VIEWPOINT

Immigrant Populations: Global Health in our Backyard

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During the past few decades, public awareness and interest in global health issues have steadily increased. This phenomenon may reflect the fact that the boundaries separating developed and developing nations are rapidly disappearing. Indeed, the continuous stream of foreign nationals moving to developed countries makes global health issues more relevant for these countries and requires a thorough analysis and evidence-based revision of current public health policies.

It is estimated that 160 million international migrants, mostly originating from middle-income countries currently live in high-income countries, which is nearly a 2-fold increase compared with the 87 million in 1990.[1] The impact of immigrants on the United States is clear simply from a numerical standpoint. In 2013, the number of foreign-born individuals in the United States reached 14%, almost 46 million individuals, which makes the United States the nation with the largest number of international migrants.[1]

A variety of social, political, and economic factors motivate human migration; however, experts agree that global economic disparities are the main drivers of migratory trends. Indeed, the benefits of an expanding international economy have not been equally distributed. According to a United Nations report, almost half of the world's 2.8 billion workers earn <$2 a day.[2] If predictions about the widening of the gap between rich and poor in the decades to come hold true,[3] current migratory trends could intensify as people seek better opportunities in wealthier countries.

It is critically important for countries receiving a large number of international migrants, such as the United States, to understand the health status of immigrant populations because disparities in income and wealth are naturally followed by inequalities in health status.[4] Clearly, although immigrants leave behind their prior economic conditions, this is not so easily done with their health status. Thus, the health problems of one country become the concern of another.

Analyzing an immigrant's country of origin during the past 50 years provides some important insights on relevant health issues. In the 1960s, for example, approximately 75% of immigrants to the United States originated in western European countries, particularly Germany, Italy, and the United Kingdom. During the past five decades, however, the number of European immigrants declined steadily, whereas Latin American and Asian groups have taken the lead. In 2010, immigrants from Latin America and Asia accounted for 53% and 28%, respectively, of the immigrant population in the United States. Individuals originating in African nations remain a small section of the total foreign-born population, although their share increased from <1% in the 1960s to 4% in 2010.[5]

From a public health perspective, an immigrant's country of origin is an important consideration because some nations suffer from endemic conditions that are not commonly seen in the United States. We are specifically interested in a group of chronic parasitic infections collectively referred to as neglected parasitic infections (NPIs).

NPIs are a broad group of helminth and protozoa infections caused by parasitic organisms that require a human host to develop at least part of their life cycle. Infections by these pathogens are defined as *neglected* because of the relative scarcity of institutional funds allocated to research, treatment, and eradication of these conditions compared with other high-profile infectious diseases. Overall, poverty is the most important factor that determines infection rates.

Although some NPIs are self-limiting, others have a disturbingly quiescent nature to their disease progression

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and can potentially have long-term sequelae. These pathogens can remain asymptomatic for extended periods of time. Thus, asymptomatic infected migrants do not show signs of disease until many years later, when living in their new host country.

The following are some examples of this type of infection. *Trypanosoma cruzi*, the parasite responsible for Chagas disease, is one of the most common NPIs in the Western hemisphere. Chagas disease is estimated to infect approximately 10 million people and it is highly prevalent in Latin America.[6] Although the majority of infected individuals remain asymptomatic, approximately 30% will progress to significant cardiomyopathy. The progression of this disease can take decades and can remain asymptomatic until life-threatening events, including cardiac sudden death, megaesophagus, and megacolon occur.[7]

Strongyloides stercoralis also is a very common NPI and it is estimated to infect 100 million people worldwide.[8] The majority of people are infected via exposure to contaminated soil. *Strongyloides* has a unique ability to recurrently infect its host who, as a consequence, can remain infected for decades.[9] If a *Strongyloides*-infected individual receives immunosuppressive therapy, particularly corticosteroids, a potentially fatal hyperinfection syndrome and disseminated strongyloidiasis can occur.[10] Mortality for this condition can be as high as 100% if not properly diagnosed and treated.[10]

Finally, *Taenia solium* is the pork tapeworm responsible for neurocysticercosis, which is a condition associated with 30% of all cases of adult-onset seizures worldwide.[11] Infected individuals can develop parasitic cysts in the brain parenchyma, ventricles, or subarachnoid spaces that can result in neurologic sequelae. This condition has important epidemiologic implications because infected individuals with gastrointestinal taeniasis can infect other individuals who come in contact with the eggs of this parasite by the fecal-oral route.

