of local context, and the importance of listening to those most affected by the burdens of disease. From my current perspective of working in rural Malawi, I offer some reflections on recent successes, as well as ongoing issues and challenges faced by global health, using Malawi as an example.

## CONTEXT

### Poverty

Malawi, a land-locked country of 17 million people approximately the size of Pennsylvania, is one of the world's poorest countries. According to World Bank statistics, its 2015 per capita income of \$381 is fourth from the bottom, ahead of only Burundi, Central African Republic, and Niger. In Neno District, one of its poorest, fewer than 5% of households have access

to the electric grid. Most people depend on subsistence farming, and the recent two years of drought have left many dependent on outside food aid for much of the year.

A foundational principle of global health is recognition of the strong causal relationship between poverty and poor health. In virtually every epidemiologic study around the world, the poor "live sicker and die younger" than the non-poor, with higher morbidity and mortality from almost every disease, and drastically shorter life expectancy. Whether the problems are TB, HIV, malaria, and malnutrition in Malawi, or hypertension, diabetes and cancer in the United States, most pathogens (both biological and social) disproportionately affect the poor. Recognizing this reality, Partners in Health (PIH) continues to stress "a preferential option for the poor in health care" as a moral imperative.<sup>3</sup>

### Burden of Disease

In the context of poverty, and with the additional burden of various tropical diseases, it is not surprising that Malawi, like virtually all of sub-Saharan Africa, suffers under a much greater burden of disease than is typical in developed countries. As measured by disability-adjusted life years (DALYs), the number one cause of combined premature death and disability is HIV/AIDS, with malaria second, diarrheal diseases fourth, malnutrition eighth, and meningitis ninth.<sup>4</sup> Despite its very young population (median age 17), the crude death rate per 1,000 population is higher in Malawi than the United States, and life expectancy at birth is 20 years lower.

### Health Care Resources

Another contextual reality in Malawi is the overwhelming lack of health care resources. In 2014, combined spending in the public and private health care sectors was just \$29 per capita, down from a "peak" of \$43 in 2011.<sup>5</sup> This represents less than .03% of per capita health care spending in the U.S. (\$9,403).

The World Health Organization (WHO) estimates that an “essential health package” of bare-bones primary care would cost about \$60 per capita, so even with international aid, Malawi spends less than half of that benchmark. This translates into a stark lack of resources: frequent medication shortages, dilapidated infrastructure, crowded wards, lack of equipment, and almost no access to advanced technology like CT, MRI, ICUs, endoscopy, or specialized surgery.

Health care personnel are another limited resource. Malawi has 0.19 physicians/10,000 people, and 3.43 nurses/midwives. This leaves them drastically short of the WHO’s current “critical threshold” of 22.8 physicians and nurses/midwives per 10,000 population, as well as the projected goal of 44.5 estimated to be necessary to meet the WHO’s goal of universal health care by 2030.<sup>6</sup>

The WHO estimates that Africa, with 11% of the world’s population, suffers 25% of the global disease burden, but has just 3% of the global health workforce, and consumes just 1% of the world’s health care resources.<sup>7</sup>

#### RECENT SUCCESSES

Despite this bleak-sounding assessment, much that is positive has happened and is happening in health care in Africa. To illustrate, I describe below recent success in two areas.

**HIV/AIDS:** Perhaps nothing better illustrates this progress than comparing AIDS 15 years ago and now. By 2001, HIV had become a treatable chronic disease in the developed world, but antiretroviral therapy (ART) had made almost no impact in Africa, which then as now was home to more than 70% of people living with HIV/AIDS. As the moral dimensions of this imbalance became more and more intolerable, the developed world eventually came to the position that it had a responsibility to make effective treatment available. Beginning in 2002 with the United Nation’s Global Fund to Fight AIDS, Tuberculosis and Malaria, followed in 2003 by the President’s Emergency Plan for AIDS Relief (PEPFAR), as well as major private donors like the Gates and Clinton Foundations, donor funds began to flow, and the results have been dramatic. Globally, AIDS-related deaths have decreased by 45% since their peak in 2005, and from 2000 to 2014, increased availability of ART has averted 7.8 million deaths.<sup>8</sup> Over 12 million people in sub-Saharan

Africa are now on ART, compared with just 100,000 in 2003.<sup>9</sup> Of those, 547,000 are in Malawi, and 7,321 are in Neno District. From 2005 to 2013, HIV-related deaths in Malawi fell by 51%, and new HIV infections are down by 65%.<sup>10</sup>

This success has had an enormous impact on the aspirations of global health. Indeed, some have argued that AIDS “invented global health.”<sup>2</sup> The commitment to combat the HIV epidemic gave rise to a “golden age of global health,” with combined public and private assistance for development of health programs rising from \$8.65 billion in 1997 to \$21.79 billion in 2006.<sup>11</sup> As an example, PEPFAR funding in Malawi increased from \$16 million in 2006 to \$95 million in 2015, an increase of almost 600%.

