Consensus Recommendations of the Neuroscience-20 (N20) Group to the G20 Leaders and Sherpas

Convened by the Society for Brain Mapping and Therapeutics (SBMT) and Brain Mapping Foundation (BMF) at the Hilton Puerto Madero, Buenos Aires, Argentina, 26-27 November 2018

Attn: HE Ambassador Pedro Villagra Delgado, G20 Sherpa, Argentina
CC: HE Prof. Adolfo Rubinstein, Governmental Secretary of Health of Argentina
HE Lino Baranao, Governmental Secretary of Science and Technology, Argentina

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Buenos Aires, Argentina, 27 November 2018

Recognizing that the global economic burden of brain, spine, and other nervous system disorders amounts to over a $13 Trillion (USD) annually.

SBMT and BMF founded the Neuroscience-20 Group in order to create the world's first think-tank for basic, translational and clinical neuroscience consisting of physicians, surgeons, researchers, engineers, non-profits, government officials, industry leaders, venture philanthropists and entrepreneurs. In the last 5 years N20 has met its mission and held its meetings in conjunction with the G20 Leaders summits.

The N20 group wishes to share its policy recommendations based on the real-world experience of its members and the organizations they are affiliated with. One objective is to have an agenda item on the upcoming and future G20 Leaders' Summit on the Global Economic Burden of Diseases and Injuries of the Brain and Spine.

The group plans to publish its recommendations in high-impact scientific journals, publicizing its finding and recommendations within the next 3 months through a series of press releases and fully engaged the G20 leaders, Sherpas, finance, science and health ministers.

The N20 Policy Recommendations 2018

R1. Account for the Global Economic Burden of Diseases and Injuries of the Brain, Spine, Retina, and Peripheral Nervous System.

Multiple studies analyzing the economic burden of neurological disorders have been undertaken recently in the EU and the United States. Some G20 countries do not have national figures on the costs of the neurological, neuro-psychiatric and spinal disorders to their economies, which are estimated to be in billions.

In order to prioritize policy making in public health, health systems reform, social services, prevention, and research and innovation policy, it is essential to understand the magnitude of the direct and indirect economic and societal cost of such disorders.

Action item:

- Encourage funding of studies analyzing the economic burden of neurological, psychiatric and spinal disorders, and more importantly, the establishment of an international data repository.

R2. Raise Awareness to Stop Stigmatization of Neurological and Neuro-psychiatric Diseases

The burden of mental illness and other brain and spine diseases is exacerbated by societal stigmatization of patients. This leads to feelings of shame and can worsen or even cause new morbidity, like depression and suicide, not only in patients, but also for families and caregivers. This adds to the already existing overload of health services and can thus prevent patients from obtaining proper diagnosis and adequate healthcare.

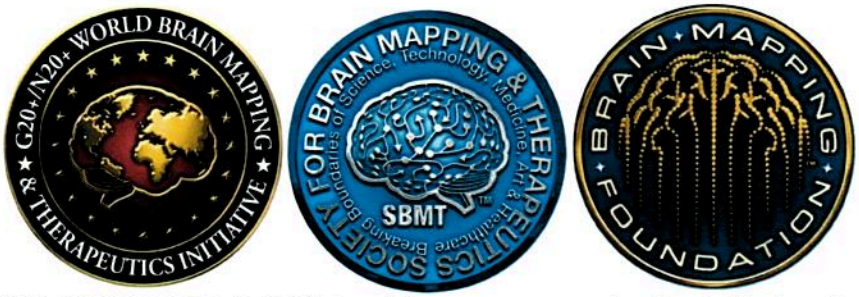
Ending stigmatization of neurological and psychiatric disorders can be achieved through education of caregivers, work place programs, and public campaigns in partnership with industry leaders, academic center, governments and non-profits. In research and healthcare system policy, the aspiration should be to phase out the dichotomy between psychiatry and neurology. This can be achieved by writing joint calls for research funding and better fund research in the neurological mechanisms of psychiatric conditions, as well as brain connectivity, functional mapping, and research on the underlying connectome, basic and clinical brain and spinal mapping and therapeutics.

Action Item:

- Promote education to destigmatize mental health.
- Encourage research funding into the neurological mechanisms of psychiatric conditions, as well as brain and spine functional mapping and therapeutics.

R3. Close the Gaps in Access to Neurodegenerative Disorders and Epilepsy Care

Neurological disorders are prevalent globally. For example, epilepsy accounts for 1% of the Global Health Burden. Yet millions of patients around the world are not diagnosed and / or do not have access to care for this debilitating disease. This treatment gap is economically devastating and should be addressed through multiple action items:



- For under-served areas in G20 countries, governments should foster the introduction of low-threshold screening technologies, such as mobile EEG in combination with tele-medicine.
- In order to harmonize treatment protocols and promote access to new treatment options worldwide, create international frameworks for multi-center clinical trials including data sharing.
- Promote epilepsy surgery where indicated through education and appropriate referral.
- Address the insufficient deployment of advanced technologies in epilepsy care in the G20 countries
- In addition, apply the same strategies to address unmet patient needs in neurological disorders such as Alzheimer's Disease, Dementia, Parkinson's Disease, Pain disorders, Movement Disorders and Spinal Disorders
- Promote development of innovative technologies, such as nanotech, molecular, cellular and device based therapeutics.

