



Insight

An emphasis on neurology in low and middle-income countries

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For the Global Burden of Disease Study 2017 see [Global Health Metrics Lancet 2018; 392: 1789–858](https://doi.org/10.1016/S0140-6838(18)30858-8)

For more on the global burden of neurological disorders see [Articles Lancet Neurology 2019; 18: 459–80](https://doi.org/10.1016/S1473-3099(18)30459-8)

For more on Global Burden of Disease data using the Institute for Health Metrics and Evaluation GBD Results Tool see <http://ghdx.healthdata.org/gbd-results-tool>

The Global Burden of Diseases (GBD), Injuries, and Risk Factors Study produces the most comprehensive epidemiological estimates. Results yielded in 2017, indicated that cardiovascular diseases, including stroke, were the top cause of morbidity and mortality worldwide. However, a re-analysis by the Neurology Collaborators of the 2016 GBD Study, spanning 15 disease categories that require specialist neurological care, showed that the highest burden was attributable to neurological diseases. For this analysis, stroke was classified as a neurological disorder instead of under cardiovascular diseases and, for the first time, traumatic brain injury and spinal cord injury were also included as neurological disorders.

This evidence alone should alert policy makers and other key stakeholders to place neurological disorders at the top of their priority list. Furthermore, other disorders requiring specialist neurological care, such as cerebral malaria and neurological disorders associated with HIV/AIDS, were not included by the Neurology Collaborators, which might have led to underestimations. In fact, when adding those

numbers and analysing them by income level, the burden clearly lies in low and middle-income countries (LMIC) (figure). The main drivers seem to be population growth and ageing, in addition to a shift from communicable towards non-communicable disease.

It is important to understand knowledge and perception of a disease in the populations at risk (ie, health literacy), the various disease aetiologies, risk factors, comorbidities, and treatment-seeking behaviours. This information can drive prevention and management strategies, with both depending on the existence of health systems with a well-trained workforce. Based on the GBD data, neurological disorders in LMIC deserve special attention; however, they have hardly been recognised by policy makers and key stakeholders. This is partly due to the scarcity of evidence because of challenging local circumstances, in places where data on neurological disorders all too often do not exist.

Stroke is the second most common cause of disability and death worldwide, with over 80 million stroke survivors

