World Health Organization

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WHO position paper

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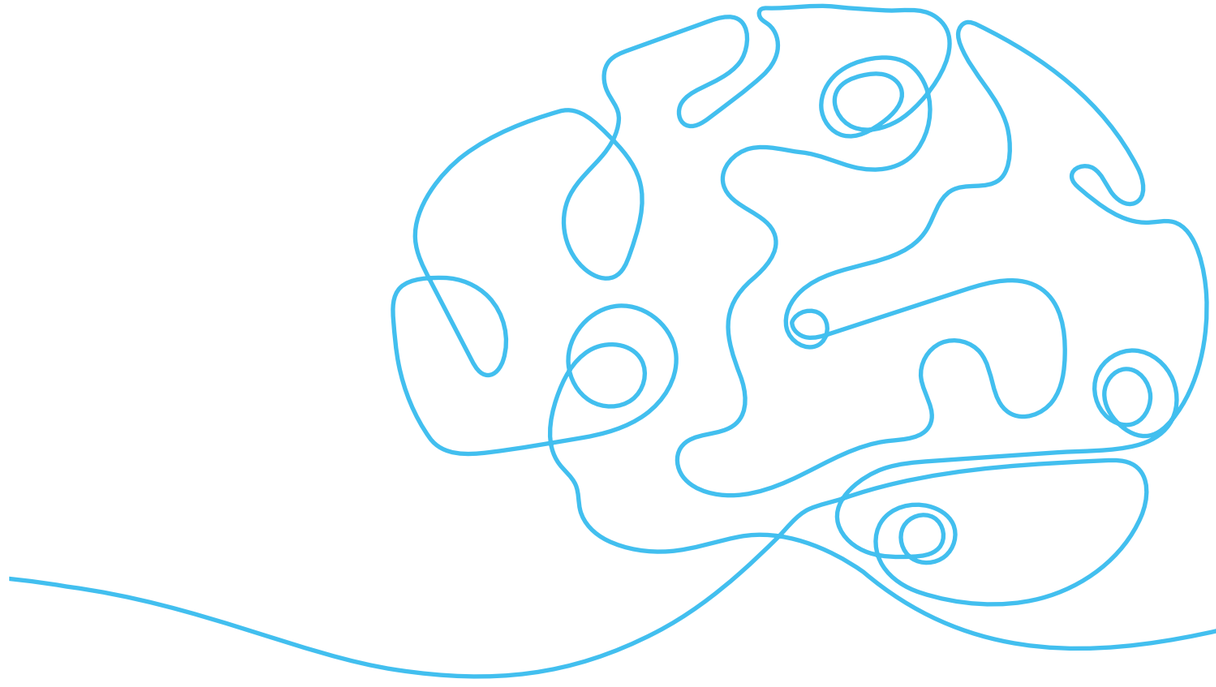

Optimizing brain health across the life course: WHO position paper

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Foreword

The brain is by far the most complex organ of the human body, allowing us to sense, feel, think, move and interact with the world around us. The brain also helps regulate and influence many of our body's core functions including those of the cardiovascular, respiratory, endocrine and immune systems. A multitude of factors can affect our brain health from as early as pre-conception. These factors can pose great threats to the brain, leading to immense missed developmental potential, global disease burden and disability. Yet, these factors also represent great opportunities for action. Optimizing brain health across the life course means addressing five major groups of determinants, namely: physical health; healthy environments; safety and security; life-long learning and social connection; as well as access to quality services.

Advances in neuroscience and neuroimaging – in combination with other disciplines such as artificial intelligence, machine learning and data science – are drivers of research into the human brain, lifting multisectoral discourse and discovery to entirely new levels. This is a cause for great excitement and optimism.

However, if the factors that have a dire impact on brain health are left unaddressed, we shall fail both to promote everyone's full potential and to reduce the burden of neurological conditions, thereby impeding not only health but also social and economic development globally. We will achieve bold global commitments – such as the United Nations Sustainable Development Goals, WHO's Triple Billion targets and the recently-adopted Intersectoral global action plan on epilepsy and other neurological disorders 2022–2031 – only if we work together to address brain health at all societal levels and across all sectors of society.

With this WHO position paper I am pleased to present a conceptual framework for optimizing brain health across the life course that will help us to raise awareness of the pressing need to establish brain health as a global priority. As such, this position paper represents an important tool for supporting the implementation of the new intersectoral global action plan. Let's not forget, optimizing brain health across the life course will improve health outcomes and well-being for all people in all corners of the world.