**Malaria:** Parallel to the progress against HIV/AIDS has been equally impressive success against malaria. Global deaths from malaria also peaked around 2005, but between 2000 and 2015 deaths from malaria declined by 48%, from an estimated 839,000 to 438,000. Deaths from malaria in African children under age 5, which accounts for two thirds of all malaria deaths, decreased by 58%, from 694,000 in 2000, to 292,000 in 2015. As a result, over the last several years, malaria has fallen from the number one spot as a cause of child mortality in Africa, to No. 4.<sup>12</sup>

Since 2005, an estimated 6 million deaths from malaria have been averted. Much of that success has been from a very “low tech” intervention: sleeping under insecticide-treated bednets (ITNs). For under-5 African children, this increased from <2% of children in 2000 to 68% in 2015. Other factors include the widespread use of rapid diagnostic tests, replacement of ineffective treatment regimens with artemisinin-based combination therapy (ACT, instituted by Malawi in 2007), and indoor residual spraying (IRS) of insecticides.

Despite this progress, malaria continues to be a major public health problem in Malawi. With approximately 5 million cases annually, malaria accounts for 30% of all outpatient visits and 40% of all hospital admissions for children under 5. Although deaths are down, the morbidity from malaria is immense: school absences, chronic anemia, and frequent work absences by adults.

#### CHALLENGES AND INNOVATION

PIH believes that in order for the very poorest to have access to better health care, it is essential to work

with the public sector, which by necessity provides the largest portion of health care to the poor. Our role here is therefore to “accompany” the Ministry of Health, and provide at least some of the human and material resources that would otherwise be lacking. As we strive to make Neno a “model district” for the rest of the country, we provide resources amounting to about \$30 per capita, over and above the Ministry of Health budget. Working with our Ministry colleagues, much of what we do is quite innovative—with perhaps lessons for the U.S. health care system:

**1. Community Health Workers:** Since its earliest days in Haiti, PIH has recognized that social and economic barriers faced by the poor are at least as important as the microbes. Growing out of the original strategy for tuberculosis of “directly observed therapy,” a system of village or community health workers has evolved. In Neno District, PIH employs over 900 village health workers (VHWs), who receive very basic training as well as a small stipend of about \$20 per month. Every HIV and TB patient is assigned a VHW, who is responsible for monitoring compliance with medication and accompanying patients to follow-up appointments, which in turn has led to much higher retention of patients in treatment. We are about to undertake a major expansion of this program by transitioning to a household model, where every household in the district will be assigned a VHW *whether or not* that household has an HIV or TB patient. This plan will allow VHWs to expand their responsibilities to include, for example, screening for childhood malnutrition, early initiation of prenatal care, and monitoring of compliance with treatment of chronic non-communicable diseases like hypertension and diabetes.

**2. Universal Health Care:** It is now widely recognized that the 1980s push by the World Bank and major donors for “users fees” as a strategy to finance health care in poor countries was a mistake, leading to decreased utilization that disproportionately affected the poorest and sickest segment of the population, which by some estimates led to an excess of up to 3 million child deaths in Africa over the next 20 years.<sup>13</sup> Malawi has adopted the WHO’s goal of universal health care by 2030. Even now, all care at the Ministry’s 11 health centers and two hospitals in Neno District is free of

charge. Though we care for an average of 200 outpatients and 40 inpatients per day at Lisungwi Hospital, no money changes hands. Beyond free care, universal health care involves what in the U.S. might be called “population health.” For example, we know the national incidence of HIV, childhood malnutrition, TB, and hypertension. Based on our catchment area population, we know we are seeing fewer cases than we should be seeing, and that gap tells us that we have not yet achieved universal health coverage. We therefore have an aggressive program of community screening events, often travelling to the most remote areas of the district to screen for these common conditions and refer them for treatment.

**3. Non-communicable Diseases:** Even while countries like Malawi struggle to deal with a still-high burden of infectious diseases, they also are now faced with a rapidly rising burden of chronic non-communicable diseases (NCDs) such as diabetes, cardiovascular disease, and cancer. For poor countries, this is the so-called “double burden” of epidemiology. Globally, almost two thirds of annual deaths are due to NCDs, and contrary to common opinion, up to 80% of these deaths occur in low- and middle-income countries. In Malawi, the age-standardized death rate from NCDs is actually 2.5 times greater than in the United States.<sup>14</sup> As one example, the prevalence of adult hypertension in Malawi is 33%, with over 90% of patients undiagnosed and untreated.<sup>15 \*</sup>

NCDs, with their need for regular appointments, lifestyle modification, and chronic medication compliance (even in the absence of symptoms), introduce a level of complexity into health care that is well beyond developing countries’ traditional focus on acute infectious diseases. And yet Malawi, like most of its neighbors, has accumulated considerable experience dealing with another chronic disease – HIV – that makes many of the same demands on patients and providers. In response to the increasing importance of NCDs, PIH in Malawi has transformed its HIV clinics into “integrated chronic care clinics” that now include care for chronic NCDs like hypertension, diabetes, asthma, epilepsy, and heart failure.<sup>16</sup> Since many HIV patients also have one or more NCDs, this simplifies their care and also lessens stigma (since attendance at the clinic does

\* The reference cited is a study funded by WHO that extrapolated the prevalence from a sample of 5,000 randomly selected adults. Ninety percent of hypertensives in this study were previously undiagnosed.

not automatically mean one has HIV, but just some chronic disease).

