MONDAY, APRIL 27, 2026

Smog to Synapse: Unraveling the Web of Neurodegenerative Risk and Resilience

SESSION CHAIRS

Sara Adar
University of Michigan &
HEI Review Committee

David Dorman
North Carolina State University
& HEI Research Committee

SPEAKERS

Burcin Ikiz
Neuro Climate Working
Group / Stanford University

Jennifer Weuve
Boston University
School of Public Health

Deborah A. Cory-Slechta
University of Rochester
Medical Center

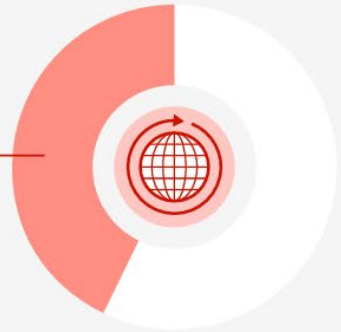
Smog to Synapse: Unraveling the Web of Neurodegenerative Risk and Resilience

Sara Adar, University of Michigan & HEI Review Committee
David Dorman, North Carolina State University and HEI Research Committee

Health Effects Institute

Neurologic conditions are the #1 cause of global disease burden

In 2021, around **3·40 billion individuals** had conditions affecting the nervous system, equivalent to...



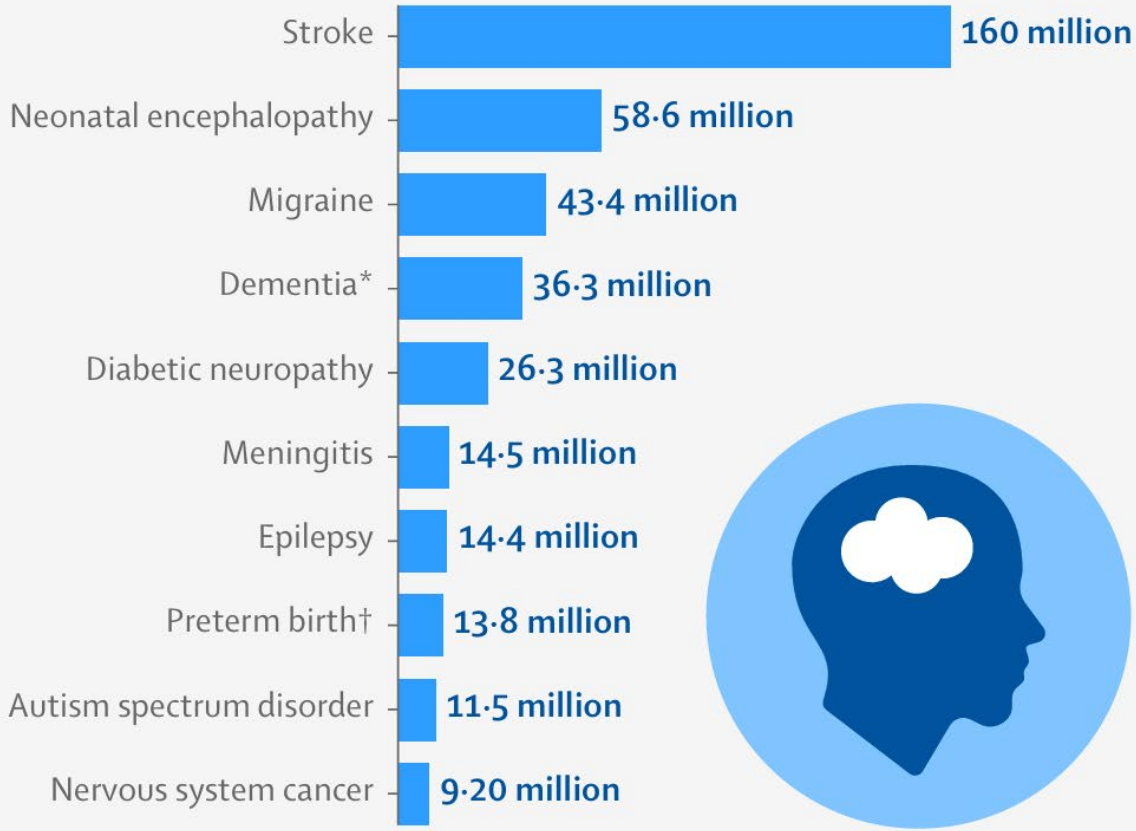
43% of the world population

These conditions contributed to...

443 million **Disability-adjusted life-years (DALYs)**

... making them the leading cause of disease burden worldwide.

The ten neurological conditions that accounted for the greatest DALYs in 2021 were...