R4. Promote a Whole-of-Government Approach to Address Brain and Spine Disease and Injury (BSDI)

A significant reduction of the incidence of BSDI can be achieved through prevention. The lowest cost incidence of a traumatic brain and spine injury (TBSI) is the one that does not occur in the first place. On the other side of the spectrum, research, development and innovation can significantly increase treatment efficiency and efficacy, reduce cost, human suffering and increase access to care. To achieve optimal policy outcomes, a whole-of-government approach is necessary, through multiple action items:

- Encourage industry and entrepreneurs to invest in innovative approaches to prevent and treat SBDI by ensuring the long-term predictability of government regulatory approval processes for the development of therapeutics and devices.
- Encourage national and International Brain and Spine societies, as well as Patient and Research organizations and foundations to network globally to enable knowledge transfer, good laboratory practices, clinical protocol sharing, and foster collaboration
- Bring **National Research Funding Organizations (NRFOs)** together to set up and fund Global partnerships and new funding initiatives across academic, educational, industry and non-profit organizations.
- Departments of Transportation and Road Safety Services in G20 Countries should start or renew campaigns for road safety and accident prevention in order to reduce the incidence of Traumatic Brain and Spine Injuries.
- Initiate preventive programs, which involve education, exercise and follow ups.
- Adopt national outcome registries for BSDI approaches and procedures and create a framework to link such anonymized databases. Encourage G20 member states to make their national registries available.
- In Research and Innovation Policy: Facilitate the translation and Commercialization of technologies across disciplines of science in order to rapidly identify and introduce

new generation of therapeutics including stem cells, nanotechnology, device, neurophotonics and imaging, as well as personalized computer models of lesions to plan therapy.

- Work towards harmonization of global regulations and guidelines on clinical trials and drug/device combination discovery.
- Fund research in linkages between brain health and vision/auditory systems and digestive tract microbiome.

R5. Fund the Responsible Application of Technologies Associated with the Digital Transformation for Brain and Spine Research and Clinical Treatment

Digital transformation touches every area of our lives and healthcare. For Brain and Spine Disease and Injury (BSDI), it is critical that we enable ethical and effective use of technologies such as Machine and Deep Learning, Artificial Intelligence Applications, High Performance Computing, Simulation Science, High Resolution Brain and Spine Mapping and Disease Modelling.

Action items:

- Identify and Fund Machine and Deep Learning technologies in order to fast track new life saving diagnostics and therapeutics.
- Use cloud solutions/blockchain with high standards on data safety and security to make data, knowledge, and interactive atlases available and accessible across G20 countries and beyond.

Summary Recommendation for the G20 Leaders:

1. Given the cost of the neurological disorders to the world economy (>$13 Trillion USD), ensure that N20 is an integral part of the future G20 Summits and its leadership discussions.
2. Facilitate global partnership of Brain and Spine research, development, and policy.
3. Enable the implementation of the N20 recommendations listed as above.

The undersigned endorse the above recommendations, either in their professional capacity, and/or as representatives of their respective organizations. Overall, the participating organizations represent public outreach and are collectively engaged with over 2.5 million professionals worldwide.

SBMT and its partner organizations are committed to improving the quality of life of patients with neurological, spinal and psychiatric disorders worldwide. We support national and international governmental initiatives, which could impact global human health. We are willing to advise in the formulation and implementation of these policy recommendations.

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Babak Kateb, MD
Chairman and CEO of Society for Brain Mapping and Therapeutics (SBMT)
President of Brain Mapping Foundation (BMF)
Global President, Chairman and CEO of N20, USA

Alejandro Mercado, MD
President of N20-Argentina
Captain, Argentinian Army, Argentina

27/11/2018

Kuldip Sidhu, PhD
President of N20-Australia
President of SBMT-Australia
Global Vice-Chairman of N20, Australia

Tatiana Peres Vilasboas Alves, MD
Global Secretary, Walter Dandy Society, Brazil

Hani Mhaidli MD, PhD
President-Elect, Society of Latin American and Iberian Spine Societies (SILACO), Spain

Claudio Gustavo Yampolsky, MD
President, Federation of Latin American Neurosurgical Societies (FLANC), Argentina

Pablo Gustavo Jalon, MD
President, Spine Chapter Federation of Latin American Neurosurgical Societies (FLANC)
President, Society of Neurological Surgery of Buenos Aires (SCNBA), Argentina

Margareta Nordin Dr.Med.Sci
Past President, EUROSPINE
President World Spine Care Europe, France