Infectious agents with significant rates of person-to-person transmissibility are regularly the object of media attention and frequently at the center of national and international concern. NPIs often receive less attention because they are unlikely to be transmitted in the context of many Western societies where insect vectors are rare, clean water is available, and public sanitation is common. Although less likely to be transmitted, NPIs pose significant health risks to those who carry them and are a challenge to health providers who care for underserved populations.

To help reduce the number of individuals with infectious diseases entering the United States, the Department of Health and Human Services (HHS) and the Centers for Disease Control and Prevention (CDC) provide and implement guidelines for the medical examination of immigrants. This medical examination is designed to determine whether prospective immigrants suffer a class A highly communicable infectious disease, which would make them inadmissible into the United States or a class B condition, highly communicable infection that, due to past or ongoing treatment, requires patient follow-up.[12,13]

However, these directives do not include studies to rule out parasitic infections, which can be carried in the absence of clinical symptoms by legal immigrants from endemic countries. The only exceptions are immigrants who enter the United States with refugee status. Refugees receive treatment for malaria and intestinal parasites before leaving their country of origin. This predeparture treatment acknowledges the possibility that certain parasitic infections, highly prevalent in some areas of the world, are likely to be transported into the United States by individuals originating in those areas. Nevertheless, individuals entering the United States with a refugee status represent a relatively small fraction of legal immigrants, much less all immigrants.

The problem is even more serious in those who entered the country illegally and bypassed the HHS/CDC-mandated medical examination, which means that in addition to possibly carrying NPIs, they could also have class A or B conditions. As of March 2012, it was estimated that 11.7 million undocumented immigrants reside in the United States. This large undocumented population adds to the difficulty of estimating the health risks to which many immigrants are exposed and the associated public health care costs.

The chronic and relatively silent nature of NPIs makes many immigrants unaware of their possible disease burden. Assuming an individual becomes symptomatic and seeks care, proper diagnosis can be elusive because these NPIs are uncommon in the United States and general practitioners may not immediately suspect these infections. It is, therefore, essential that we investigate the prevalence of NPIs in the significant number of foreign-born individuals currently living in or around major metropolitan areas. Additionally, current epidemiologic data on NPIs in the United States is very sparse. This information gap may lead health authorities to ignore or misunderstand present and future public health challenges.

The burden of a severe health condition can be particularly serious for immigrants. The economic cost of receiving care can be crippling for immigrants, both documented and undocumented. It is estimated that >30 million individuals, a combination of undocumented immigrants and recent legal immigrants who have resided in the United States for <5 years, are ineligible for Medicaid and unable to purchase health coverage through state exchanges.[14] Although this clearly hurts individuals, it also causes stress on the public health system. Academic health centers delivering charity medical care and federally qualified health centers providing uncompensated health services to medically underserved populations are responsible for addressing the needs of the majority of such patients.[14,15]

Despite these challenges, finding a strategy to cope with NPIs in the US immigrant population is critical. When these conditions do occur, they will result in a more severe disease for the individual and a higher cost of care

for the public health system. Enhanced health examinations of immigrants, including the investigation of possible NPIs, would permit early diagnosis and treatment of these conditions. Alternatively, population-wide screening in areas of heavy immigrant concentration would be an extremely useful tool to increase understanding of the extent of NPIs in the United States. Although these relatively simple and inexpensive preventative medical measures could avoid long-term sequelae, they must be implemented in a way that preserves the confidentiality of the individual's health and immigration status.

We can no longer ignore the public health challenges that come along with increased immigration. This trend ensures that the health problems once thought to only afflict less-developed countries will also need to be dealt with in the developed world. It is important that many of the global health strategies that have been used to fight these diseases abroad are now applied in new settings. Medical, social, and economic perspectives must all be taken into account to properly address these new issues. The first step along this process is collecting better information on immigrants' health status when they enter the United States so we can better understand the problem and develop new strategies.

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