

Tropical Medicine in the Era of Global Connectivity

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In the modern era in which air travel has collapsed global boundaries, the study of tropical infections has gained a more urgent relevance for all nations. The Ebola virus disease (EVD) epidemic that started in spring 2014 has highlighted the speed at which infectious diseases can cross borders and the impact they can have on societies. The virus that has caused thousands of deaths in West Africa also affected patients in Europe and the United States. Preparations to prevent the further spread of EVD have transformed hospital systems as well as society as a whole. In response to this outbreak, novel therapeutics and vaccines for the treatment and prevention of EVD came to the forefront of global attention. Management of patients with EVD in state-of-the-art facilities with maximum isolation protocols demonstrated that intubation and dialysis were procedures that could be performed safely and could prove lifesaving. The management of EVD in resource-poor settings remains a tremendous challenge for communities affected and the control of the outbreak remains a priority for the world at large. This issue features two articles on the topic of EVD.

The past 12 months also has seen a massive outbreak of chikungunya spread across the Caribbean. In any other year, this would have been a dominant story in the infectious diseases and public health community. This mosquito-borne virus is another example of the rapidity at which infections can spread as they are introduced into environments that are plush with insect vectors. *Aedes* mosquitoes also transmit dengue virus and their presence throughout the Americas make infection control and prevention measures increasingly challenging. Dengue and chikungunya viruses are the subject of a state-of-the-art review by Drs. Fredericks and Fernandez-Sesma.

Robert Koch first isolated *Mycobacterium tuberculosis* in the 19th century. Many of the techniques he used to culture the bacteria are still used today. With the impact of the HIV epidemic in the 1980s, rates of tuberculosis (TB) surged. Strains of multidrug-resistant TB (MDR-TB) have made the organism increasingly difficult to

treat. The importance of early diagnosis of TB is paramount to staving off the spread of these resistant strains. Dr. Vittor's article addresses the most recent developments in TB diagnostics.

Over the past 15 years tropical medicine has finally become a focus of the global health community in both developing and developed nations. Remarkable advances have been achieved. There is increasing access to more affordable medicines for patients in low-income countries and innovative models are stimulating research into treatments and diagnostics for neglected tropical diseases. Large-scale treatment of HIV with antiretroviral drugs has become a reality and an international priority. An effective malaria therapy, known as artemisin-based combination therapy, has been introduced in most African countries. Treatment of people with MDR-TB has become an international public health priority. The right to balance public health needs with intellectual property rights was affirmed in the Doha Declaration on Trade-Related Aspects of Intellectual Property Rights and Public Health.

Still, formidable challenges remain. Many medicines are too expensive for patients or governments in developing countries to afford, and the growth in patent protection in developing countries has led to increased costs and stifled competition. Research and development is still not directed to the needs of people in poor countries. Drugs and diagnostic tests are being developed on the basis of their future market potential rather than on patients' needs. Only 1% of the drugs that have come to the market in the past 30 years were developed for tropical diseases or TB. Taking the chronic shortage of health staff in low-income countries into account, simpler more innovative models of care to deliver treatment for tropical diseases that will benefit both patient and health care workers have to be developed. Steven Hoffman and Karen So's article on strategies to promote innovation and access to medicines addresses many of these issues.

Neglected tropical diseases (NTDs) are a subgroup of tropical diseases, which have suffered a particular neglect in terms of investment in research, treatment, and control measures. Of the 850 new therapeutic products registered in 2000-2011, only 5 (0.6%) were indicated for NTDs, none of them being a new chemical entity or vaccine. However, the global disease burden caused by NTDs is high. According to the World Health Organization, the number of disability-adjusted life-years

caused by NTDs in 2004 was 18,325—similar to that of diabetes mellitus. Dr. Ostera and her colleagues address the impact of some of these illnesses among immigrants to the United States.

This issue of the *Annals of Global Health* focuses on tropical diseases. Although some of these illnesses are

finally getting the priority that is necessary to control or even eradicate them, others are still barely recognized except for the individuals who suffer from them. Our hope is not only that these diseases will cease to be neglected, but that society will also cease to neglect the people suffering from them.