Dr REN Minghui
Assistant Director General
Universal Health Coverage/Communicable and Noncommunicable Diseases

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Abbreviations

ACEs	Adverse childhood experiences
BDNF	Brain-derived neurotrophic factor
CDC	Centers for Disease Control and Prevention
CNS	Central nervous system
CST	Caregiver skills training
CT	Computed tomography
DALYs	Disability-adjusted life years
DNA	Deoxyribonucleic acid
GSED	Global Scale for Early Development
HAT	Helping adolescents thrive
HPA axis	Hypothalamic–pituitary–adrenal axis
ICF	International Classification of Functioning, Disability and Health
IHME	Institute for Health Metrics and Evaluation
MRI	Magnetic resonance imaging
NCDs	Noncommunicable diseases
NCF	Nurturing Care Framework
OECD	Organisation for Economic Co-operation and Development
PHC	Primary health care
RNA	Ribonucleic acid
SDGs	Sustainable development goals
TBI	Traumatic brain injury
TCE	Trichloroethylene
UHC	Universal health coverage
UN	United Nations
UN CRPD	United Nations Convention on the Rights of Persons with Disabilities
UNICEF	United Nations Children's Fund
USA	United States of America
WHO	World Health Organization

Executive summary

> Lack of brain health is often invisible; make it visible! Brain health affects us all. Not only the person with a brain condition but also their family, friends, colleagues, etc.”

Anja Minheere, Netherlands

Introduction

Brain health is an evolving concept that is attracting increasing attention not only from the health sector but also from wider society, stimulating rich debate – and for good reasons. The brain and central nervous system (CNS) are widely recognized as the command centre of the human body, controlling both conscious and unconscious body functions and thereby influencing every aspect of life. If our brains are challenged by disease or other factors, this poses significant risks not only to the individual's overall health and well-being but also global development and productivity. Optimizing brain health, on the other hand, can lead to a wide array of benefits for the individual and society.

One way to stress the importance of optimizing brain health is to quantify the impacts of missed developmental potential in children which lead to cycles of poverty and health inequities. For example, in 2017, 43% of children under the age of 5 years in low- and middle-income countries (nearly 250 million children) were at risk of not reaching their developmental potential due to extreme poverty and stunting. The costs of inaction are high, with the financial losses alone for this missed developmental potential projected to be around 26% lower annual earnings in adulthood. Moreover, too few countries globally have family-friendly policy protections in place with the aim of safeguarding child brain development, such as programmes to offer tuition-free pre-primary school education,

disorders led by stroke, migraines, dementia and meningitis are currently the number one cause of disability globally. In addition, neurological disorders are the second leading cause of death, responsible for 9 million deaths per year. Global trends over the past three decades – largely driven by worldwide demographic changes and population ageing – suggest that these numbers will only increase. Nearly one in three people globally will develop a neurological disorder at some point in their lifetime, which means that virtually all readers of this paper will be touched by neurological disorders, either directly or indirectly. Further, the financial costs of neurological disorders are enormous, with common neurological disorders accounting for US$789 billion in the United States of America alone.

Unfortunately, global action on brain health is grossly insufficient. Despite growing threats to brain health, there is limited policy response to address brain health comprehensively and there are inadequate services to promote and optimize brain health for people with lived experience. Regardless of the huge global burden, access to services and support are both inadequate and unevenly distributed across country income brackets and between urban and rural areas within countries. Numerous barriers to accessing timely and responsive services for neurological disorders exist globally, including the limited number of health workers with neurology-specific training in lower-resource settings.

disorders, to develop a position paper on optimizing brain health across the life course through an iterative process of desk reviews, consultations and peer review. The position paper provides a conceptual framework of brain health and brain health optimization **(see Box 1)**.

The paper outlines the determinants of brain health, describes the impact that optimizing brain health would have for the individual as well as for society, and offers practical policy solutions and future directions for the field.

A framework for brain health optimization

Numerous concepts and definitions of brain health exist and have gained traction in various settings in recent years. Many definitions of brain health focus on older life, with implications for specific neurological conditions (e.g. dementia or stroke), while others focus mainly on one domain of brain functioning (e.g. cognition), which also holds implications for specific neurological conditions (e.g. dementia). Some definitions of brain health span multiple domains of brain functioning, developmental phases across the life course, and disorder categories (including mental health, neurological, substance use and pain conditions).

Box 1.

What is brain health and what does optimizing brain health mean?

Brain health can be defined as the state of brain functioning across cognitive, sensory, social-emotional, behavioural and motor domains, allowing a person to realize their full potential over the life course, irrespective of the presence or absence of disorders.

Continuous interactions between different determinants and a person's individual context lead to lifelong adaptation of brain structure and functioning.

Optimizing brain health improves mental and physical health and also creates positive social and economic impacts, all of which contribute to greater well-being and help advance society.