

Effort details global brain disorders research agenda in Nature supplement

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Brain disorders across the lifespan

Research to achieve nervous system health worldwide







Cover of supplement to journal Nature, titled Brain Disorders Across the



Lifespan: Research to achieve nervous system health worldwide. Credit: *Nature*. imageBROKER/

Infants are starved of oxygen during difficult births. Children's cognitive function is permanently damaged due to malnutrition or exposure to infections or toxins. Adults suffer from crippling depression or dementia. The breadth and complexity of these and other brain and nervous system disorders make them some of the most difficult conditions to diagnose and treat, especially in the developing world, where there are few resources. An NIH-led collaboration has studied these complex issues that occur across the lifespan and today published a supplement to the journal *Nature* that lays out a research strategy to address them.

"We may be at a tipping point for research related to global brain disorders," according to an introductory article authored by co-editors Dr. Donald Silberberg, of the University of Pennsylvania, Philadelphia, and Dr. Rajesh Kalaria, of Newcastle University in the United Kingdom. "Over the past few decades, exciting basic science discoveries have been made, effective interventions have been developed and advances in technology have set the stage for a research agenda that can lead to unprecedented progress in this field."

More than 40 scientists collaborated to produce nine review articles that detail research priorities for different aspects of brain disorders in lowand middle-income countries (LMICs). The most strategic opportunities involve cross-disciplinary studies of the relationship among environmental, developmental and genetic factors on brain disorders, the co-authors note. Advances in genomics provide new clues for mental disorders research, including predispositions for substance abuse and addiction, which could be harnessed to improve diagnosis and identify



tailored treatments. The miniaturization of diagnostic technologies and other mobile health advances could improve surveillance, assessment and treatment of mental and nervous system disorders in LMICs, where cell phones are widely used.

To address infection-related <u>nervous system</u> morbidity, scientists should produce accurate estimates of disease burden, develop point-of-care assays for infection diagnosis, improve assessment tools for cognitive and mental health impairment, and study ways to improve infection prevention and treatment. In addition, the authors note that because LMIC populations suffer exposures to toxins due to poorly regulated mining or other industries, there are opportunities to advance scientific understanding of brain responses to environmental challenges.

The authors also advocate for longitudinal studies that would be conducted across the lifespan in LMICs, to study the unique circumstances and risk factors in childhood, adolescence, adulthood and old age. Regional variations in the challenges posed by <u>brain disorders</u> mean that research priorities need to be addressed country-by-country, and by regions within countries. To explore these many research gaps, local scientific capacity must be developed, as these questions are best addressed by indigenous scientists who can seek context-sensitive solutions.

Although they cause nearly one-third of the global burden of disease, brain and <u>nervous system disorders</u> have been largely absent from the global health agenda, according to authors. As the population ages, these disorders will make up a growing proportion of illness and disability. This rise will be steeper in LMICs, where early life trauma, infectious disease and malnutrition contribute to the development of these disorders, the co-authors of the study predict. Although developing countries bear a disproportionately large share of these problems, they have minimal resources to cope with the challenges.



"This burden significantly affects the ability of children and adolescents to thrive and live out their true potential, and the ability of young adults to be productive economically and support their families, as well as the opportunity for older adults to age in safe and nurturing settings," the coauthors observe.

The tide is changing, the supplement's authors acknowledge, with mental health, <u>substance abuse</u> and chemical exposures among the priorities included in the new Sustainable Development Goals, announced by the United Nations last September.

The project, led by the Center for Global Health Studies at the NIH's Fogarty International Center, grew from a meeting of grantees and other scientific experts, convened in February 2014.

While advances in brain imaging, nanoscience and genetics hold much promise for research discoveries, more resources are needed, according to Fogarty Director Dr. Roger I. Glass, who contributed a foreword to the publication. "We hope this supplement inspires other scientists and funding partners to join us in addressing the full spectrum of research, training, implementation and policy questions needed to alleviate global suffering from mental and neurological <u>disorders</u> that occur across the lifespan."

More information: The journal supplement is open-access and available at <u>www.nature.com/brain-disorders</u>

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