## MEDICAL PRACTICE

To convey a sense of what practice is like, I will close by offering four case vignettes. Most patients are simple and straightforward, with good outcomes, so these by no means represent “typical” patients. Nevertheless, cases of this complexity occur on an almost daily basis—and keep medical practice here challenging.

**1. Patient A was a 2-year-old girl, severely malnourished at 17 pounds. She had a fever and some vomiting for two days, and arrived on the ward during morning rounds, critically ill and struggling to breathe. Soon she was getting a blood transfusion for severe anemia (hemoglobin of 3.0), antibiotics for possible pneumonia, and IV artesunate for overwhelming malaria. She died that evening, about 12 hours after admission.**

*Comment: It is impossible to overstate the burden of malaria on Malawi's children. Tragically, we learned that the day prior to admission, her mother had taken her to the local health center but found that there was no clinician on duty, so she decided to wait and see if the child improved. When she was no better the next day, she carried her sick child the seven or eight miles to the hospital. It is hard to blame the missing clinician – he is the only provider at the health center, and was finally granted a leave after several months without a break. This is often the reality in rural Malawi: local health centers are understaffed, with frequent shortages of basic medicines. Although most malaria responds promptly to therapy, cerebral malaria from *P. falciparum* can be fatal within 24 hours of onset.*

**2. Patient B is a 33-year-old female, found to be HIV positive and started on ART (TDF/3TC/EFV) several months prior. She was admitted in May with fluid overload and suspicion of heart failure, but found to have a creatinine of 3.0. Because of presumed nephrotoxicity from TDF, she was switched to AZT/3TC/NVP. She was readmitted three months later, with two weeks of fever and productive cough, and at that time was found to have a hemoglobin of 3.3 g/dl, with marked splenomegaly on exam. She was transfused two units of blood, at which point the central blood bank told us that they were out of her blood type. Her anemia was felt to be likely from AZT toxicity, so her regimen was again switched, to ABC/3TC/NVP. Although her chest X-ray was normal, sputum tested positive for *Mycobacterium tuberculosis* by GeneXpert® (a nucleic acid amplification technology**

**only recently available in our hospital), and she was started on anti-TB therapy. A rapid test for schistosomiasis was positive (accounting for her splenomegaly), and she was given a single dose of praziquantel. She was discharged after two weeks, improved, for follow-up at the integrated chronic care clinic.**

*Comment: Most HIV patients are managed by midlevel providers (clinical officers and nurses) and have only minor side effects from their regimens, but occasionally patients have major complications. In just a few months on ART, Patient B developed two separate life-threatening complications to two different first line ART regimens. Additionally, second-line regimens for those with virologic failure (which would include a protease inhibitor) are in short supply and can be hard to come by.*

**3. Patient C is a 10-year old, admitted with fevers for a week. Rapid test for malaria was positive and she was started on IV artesunate, but over the next three days her fever persisted. Rapid test for IgM antibodies to *S. typhi* (Enterocheck®, only recently made available to us) was positive, and she was put on IV ceftriaxone, with slow improvement.**

*Comment: This proved to be the index case of a major typhoid outbreak, now with over 200 presumed cases, based on clinical symptoms and positive antibody tests. Several cases have now been confirmed as *S. typhi* by blood culture (sent to a research lab in Blantyre), with resistance to all first-line antibiotics. We have responded with a Rapid Response Team, visiting affected communities to do contact tracing, to distribute chlorine, and to educate on symptoms, prevention, and good hygiene practices.*

**4. Patient D is an 11-year-old boy who was diagnosed with HIV two months ago. He was admitted with three weeks of fever, cough, diarrhea, weight loss, and disabling arthralgias. WBC was normal; hemoglobin was 4.7 and he was transfused twice. Chest X-ray showed diffuse bilateral infiltrates. He was unable to produce sputum, and on the fourth hospital day was started empirically on anti-TB treatment. He improved dramatically over the next week, and was discharged home with nutritional assistance in the form of fortified porridge, for close follow up from his village health worker and the chronic care clinic.**

*Comment: He likely contracted HIV at birth or from breast feeding. His mother died of HIV complications and his father is currently under treatment. TB is by far the most common opportunistic infection we see, and with no culture capability, we are often forced to treat empirically, based on clinical suspicion alone. When we are correct, patients often improve in a matter of a few days. Judging by the time course,*

with symptoms starting a few weeks after ART initiation, his symptoms likely represent immune reconstitution inflammatory syndrome, or IRIS.

## CONCLUSIONS

What is it like to practice medicine in the environment I have described? The day-to-day hospital routine can be a struggle, with frequent shortages of

even the most basic medicines and supplies, repeated interruptions for administrative tasks (“Why do you need me to sign for you to replace a light bulb?”), a shortage of qualified clinicians and nurses, and an abundance of very sick patients, many with advanced pathology. And yet, the overall experience has been gratifying; in the end, we are making a difference here.

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