



Neurosurgery and Sustainable Development Goals

Ernest J. Barthélemy^{1,2}, Kee B. Park², Walter Johnson³

■ **BACKGROUND:** On September 25, 2015, the United Nations General Assembly adopted a 17-goal action plan to transform the world by the year 2030, ushering in the Era of Sustainable Development. These Sustainable Development Goals (SDGs) were designed to continue where the preceding Millennium Development Goals left off, expanding on the Millennium Development Goal successes, and facing the challenges encountered during the previous decade and a half. The current Era of Sustainable Development and its impact on a breadth of neurosurgical concerns provide several unprecedented opportunities to enhance political prioritization of neurosurgical care equity. Neurosurgeons could therefore be well positioned to participate in the leadership of these global health development and policy reform efforts.

■ **METHODS:** Each of the 17 SDGs was reviewed and analyzed for its relevance to the public health aspects of neurosurgery. The analysis was guided by a review of the literature performed in PubMed, Google Scholar, and the databases of the World Health Organization.

■ **RESULTS:** Among the 17 SDGs, 14 were found to be of direct or indirect relevance to neurosurgeons and neurosurgical care delivery. Results of this analysis are presented and discussed, and recommendations are provided for using this knowledge to inform the emerging discipline of global neurosurgery.

■ **CONCLUSIONS:** This article contributes to the global neurosurgery movement by providing the socially and

globally conscious neurosurgeon with a compass for directing the place of neurosurgery in the international agenda for sustainable development.

INTRODUCTION

On September 25, 2015, the General Assembly of the United Nations adopted a 17-goal action plan to transform the world by the year 2030.¹ These Sustainable Development Goals (SDGs) were designed to continue where the preceding Millennium Development Goals (MDGs) left off, expanding on the MDG successes, and facing the challenges encountered during the previous decade and a half.² Inequities in surgical care constitute a vital area of health care disparity that was inadequately prioritized by the international community in the MDG era, for example strengthening maternal and child health care without a commensurate improvement in maternal or child surgical care capacity. Despite this situation, the current Era of Sustainable Development and its impact on a breadth of neurosurgical concerns provide several unprecedented opportunities to enhance political prioritization of surgical care equity in general and neurosurgical care equity in particular.^{2,3}

The term global neurosurgery is relatively recent in the parlance of academic neurosurgeons; it describes an emerging interdisciplinary field exploring the interface between neurosurgery and the SDGs and the impact of worldwide neurosurgical care inequities on social justice.⁴ Neurosurgeons, by engaging in the work of global neurosurgery, are well positioned to participate in the

Key words

- Global health
- Global neurosurgery
- Global surgery
- Public health
- Sustainable development goals

Abbreviations and Acronyms

- IPV:** Intimate partner violence
LMIC: Low- and middle-income countries
MC: Motorcycle collision
MDG: Millennium Development Goal(s)
RTA: Road traffic accident
SDG: Sustainable Development Goal

TBI: Traumatic brain injury

WHO: World Health Organization

From the ¹Department of Neurosurgery, Icahn School of Medicine at Mount Sinai, New York, New York, USA; ²Program in Global Surgery and Social Change, Harvard Medical School, Boston, Massachusetts, USA; and ³Emergency and Essential Surgical Care Programme, World Health Organization, Geneva, Switzerland

To whom correspondence should be addressed: Ernest J. Barthélemy, M.D., M.A.
[E-mail: globalneurosurgeon@gmail.com]

Citation: *World Neurosurg.* (2018) 120:143-152.

<https://doi.org/10.1016/j.wneu.2018.08.070>

Journal homepage: www.WORLDNEUROSURGERY.org

Available online: www.sciencedirect.com

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Table 1. The Neurosurgeon's Role in Achieving Sustainable Development Goal 3: a List of Specific Areas of Neurosurgery That are of Direct Relevance to the Achievement of Sustainable Development Goal 3

Ensure Healthy Lives and Promote Well-Being for All at All Ages			
Sustainable Development Goal 3 Target Number	Sustainable Development Goal Target Description	Neurosurgeon's Role	References
3.1	By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births	Neurosurgical diseases that affect maternal morbidity and mortality during pregnancy include hypertension-associated and eclampsia-associated conditions such as aneurysmal subarachnoid hemorrhage, and intracerebral hemorrhage	5,6
3.2	By 2030, end preventable deaths of newborns and children <5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1000 live births and under-5 mortality to at least as low as 25 per 1000 live births	The evolution of treatments for pediatric hydrocephalus and spina bifida in the developing world are among the most impactful contributions of neurosurgeons to newborn and child health in low-income, middle-income, and high-income countries	7-9
3.3	By 2030, end the epidemics of AIDS, tuberculosis, malaria, and neglected tropical diseases and combat hepatitis, waterborne diseases, and other communicable diseases	Neurosurgical consultation and treatment is an indispensable component of managing infections of the head, brain and spine, including abscesses, Pott disease, neurocysticercosis, toxoplasmosis, and human immunodeficiency virus/AIDS-associated diseases of the nervous system	10,11
3.4	By 2030, reduce by one third premature mortality from noncommunicable diseases through prevention and treatment and promote mental health and well-being	Neurosurgery is primarily concerned with the prevention, diagnosis, and treatment of noncommunicable diseases of the nervous system, including trauma, and conditions of vascular, oncologic, and degenerative cause	12,13
3.5	Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol	Surgical treatments for drug addiction are an active area of investigation in functional neurosurgery, promising revolutionary strategies for treatment of this area of neuropsychiatric disease	14-17
3.6	By 2020, halve the number of global deaths and injuries from road traffic accidents	Head and neck trauma is the most common cause of mortality from motorcycle accidents. Neurosurgeons play a vital role in advocating for helmet-wearing policies that reduce these injuries, and providing timely access to the lifesaving care required to manage these injuries	18-22
3.7	By 2030, ensure universal access to sexual and reproductive health care services, including family planning, information, and education, and the integration of reproductive health into national strategies and programs	Neurosurgical treatment of pituitary disorders is an important aspect of the reproductive health care armamentarium	5,23-25
3.8	Achieve universal health coverage, including financial risk protection, access to quality essential health care services, and access to safe, effective, quality, and affordable essential medicines and vaccines for all	Access to timely affordable neurosurgical care is part of a comprehensive health care system that provides essential services to populations in need	3
3.9	By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water, and soil pollution and contamination	As biomedical research elucidates the nature of environmental influences on neurodevelopmental and cancer biology, neurosurgeons have an increasing responsibility for considering the impact of these risk factors on neurosurgical patients	26-31
3.a	Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate	Neurosurgeons play an important role in educating patient populations globally about the nefarious effects of tobacco on neurosurgical diseases such as cerebral aneurysms and central nervous system tumors	32-34

Continues

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