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STROKE AND THE NONCOMMUNICABLE DISEASES: A GLOBAL BURDEN IN NEED OF GLOBAL ADVOCACY

Catalyzed by advocacy in the early period of the global AIDS crisis, the past decades have witnessed a revolution in global health funding, programs, and outcomes. In 2011, global HIV/AIDS programs received \$7.7 billion of development assistance, amounting to 25% of total global health funding. In comparison, all noncommunicable diseases (NCDs) combined received only \$377 million or 1.2% of global health funding, 20-fold less than HIV/AIDS funding.¹ Taken together, NCDs cause an estimated 66% of yearly global mortality.² The percentage of estimated total global mortality due to stroke (11.3%), a single NCD, exceeds that of HIV/AIDS, tuberculosis, and malaria combined (7.2%) by more than 50%.² Even limiting the percentage of the total global burden of mortality due to stroke only to that incurred by low- and middle-income countries (LMIC) still yields a figure (8%) that exceeds the percentage of combined global mortality due to HIV/AIDS, tuberculosis, and malaria. HIV/AIDS, tuberculosis, and malaria together received 35 times more funding than all NCDs combined in 2011.¹

The goal of this comparison is not to argue for a diversion of funds away from infectious diseases (indeed more funding should be committed), but to ask how to generate similar momentum, funding, and innovative programs for NCDs, as our colleagues did so successfully for HIV/AIDS.³ Just over 30 years ago, the cause of AIDS had not yet even been elucidated. It is nothing short of a modern medical miracle how rapidly the basic biology of HIV was understood and treatments were developed. And it is nothing short of a societal miracle how innovative global health strategies are making treatment ever more widely available to the world's most vulnerable populations.

Knowledge of effective, inexpensive, and widely available strategies for the prevention and treatment of stroke and other NCDs precedes the entire history of the HIV/AIDS epidemic. Addressing diet, smoking, blood pressure, and physical activity through lifestyle modification and pharmacologic therapies is

inexpensive and low-tech compared to the feats of molecular biology that were necessary to discover, diagnose, and treat HIV/AIDS. Primary health care in LMIC is expanding, in large part due to shared delivery infrastructure developed through HIV/AIDS-related programs, providing a platform for integration of low-cost effective strategies for NCD prevention and treatment. Yet, in contrast to the extraordinary political and financial responses to AIDS activism, the will to address NCDs has been aptly described as "political apathy."⁴

What is needed now is advocacy akin to that for global AIDS prevention and treatment in order to encourage funding agencies to support innovative strategies for NCD prevention and treatment.³ The abstract NCD moniker has not been able to give a face to the worldwide death and suffering caused by this large group of diseases. Perhaps advocacy centered around stroke as a single deadly and disabling disease whose risk factors include all of the NCD targets could catalyze an effective campaign for NCDs, just as AIDS activism led to a revolution in global health in a way that a campaign for an abstraction such as "global infectious diseases" may never have. While many of the NCDs are so-called silent killers, the images of lives disrupted by disability or premature death from a preventable disease such as stroke could serve as a poignant rallying cry for the NCD community.

By the numbers, stroke is the second leading cause of death² and the third leading cause of disability⁵ worldwide. Although ischemic heart disease exceeds stroke as the leading contributor to the global burden of mortality and disability-adjusted life years (DALYs) lost,^{2,4,5} a higher relative burden of stroke and stroke-related mortality compared to ischemic heart disease occurs in LMIC.⁶ An estimated 16.9 million strokes occurred worldwide in 2010,¹ or one every 2 seconds. Approximately 70% of these strokes occurred in LMIC, accounting for 71% of worldwide stroke mortality and 77.7% of worldwide stroke DALYs lost.¹ This is not simply because a larger proportion of the world's population lives in LMIC: stroke incidence rate, rate of DALY loss, and

Supplemental data
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mortality rate due to stroke are higher in LMIC,^{e1} correlating inversely with country-level macroeconomic status indicators.^{e2} Thus, not only are individuals in LMIC more likely to have strokes, but these strokes are more likely to lead to death and disability. The disparity between LMIC and high-income countries (HIC) is increasing, with a 42% decrease in stroke incidence in HIC and a 100% increase in LMIC over the last 40 years.^{e3}

This disproportionate stroke burden in LMIC is not mediated by a greater prevalence of cardiovascular risk factors in LMIC. Cardiovascular risk is actually lower in low-income countries, where the burden of cardiovascular disease is greatest,^{e4} and national per capita income correlates inversely with stroke mortality and DALY loss rates independent of cardiovascular risk.^{e5} It is therefore inadequate country-level resources to invest in stroke prevention, treatment, and rehabilitation that have led to and perpetuate enormous inequities in stroke incidence and outcomes out of proportion to the burden of stroke risk factors.

We should take inspiration from our colleagues in the field of HIV/AIDS and emulate their advocacy efforts so as to galvanize the public and private sectors to mobilize resources to address the global and inequitably distributed burden of NCDs.³ The “faceless” campaign of statistics and “calls to action” in academic journals has clearly been ineffective for NCDs. Stroke could serve as a symbol of NCD-related disability and mortality. A Global Fund for Stroke and Cardiovascular Disease could provide a focal point to address the common risk factors associated with a number of NCDs, just as global AIDS programming led to an expansion of shared delivery infrastructure for primary health services. The UN General Assem-

bly has set the goal of a 25% reduction in mortality from NCDs by 2025 (“25 × 25”). We must now develop advocacy campaigns that inspire both innovative strategies to achieve this ambitious goal and the commensurate funding to support them.

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