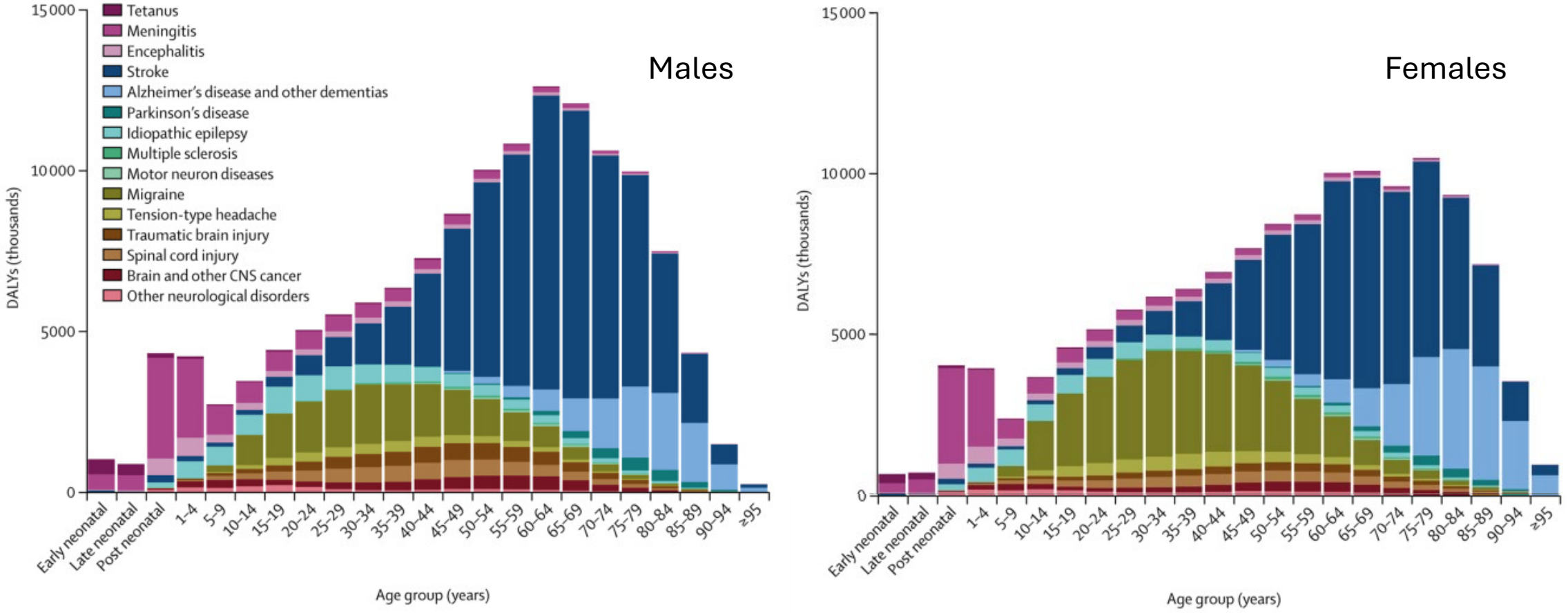
*Alzheimer's disease and other dementias; † Neurological complications associated with preterm birth

GBD 2021 Nervous System Disorders Collaborators. Global, regional, and national burden of disorders affecting the nervous system, 1990-2021: a systematic analysis for the Global Burden of Disease Study 2021. *Lancet Neurology* 2024; published online March 14. https://doi.org/10.1016/S1474-4422(24)00038-3.

Strong Patterning of Diseases by Age Encourages Life-Course Thinking

Global, regional, and national burden of neurological disorders, 1990–2016: a systematic analysis for the Global Burden of Disease Study 2016

*GBD 2016 Neurology Collaborators**



GECC | GATEWAY EXPOSOME COORDINATING CENTER

- Identify research priorities through inclusive consensus-building
- Develop guidance for measuring, harmonizing, and using exposome data
- Create novel exposome measures and data
- Disseminate open-access resources to the broader research community
- Build capacity through guidance documents, publications, and workshops

HEI-Funded Research

Chen 2017

Particulate Air Pollutants, Brain Structure, and Neurocognitive Disorders in Older Women

Guxens 2022

Associations of Air Pollution on the Brain in Children: A Brain Imaging Study

HEI Panel 2022

Systematic Review and Meta-analysis of Selected Health Effects of Long-Term Exposure to Traffic-Related Air Pollution

Herting 2025

Air Pollution Exposure, Prefrontal Connectivity, and Emotional Behavior in Early Adolescence

Sheppard 2025

Optimizing Air Pollution Exposure Assessment with Application to Cognitive Function

Carlsten and Cleland

Neurocognitive Effects of Episodic Exposure to Wildfire Smoke: Mechanisms and Patterns of Exposure

Reports available on HEI's website

www.healtheffects.org/publications/research-reports

In progress.
Check out their poster!

HEI
Health Effects Institute

SPEAKERS

Burcin Ikiz
Neuro Climate Working Group / Stanford University

Jennifer Weuve
Boston University School of Public Health

Deborah A. Cory-Slechta
University of Rochester Medical Center