



Barriers to implementation of evidence into clinical practice in low-resource settings

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Low-resource settings lag behind the rest of the world in achieving good health, in part owing to poor translation of clinical evidence into practice. Focusing on neurological disorders — in particular, stroke — this Comment identifies barriers to translation at the individual, provider and health systems levels and proposes theory-driven mitigating solutions.

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Low- and middle-income countries (LMICs) and underserved populations in high-income countries (HICs) contribute disproportionately to the global burden of disease, accounting for more than 80% of global mortality and disability^{1,2}. Neurological disorders such as stroke and dementia are leading causes of death and disability-adjusted life years worldwide³. Moreover, brain health is crucial to physical, mental, social and spiritual well-being.

Advances in evidence-based clinical interventions for neurological disorders have led to increased life expectancy and a trend towards reduced morbidity, but these benefits have often failed to translate to low-resource settings (LRSs)^{1,2,4,5}. Here, we highlight barriers to the translation of evidence on neurological diseases into clinical practice in these settings across the four pillars of what we term the neurological quadrangle — surveillance, prevention, acute care and rehabilitation — at the individual, provider and health systems levels⁶ and discuss how these barriers might be overcome (Supplementary Table 1).

At the individual level, barriers to implementation of evidence into clinical practice include lack of awareness about neurological diseases and evidence-based interventions. Other barriers include poor brain health, poverty and inability to afford the out-of-pocket payments for neurological services. These factors result in delayed presentation or non-presentation to health-care facilities, presentation to unorthodox facilities and/or poor treatment adherence. Access to appropriate prevention and care is also impaired by external factors, including inefficient transportation to remote health facilities.

To resolve these challenges, individuals can be empowered through population-wide education and enlightenment using social, print and electronic media and digital tools, including point-of-care devices to monitor and promote personal health and longevity. For example, information about stroke prevention, detection and acute care can be disseminated via

interactive media. In addition, enabling environments, including safe and secure neighbourhoods with walkways and playgrounds, can promote a healthy lifestyle and thereby help to prevent neurological disorders.

Barriers at the health-care provider level include inadequate quantity and quality of health-care workers to provide surveillance, research, prevention, acute care and rehabilitation services. In LRSs, health-care systems depend heavily on individual performance of the few available health workers, who are often overstretched by high disease burdens and workforce shortages⁷. Poor motivation can lead to negative provider behaviour, such as absenteeism, poor communication and discourteous treatment of patients, which in turn leads to distrust and reduced use of the service⁷. The negative effects of these actions are frequently overlooked by policy makers and administrators owing to low levels of accountability. Skills gaps in LRSs are often traceable to inadequate training curricula, lack of training facilities and resources, and dysfunctional health systems⁷. These skills gaps not only hinder effective service delivery but also result in an inability to identify evidence gaps and conduct research aimed at generating and implementing evidence-based solutions.

To address these workforce barriers and help to bridge the service and research gaps in neurology-related health care, education, training, incentivization and enablement strategies will be required⁸. Strategies include reinvigoration of existing programmes and creation of new courses and programmes, augmented by remote learning, short exchange programmes and hands-on workshops. Curricula and mentorship schemes should incorporate programmes to impart adequate clinical, cognitive, self-learning, psychomotor, empathic, research, multidisciplinary, collaborative, communication, creative and leadership skills. This intervention will require multisectoral investment, coupled with supervised, regulated, protocol-based task shifting and task sharing in the short term. For stroke services,

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neurological organizations such as the World Stroke Organization and OneNeurology could facilitate these initiatives.

At the health-care systems and organizational micro level, lack of efficient health-care processes and structure limits knowledge translation. Health-care structure comprises infrastructure, facilities, workforce, supplies and guidelines. Health-care processes include clear care pathways, clinical diagnostic and prognostic tools, functional referral systems, effective information systems, task-shifting protocols and interdisciplinary harmony. The absence of these processes in LRSs has led to inefficient use of limited resources. Furthermore, clinical practice guidelines in these settings are often absent or low quality compared with high-income settings, and are often based on evidence extrapolated from other settings with inadequate emphasis on implementation pathways and pragmatic solutions. For instance, a systematic review of stroke guidelines in LMICs revealed deficiencies that resulted in poor uptake of clinical evidence into practice⁵.

Collaborative efforts could create evidence-based, pragmatic solutions for LRSs by going through the stages of the implementation cycle (Supplementary Table 1). This strategy will ensure realistic translation of evidence by providing structures and ecosystems for successful implementation of co-created recommendations. Solutions include local validation of diagnostic and prognostic tools, adaptation of locally derived resources, appraisal of referral systems, health-care provider conflict resolution, and research into locally adaptable health-care delivery models. Health insurance and pharmaceutical company incentives and telemedicine can be used to provide and administer preventive and acute reperfusion therapies.

At the health-care systems and organizational macro level, political and socioeconomic considerations involve multisectoral national and international decision makers, including policy makers, regulators, implementation partners and payers. Decisions on health funding, redesign of health systems and health-care access are made at this level. Public health systems in LRSs are affected by many factors, including weak economies, low health budgets, insecurity, political instability and conflicts, inefficient health insurance systems, corruption, distrust and a failure to use systems analysis to drive actions⁹.

To improve neurological care in LRSs, we advocate a multisectoral approach that involves optimization of public–private partnerships and collaboration with non-governmental organizations and professional societies⁹, in addition to effective primary health-care policies, improved payment options and health financing solutions. All stakeholders need to collaborate to resolve facility-related inefficiency and generate data to define and bridge the gaps in care. Legislation and policies should cover education, training, environmental restructuring, incentivization and other interventions. On a larger scale, more effective HIC–LMIC and LMIC–LMIC partnerships could increase resources

and build capacity. To improve stroke surveillance, prevention, acute care and rehabilitation, the World Health Organization (WHO)–World Stroke Organization–Lancet Commission on stroke is developing the global Stroke Control, Observatory, and Reduction Ecosystem (gSCORE)¹⁰. This ecosystem will harness and leverage global resources, including the WHO and United Nations non-communicable disease control plan and the WHO intersectoral global action plan against neurological diseases.

To develop efficient interventions against neurological disorders for LRSs, needs-driven research covering discovery science, population health, health systems analysis, implementation science, social accountability and management frameworks is crucial. The COVID-19 pandemic has highlighted the importance of good health and well-being (Sustainable Development Goal (SDG) 3) to the other SDGs, including security and economy. Good health is necessary for human capital development, which is vital for improving the economies of LMICs and underserved populations in HICs. Investment in health research and services coupled with education could help to create a better world in which evidence-based solutions are equitably translated into better health and well-being for everyone.

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Competing interests

The authors declare no competing interests.

Supplementary information

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