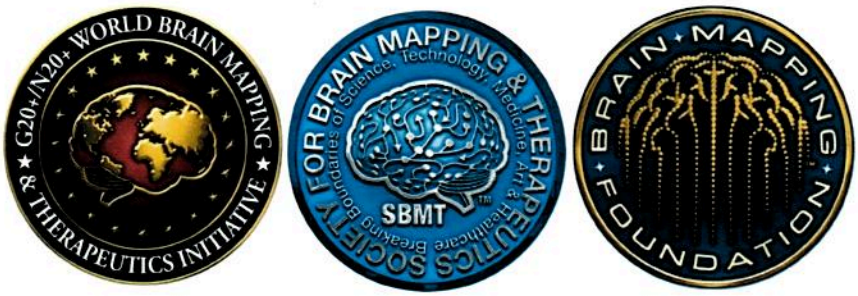
Katrin Amunts MD, PhD
Scientific Director, EU Human Brain Project (HBP)
Director, Institute for Brain Research
Dusseldorf University Hospital
SBMT Board Member, Germany

Eric Muehlbauer, MJ, CAE
CEO of North American Spine Society (NASS), USA

Nevzat Tarhan, MD
President of Turkish-American Neuro-Psychiatric Association (TANPA)
President of N20 Turkey
President of SBMT-Turkey
President of Uskudar University, Turkey

Vicky Yamamoto, PhD
Executive Director of SBMT
Executive board member VP of Brain Mapping Foundation, USA

Venkatraman Sadanand, MD, PhD
COO and Member, Board of Directors SBMT, USA



Christoph Ebell
Senior Vice President of N20
SBMT Board member, Switzerland

Luis A Camputaro MD MBA MSC FCCM FAHA
Associate Professor Internal Medicine. School of Medicine. Buenos Aires Universtity
Coordinator Neurovascular Neurointensive Care
Intensive Care Department
Hospital Juan A Fernandez

Tarhan Nevzat MD
Professor of Psychiatry. Uskudar University Istanbul Turkey

Dawn Eliashiv MD
Professor of Neurology, David Geffen School of Medicine at UCLA
Co Director UCLA Seizure Disorder Center
Commission, ILAE/IBE
Executive Board of SBMT
Los Angeles, California, USA

Roberto Steven Zaninovich M.D.
Chief Oncological Neurosurgery Section
Hospital de Clinicas, University of Buenos Aires, School of Medicine
Buenos Aires, Argentina

Fabian Cremaschi, MD, MSc
Head Professor
Clinical and Surgical Neurology
Department of Neuroscience
School of Medicine. National University of Cuyo
Mendoza, Argentina

Matteo Maria Baccanelli
Director
Interinstitutional Relationship Department
Instituto Universitario del Hospital Italiano
Associated Professor, Chief of Vascular Surgery, Department of Neurosurgery
Hospital Italiano de Buenos Aires, Argentina

Deborah Zelinsky, O.D., F.C.O.V.D., F.N.O.R.A.
Executive Director of Research
Mind-Eye Institute
Northbrook, IL USA
Adjunct Professor, College of Optometry, Western University of Health Sciences
Pomona, CA USA

Jorge Mura, MD, IFAANS, FACS
Assistant Professor of Neurosurgery.
Department of Neurological Sciences. University of Chile.

Chief of Cerebrovascular Surgery & Skull Base Surgery.
Institute of Neurosurgery Asenjo. Providencia. Santiago. Chile.
Department of Neurosurgery. Clinica Las Condes. Chile.
Coordinador of Cerebrovascular & Interventional Chapter.
Chilean Society of Neurosurgery.

Fabian Castro Barros, MD
First Lieutenant – Argentinian Army
Skull Base Division of Neurosurgery Service, Central Army Hospital
Instructor of Residents, Central Army Hospital, Buenos Aires.
Assistant Professor of Anatomy, School of Medicine, University of Buenos Aires.

Luis Fernando Zapata Mansilla, MD
First Lieutenant – Argentinian Army
Neurosurgeon Staff, Regional Hospital Army, Mendoza.

Fernando Ezequiel Petra MD, PhD
Associate Professor of Neurointerventional Radiology
National University of Cuyo
Assistant Junior Professor of the European Board of Interventional Radiology

Federico Landriel MD
Assistant Professor in Neurosurgery
Argentinian Association of Neurosurgery Spine Chapter Coordinator
Staff Spine Neurosurgeon
Neurosurgery Residency Program Coordinator
Hospital Italiano de Buenos Aires, Argentina

Jorge Rasmussen, MD
Staff Neurosurgeon
Chief of Residents
Hospital Italiano de Buenos Aires, Argentina

Maria Sol Arancibia M.D.
First Lieutenant – Argentinian Army
Chief of Intensive Care Unit
Hospital Militar Regional Mendoza

Daniel Sipple, D.O.
Fellow American Board of Physical Medicine and Rehabilitation
Diplomat American Board of Pain Medicine
Opiate Committee Society of Brain Mapping and Therapeutics
Midwest Spine and Brain Institute
Co-Founder InSitu Biologics