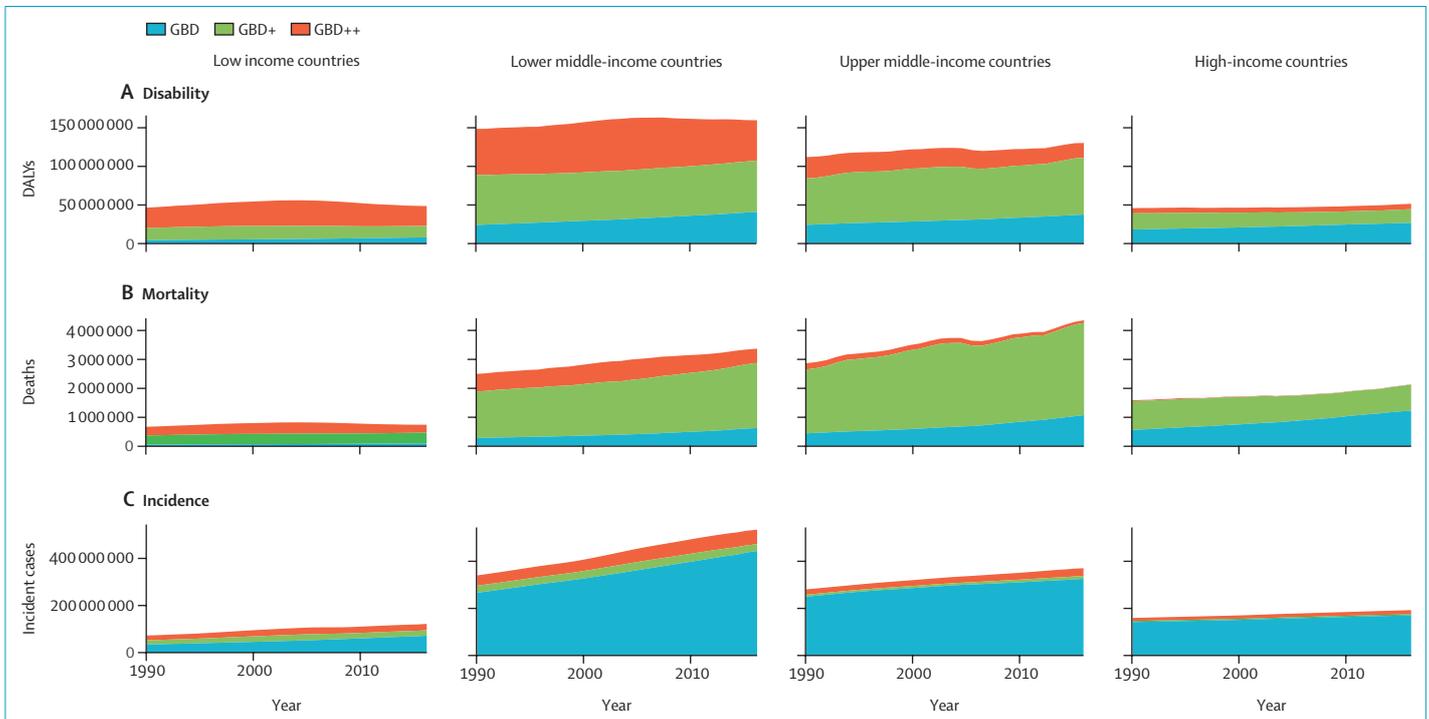


Figure: Global (A) DALYs, (B) deaths, and (C) incident cases of neurological disease in 2017, by World Bank income level, according to GBD, GBD+, or GBD++

In GBD, the neurological disorders included were Alzheimer’s disease and other dementias, Parkinson’s disease, idiopathic epilepsy, multiple sclerosis, motoneuron diseases, migraine, tension-type headache, and other neurological disorders. In GBD+, the 15 disorders reported by the GBD Neurology Collaborators also included stroke, meningitis, encephalitis, traumatic brain injury, spinal cord injury, cancer of the brain and nervous system, and tetanus. GBD++ refers to additional neurological disorders not included in one of the other two categories (rabies, cysticercosis, neural tube defects, and neonatal encephalopathy due to birth asphyxia and trauma) and diseases which, in a certain percentage (we conservatively assumed 20%), present with neurological signs and symptoms (HIV/AIDS, malaria, low back pain, neck pain, and neglected tropical diseases other than cysticercosis and rabies). Not yet included in any category are peripheral nervous system disorders. DALY=disability-adjusted life-year. GBD=Global Burden of Diseases, Injuries, and Risk Factors Study.

in 2016. Although about 84% of these stroke cases were ischaemic, haemorrhagic strokes caused more than half of disability-adjusted life years (DALYs) and deaths. Compared with high-income countries, the proportion of haemorrhagic strokes is higher in LMIC, contributing to a total of 72% of DALYs and 67% of deaths. Whilst age-standardised incidence rates for both ischaemic and haemorrhagic strokes decreased in every region, this decline was smallest in sub-Saharan Africa. Absolute numbers of stroke events are expected to further increase in the future due to population growth and ageing—particularly in LMIC.

In 2016, nearly 46 million people worldwide had active epilepsy and around 50% were idiopathic cases. Whilst the prevalence of epilepsy has hardly changed since 1990, its mortality and severity have decreased considerably. However, mortality from epilepsy is higher in LMIC, where there is a larger proportion of patients with severe epilepsy. This is due to treatments being less often sustained or adjusted to the patient's needs. Moreover, underlying causes of secondary epilepsy, such as meningitis, head trauma, or neurocysticercosis are far more common in LMIC than in high-income countries. In fact, experts have suggested that neurocysticercosis is the leading cause of acquired epilepsy in South America and sub-Saharan Africa. Apart from improvements in access to health services, awareness needs to be raised among healthcare providers that people with epilepsy often face stigma and discrimination, and are therefore marginalised in their societies.

