Few people in the world today are rich; the vast majority, 86% of the global population, live in the developing world, in countries that are classified as low or middle income. The most recent data on extreme poverty suggest that nearly a billion people, spread over many continents, live on less than one dollar per day. It is in low and middle income (LAMI) countries where most cases of neurologic disease occur, including stroke, epilepsy, primary headache disorders, and Alzheimer disease, and in these countries neurologic disease is studied little if at all.

The public health challenges for neurologic disorders in LAMI countries are multiple. Among the poor, there is special consideration of the 1) overall burden of neurologic disease, 2) lack of access to essential medications, 3) paucity of epidemiologic research available, 4) reduced ratio of practitioners in LAMI countries, 5) double burden of communicable and noncommunicable disease, and 6) stigma. At every level of society, there is a need for more education, in rich countries as well as poor ones. Health care workers, students, governments, teachers, and members of the general public all have important roles to play.

**THE OVERALL BURDEN OF NEUROLOGIC DISEASE** Dementia and stroke are among the most common disabling diseases worldwide, and in some regions of the world, stroke accounts for more deaths than ischemic heart disease. Although often considered developed world diseases, 86% of all stroke mortality and 85% of all cases of epilepsy occur in the developing world. Overall, neurologic disorders now account for a greater burden of disease than HIV/AIDS.

**LACK OF ACCESS TO ESSENTIAL MEDICATIONS** Studies from LAMI countries reveal poor access to underprescribed and often unaffordable medications. In one recent analysis of four low and six middle income countries, just 71.5% of patients with cerebrovascular disease were taking aspirin. In sub-Saharan African nations, most medications are simply not available in public and private facilities, regardless of a patient’s wealth. The World Health Organization (WHO) estimates that 150 countries do not have adequate access to medications to treat pain.

Moreover, 50 to 90% of people in LAMI countries must pay for their medications entirely by themselves. In Chad, a 30-day supply of carbamazepine 200 mg twice daily costs the equivalent of 8.8 days of an unskilled government laborer’s wages, rendering treatment of a very treatable disease effectively unattainable. Thus, access to essential medications is a result of both availability and affordability. Although costs and wages are objectively measured, the health-care seeking behavior of the poor is largely unstudied.

**PAUCITY OF EPIDEMIOLOGIC DATA AVAILABLE ON NEUROLOGIC DISEASE** From a public health stance, there is a lack of research in neurologic disorders. In other medical specialties, high income countries produce more than 90% of the world’s research although they account for approximately 10% of the global population. This is the so-called 10–90 divide in medical publication. It is uncertain whether the 10–90 divide exists in the neurologic literature because it has not been formally studied except in the case of dementia.

Among the neurologic disorders, research in LAMI countries has been so limited that their prevalence is difficult to estimate. Unlike census reports and sophisticated database analyses available from high income countries, epidemiologic information from LAMI countries is often obtained via tedious door-to-door surveys and reported in non-indexed, low-impact journals. Many studies piggyback on cardiovascular disease research and lack an emphasis on neurologic disorders. Little, in fact, is known about the cognitive effects of neuroAIDS outside of industrialized nations.

The value of research publications in LAMI countries also differs. A publication in the develop-
Neurology 69 October 23, 2007

Copyright © by AAN Enterprises, Inc. Unauthorized reproduction of this article is prohibited.
than 100 countries, neurologists and non-neurologists alike participate jointly in alleviating the global burden of neurologic disease.

In the current Resident & Fellow pages of Neurology®, two American physicians recount their experiences studying neurology abroad. Dr. Chad Heatwole, a neurology resident at the University of Rochester, relates his story teaching neurology at Jagiellonian University in Kraków, Poland. Dr. Porter provides an eye-opening account of the neurologic care in an impoverished Kenyan town. Together, their stories provide the humanitarian perspective, inarguably the most important reason of all, to aggressively tackle these challenges.

REFERENCES
2. Another day, another $1.08. The Economist. April 28, 2007; 90.
International Education Issues: Neurology and poverty
Farrah J. Mateen
Neurology 2007;69;1724-1726
DOI 10.1212/01.wnl.0000285099.58127.4b

This information is current as of October 22, 2007