Introduction

In 2011, together with a team of 15 scientists, I relocated to Houston, Texas, to launch a new school devoted to poverty-related diseases. The National School of Tropical Medicine at Baylor College of Medicine is a joint venture among three biomedical institutions—Baylor, Texas Children’s Hospital, and the Sabin Vaccine Institute—with a mission devoted to research on and training in the treatment of neglected tropical diseases, or NTDs (see box I.1). Today, the NTDs represent the most common afflictions of people who live in extreme poverty. These ailments include parasitic diseases such as hookworm, schistosomiasis, Chagas disease, and leishmaniasis—or, as I often say, the most important diseases you’ve never heard of. Virtually every impoverished individual is infected with at least one NTD.

An unusual aspect of Baylor’s National School of Tropical Medicine is that it includes as its research arm a unique type of organization known as a product development partnership (PDP). There are 16 PDPs worldwide. They are international nonprofit organizations that develop and manufacture biopharmaceuticals—drugs, diagnostics, and vaccines—for the NTDs, as well as for HIV/AIDS, tuberculosis (TB), and malaria. Together, the NTDs and AIDS, TB, and malaria are sometimes broadly defined as “neglected diseases.” PDPs develop and test new products for neglected diseases that the major pharmaceutical companies may not have an interest in because they are poverty-related afflictions that will therefore not generate significant sales income. The National School of Tropical Medicine’s PDP is known as the Sabin Vaccine Institute PDP, and it is specifically focused on developing NTD vaccines.
NTDs: The neglected tropical diseases are a group of chronic and debilitating poverty-related illnesses. Most, but not all, are parasitic diseases. An original list of 13 NTDs published in *PLOS Medicine* in 2005 has since been expanded by the World Health Organization to include 17 major conditions:

- Soil-transmitted helminth infections (including ascariasis, trichuriasis, hookworm infection, strongyloidiasis, and toxocariasis)
- Lymphatic filariasis (elephantiasis)
- Dracunculiasis (guinea worm disease)
- Onchocerciasis (river blindness)
- Schistosomiasis
- Foodborne trematodiases
- Taeniasis and neurocysticercosis
- Echinococcosis
- Human African trypanosomiasis (sleeping sickness)
- Chagas disease (American trypanosomiasis)
- Leishmaniasis
- Yaws
- Buruli ulcer
- Trachoma
- Leprosy
- Rabies
- Dengue and other arboviral infections

*PLOS Neglected Tropical Diseases* has published a further expanded list that also includes several intestinal protozoan infections, chronic fungal infections, cholera and other bacterial diseases, and ectoparasitic infections such as scabies and myiasis. Types of malaria other than those caused by *Plasmodium falciparum* (such as *Plasmodium vivax*) are also sometimes considered to be NTDs.

**Neglected Diseases:** There are several different definitions of neglected diseases. Here I refer to neglected diseases as NTDs together with the “big three” diseases—HIV/AIDS, malaria, and tuberculosis. A similar usage has been adopted by the G-FINDER report on research funding for neglected diseases. There are several reasons that the term “neglected” is used for both groups of conditions, including (1) lack of attention by government leaders and international agencies; (2) the strong links of these diseases to vulnerable populations and to people who live in extreme poverty and are thus often hidden or ignored; and (3) low levels of research funding and support.
One reason I was so eager to move our scientists to Houston was to take advantage of being located within the Texas Medical Center. The TMC is more than just the world’s largest medical center; it is a medical city comprising more than 50 biomedical institutions and 100,000 employees, occupying building space that exceeds that of downtown Los Angeles. A second reason for the relocation was the generous support we received from Texas Children’s Hospital (the world’s largest children’s hospital), which also housed the Sabin Vaccine Institute PDP in a modern research building known as the Feigin Center, named for the late Ralph Feigin, MD, one of the giants in the treatment of pediatric infectious diseases. Our goal for moving and becoming linked to the TMC was to increase the number of new vaccines we are creating for the poorest people in less developed countries, as well as to accelerate the pace at which they are produced. It was an amazing opportunity to leverage the facilities of more than 50 world-class institutions in order to launch an assault on global poverty-related diseases. The laboratories began operations in the fall of 2011, and today we have two vaccines in clinical trials—for human hookworm infection and schistosomiasis—with others in various stages of product development.

Within a few months after moving to Houston, we learned about a different side of the city. Driving just a few miles from the TMC, I began to see a level of extreme poverty that I had not previously imagined existed in the continental United States. A stark example of the severe impoverishment found in Houston (and elsewhere in Texas) is an area known as the Fifth Ward (fig. I.1), a political division of Houston located northeast of the downtown area. Following the American Civil War, freed slaves settled in this area, and today the Fifth Ward represents one of several important African American communities in the city. Driving my car deep into this neighborhood reminded me of the terrible poverty I had seen as a scientist investigating tropical diseases in destitute areas of Honduras, Guatemala, Brazil, and China. I saw abandoned buildings, dilapidated housing with no window screens, uncollected garbage, clogged drainage ditches that smelled like sewage, discarded tires filled with water, and packs of stray and roaming dogs. I thought to myself, these images look just like the standard global disease movie typically shown to first-year public health or medical students. A little bit of Lagos (Nigeria’s largest city) right here in Texas.
It was even more astonishing when we turned our global health lens inward to study diseases that were affecting impoverished areas such as the Fifth Ward. Without looking very hard, we found widespread NTDs among the poor living in Texas and elsewhere in the southern United States. It struck me that although we designate these diseases as “tropical,” the NTDs are first and foremost diseases of acute poverty. Ultimately, we determined that 12 million Americans who live at such poverty levels suffer from at least one NTD. The diseases include neglected parasitic infections such as Chagas disease, cysticercosis, toxocariasis, and trichomoniasis [1].

The finding of widespread NTDs among the poor living in the United States was eye opening and caused me to delve deeper into the problem of...
poverty-related illnesses in wealthy countries. We found that most of the world’s neglected diseases—including the NTDs and, to some extent, HIV/AIDS, tuberculosis, and malaria, as well as some important noncommunicable diseases—can be found among the poor who live amidst wealth. Thus, the traditional concept of global health that compares unique diseases in less developed countries (especially in sub-Saharan Africa) with more developed countries (such as the United States and countries in western Europe) no longer applied. With the exception of a few countries devastated by armed conflict, almost all national economies are on the rise, but they are leaving behind a bottom segment of society that still suffers from the NTDs and other neglected diseases. Startlingly, I have determined that, in addition to Nigeria, most of the world’s neglected diseases are actually also found in the wealthiest economies, including the Group of 20 (G20) nations. Unraveling some of the details around this observation is a key goal of this book.

That most of the world’s neglected diseases are highly prevalent in G20 economies has important public health and policy implications. Because I believe that widespread poverty-related diseases in wealthy countries represent a paradigm shift from traditional notions of global health, I have given this framework a new name: “blue marble health.” This commemorates the amazing images of planet Earth that the Apollo 17 astronauts first photographed as they orbited the moon in 1972 [2]. The “blue marble” became an important symbol of peace and healing [3], and it is a fitting metaphor for the pursuit of worldwide good health and efforts to alleviate human suffering from the devastating ailments associated with indigence in all nations.