In 2016, an estimated 44 million people were living with Alzheimer's disease or another form of dementia. This number is expected to increase to over 100 million by 2050, with the largest increase being anticipated in LMIC. The focus should be on potentially modifiable risk factors, such as hypertension, smoking, or low level of education. To delay the onset of dementia, mapping and monitoring these risk factors is pertinent for policy makers, but this strategy is still in its infancy in most LMIC.

Globally, 2·8 million cases of meningitis occurred in 2016, of which about 95% were in LMIC. Long-term effects of meningitis can be severe and cause life-long disability; they depend on the infective cause and the speed of diagnosis and initiation of treatment. Although the availability and affordability of antibiotics have improved in LMIC, major problems remaining are limited access to healthcare services and laboratory facilities, as well as erratic vaccination coverage, especially in children. Furthermore, a population often overlooked are people with HIV/AIDS. Particularly in southern sub-Saharan Africa, where a large burden of meningitis can be attributed to people with HIV/AIDS. It is estimated that about 15% of all deaths in people with HIV/AIDS are due to cryptococcal meningitis.

Since its first iteration in 1990, the GBD study, in an enormous effort, has been eager to include every potential source of information to estimate prevalence, incidence, deaths, and DALYs for hundreds of diseases worldwide, resorting to scientific literature, surveys, registries, and administrative and insurance records. However, transferability of measures between different regions has been questioned. This is particularly problematic for neurological disorders in LMIC, that have different aetiologies, risk factors, and consequences for health systems and the society at large, rendering lessons learned from high-income countries not necessarily useful. Additionally, case ascertainment varies substantially, even within countries, due to lack of or, if present, expensive diagnostic procedures, as well as lack of trained neurology personnel. At the same time, neurological disorders are the main cause for disability worldwide and people with disabilities caused by neurological diseases are more likely to become poor. Improving neurological training of healthcare workers in LMIC and including neurological disorders and neurorehabilitation in the framework of universal health coverage, currently underway in most LMIC, seems paramount.

Around 98% of the data sources for high-income countries contributing to the GBD Study are from registries and disease surveillance databases—sources rarely available in LMIC. However, digital technology and, in particular, mobile technology and mobile payment systems have transformed the way economies and societies work in LMIC. Harnessing the power of these technologies holds the unprecedented opportunity to accomplish universal health coverage and represents an inflection point for data availability. Mobile payment-based savings and insurance mechanisms have the potential to enable low-income households to gain access to specialised treatment, and these kind of interventions have already been successfully piloted in several sub-Saharan countries. Adoption of already widely available software solutions, like the open-source district health information system (DHIS2) platform used in over 80 countries of Africa, South America, and Asia, and allowing for a common architecture for health data are promising steps towards making high resolution health data from LMIC accessible.

More attention from national and global stakeholders, as well as from funding agencies, is needed. They must support quality research locally (eg, acquiring epidemiological research data through well-established Demographic Surveillance Systems), improve neurological training, and access to diagnostics and treatment. In LMIC, an emphasis on neurology is urgently needed.

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For more on the **global burden of stroke** see **Articles** *Lancet Neurology* 2019; **18**: 439–58

For more on the **global burden of epilepsy** see **Articles** *Lancet Neurology* 2019; **18**: 357–75

For more on **epilepsy in rural Africa** see *Epilepsia* 2009; **50**: 987–93

For more on the **global burden of Alzheimer's disease and other dementias** see **Articles** *Lancet Neurology* 2018; **18**: 88–106

For more on the **global burden of meningitis** see **Articles** *Lancet Neurology* 2018; **17**: 1061–82

For more on **poverty after neurological disease** see *Neurology* 2014; **83**: 377–79

For more on the **uses of mobile technology for health** see <https://www.hfgproject.org/mobile-money-for-health/>