

Editorials

The Algorithmic Blind Spot: Why Artificial Intelligence Needs Data from LMICs – A Call for Papers

Kathleen M Hayden, PhD¹^a

¹ GBHI; Trinity College Institute for Neuroscience, Trinity College Dublin

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Brain health is an emerging global challenge, which has strong implications for the development and implementation of artificial intelligence (AI) in medicine. To date, advances in medicine driven by data from high income countries have shaped everything downstream: what conditions are studied, what populations are enrolled, what tools are validated. This is a problem beyond simple underrepresentation; it is a problem of algorithmic drift. The algorithms generated by AI will not be adequately trained for lower-and middle-income country (LMIC) scenarios unless data from LMICs make their way into the algorithm. Bridging this algorithmic gap requires publication of locally generated, interpreted, and context-specific evidence from LMICs to ensure representation from the *majority* of the global population.

Brain health research has increased exponentially since 2015. But while this trajectory has been marked by scientific breakthroughs—it is fundamentally incomplete. Breakthroughs have been built upon data derived primarily from high-income countries (HICs), creating a gap in the knowledge base that disadvantages the world's largest and fastest-growing populations: those in low- and middle-income countries (LMICs).^{1,2} Brain health is emerging as one of the defining global challenges of the 21st century—not only because populations are ageing and dementia prevalence is rising, but because modern life increasingly places the human brain under continuous strain. Across all ages and regions, people are navigating chronic stress, information overload, social fragmentation, economic insecurity, political instability, and the psychological pressures of rapid technological change. This broader understanding of brain health has strong implications for the development and implementation of artificial intelligence (AI) in medicine.

AI has been portrayed as a potential equalizer in medicine, improving access and reducing disparities. AI can analyze vast datasets to unlock previously hidden patterns in the scientific data (e.g., the often cited AlphaFold success). It is also capable of analyzing and synthesizing data pertaining to brain health. These advances have shaped everything downstream: what conditions we study, what populations we enroll, what tools we validate, what we are able to detect, and ultimately — who gets diagnosed, who gets treatment, and who gets missed. As AI becomes embedded in clinical medicine, it is learning from that same skewed

evidence base – datasets that exclude entire populations. Models trained without diverse populations will be biased. The gaps in our literature become the gaps in our algorithms — and gaps in our algorithms will eventually become gaps in our care.

This failure goes beyond simple underrepresentation; it is a problem of algorithmic drift. When AI models are trained on HIC cohorts—which may share similar lifestyle patterns, genetic backgrounds, and exposures—they learn to optimize for those specific parameters. The resulting algorithm becomes exceptionally good at detecting Condition X in Population A, but functionally blind to the unique biomarkers, behavioral risk profiles, and exposures that manifest as Condition X in Population B (LMICs). Consequently, what appears to be a ‘missed diagnosis’ may be simply a failure of the technology to process data outside its narrow, HIC-defined parameter space.

Meanwhile, the greatest burden of brain health challenges sits in LMICs.³⁻⁵ And yet the researchers there, who live those realities — who understand those contexts— are among the least represented in the evidence base.¹ Using the example of dementia as a brain health challenge, we can see that while the incidence of dementia is declining in HICs possibly owing to societal measures (i.e., policies and practices) that modify the prevalence of risk factors such as better education or treatment for cardiovascular disease^{6,7}; the incidence of dementia is set to increase in LMICs^{6,8} as LMIC populations are aging faster than other parts of the world.^{9,10} This disparity leads to a situation that is scientifically incomplete and inequitable. The problem is com-

^a Kathleen M Hayden, PhD is the Editor-in-Chief of the *Journal of Brain Health*

pounded by the fact that without locally generated, locally interpreted evidence, governments cannot build effective policy, and health systems cannot plan.¹¹ Policies impact brain health by influencing exposures to risk factors.¹² This systemic failure results in a deficit of fundamental public health data—data regarding the existence of national dementia plans, established diagnostic pathways, or even basic levels of community care information. Addressing this systemic knowledge deficit is therefore not only an ethical imperative but also represents perhaps the single greatest untapped frontier in both science and global economic development of our time. Crucially, the demographic shift and accelerating population growth in LMICs position these regions to develop vast human potential—or ‘brain capital’^{13, 14}—at a time when global natural resources are becoming increasingly constrained. The focus must therefore pivot toward harnessing this burgeoning brain economy.

Beyond sheer scale, LMICs hold invaluable intellectual resources: rich cultural frameworks, unique community-based care models, and innovative localized approaches to diagnosis and intervention.^{15,16} Shifting investment and policies to focus on brain health, brain capital, and the brain economy¹⁷ have the effect of improving productivity, creativity, and stimulating the economy.¹⁸ The capacity for brilliant scientific advances exists within LMICs and that starts with increasing the scientific output of LMICs. The *Journal of Brain Health* is seeking papers that help to fill these gaps. Submissions presenting findings from epidemiological studies, programs that support or enhance brain health, and policy positions that make positive impacts on brain health at a population level are welcomed.

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