

Brain injury and brain health: widening the lens. Perspectives from GBHI

Roundtable Report, 14 December 2022



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INTRODUCTION

On 14th December 2022, a group of experts from the Global Brain Health Institute (GBHI) convened for a roundtable event entitled **Brain injury and brain health: widening the lens**.

This report documents the proceedings from the roundtable which was a 1.5-hour long hybrid event. There were 21 participants (see Appendix 3 for profile) from twelve countries. The roundtable was organised and chaired by a current Atlantic Fellow for Equity in Brain Health with a special interest in brain injury. The agenda (see Appendix 1) was designed around three thematic areas with short inputs from GBHI experts followed by a discussion (in plenary or small group format). The purpose of the short inputs was to stimulate participants in the discussion, generate ideas and reflect on the theme. The report follows the sequencing on the agenda. A short briefing document (see Appendix 2) was prepared and circulated ahead of the roundtable along with the agenda. The participants were invited based on their expertise and experience of working in the brain injury sphere.

WHY THE ROUNDTABLE?

The field of brain health continues to develop and a recent position paper by the World Health Organisation (2022) states that brain health is an evolving concept, garnering increasing attention not just from the health sector but from wider society. Brain health is increasingly emerging in science, clinical, research and policy discourses.

Brain health has relevance to those engaged in brain injury related work across the world. There is much to learn from each other to develop a better and clearer understanding of brain injury in the context of brain health over the life course. A brain health approach to brain injury with a focus on a life course approach would include paying attention to prevention, diagnosis and treatment, rehabilitation and recovery as well as long term care and support needs including the risk of neuro-degeneration. There is real potential in framing brain injury as a brain health issue to raise awareness in multiple domains, policy, practice, research and advocacy. Brain injury also needs exposure as a global issue requiring a global response.

The roundtable event was an opportunity to come together in GBHI to discuss the emerging brain health concept and how it relates to brain injury. It was also an opportunity to see how we can further advance GBHI's aims to improve brain health globally and achieve equity in brain health.

AIMS OF THE ROUNDTABLE

The aim of the roundtable was to explore the following three questions together:

1. How does brain injury fit into the concept of brain health?
2. What are the challenges/barriers and the opportunities/benefits?
3. How can we raise the profile/increase the exposure of brain injury in GBHI?

WELCOME AND OPENING REMARKS

DR. LORINA NACI

Lorina welcomed the participants and offered opening remarks to set the scene. Brain injury is a considerable threat to brain health that recapitulates and exacerbates the global burden of inequity in dementia incidence. Traumatic brain injury (TBI) similarly to dementia, places an enormous burden on health-care systems families and societies throughout the world.

Several parallels between the two are visible.

1. TBI, of which mild TBI makes up 70-90%, poses an immediate risk to brain health. It is associated with an increased risk of:
 - physiological/structural brain changes
 - psychiatric and mental health disorders, e.g., depression, schizophrenia, suicidality etc.
 - cognitive deficits in a number of domains, e.g., attention, memory, processing speed
 - Loss of consciousness, that exacerbates the risk for cognitive and psychological problems
2. Of the 69 million individuals who are estimated to suffer TBI from all causes each year, there is a three times higher incidence in low and middle income countries (LMICs) relative to high income countries (HICs) (Dewan 2018). The global inequity in TBI incidence is further recapitulated, as TBI feeds into dementia incidence as a major risk factor.

In 2020, the Lancet Commission on Dementia established TBI as one major risk factor for neurodegenerative disease, contributing to around 3-15% of dementia in the community. Since this publication, research on the link between brain injury, neurodegeneration and brain health has grown exponentially and there is a real opportunity for the GBHI community to further the research and education agenda in this space globally.

BACKGROUND AND CONTEXT SETTING

GRÁINNE MCGETTRICK

Gráinne presented a brief background and context for the event. As the field of brain health continues to develop and some key publications from GBHI (Chen, 2021) and the World Health Organisation (WHO, 2022) have begun to define brain health and enhance our understanding of the concept, we are coming together now to pool our expertise and knowledge of brain injury and how it fits into the new emerging discourse on brain health equity.

Those who experience a brain injury face multiple challenges in their lives, not least the inequities in the health and social care systems across the world that often leave people to exist on the margins of our societies. Without support, families struggle, people live lesser lives, and we all know that brain injury has major social and economic implications. As well as being a social justice issue, the Social Determinants of Health can also help to frame brain injury as a brain health equity issue.

A brain health approach to brain injury with a focus on a life course approach would include paying attention to

- Prevention
- diagnosis and treatment
- rehabilitation and recovery
- as well as long term care and support needs to include the increased risk of neuro-degeneration.

There is significant potential in framing brain injury as a brain health equity issue to raise awareness in multiple domains, policy, practice, research, and advocacy. Brain injury also needs increased exposure and prioritisation as a global issue requiring a global response. We also discuss how we can advance GBHI's aims to improve brain health globally and achieve equity in brain health.

THEME 1: BRAIN INJURY AND MODIFIABLE RISK FACTORS

SHORT INPUT #1: DR. LORINA NACI

Lorina outlined her research in traumatic brain injury which has focused on improving diagnosis and prognosis after severe brain injury.

Following severe brain injury, a proportion of patients become behaviourally non-responsive and are thought to be unconscious and clinically diagnosed to be in a vegetative state. Previous research has helped to establish that a lack of behavioural response in brain-injured patients does not necessarily imply the absence of consciousness. A proportion of patients are consciously aware even though they remain entirely non-responsive/cannot respond through language or behaviour.

More specifically, Lorina's previous work has shown that functional Magnetic Resonance Imaging (fMRI) is a highly sensitive tool for uncovering *covert consciousness and cognition* in chronic behaviourally non-responsive patients, who are clinically diagnosed as vegetative state. The profound importance of the findings has led to a change of clinical practice guidelines by the American Academy of Neurology and the European Academy of Neurology, by recommending that functional neuroimaging be used to help determine clinical diagnosis in the absence of behavioural evidence of consciousness.

Recently, Lorina has extended a brain health lens to brain injury with an emphasis on early prevention and intervention in early life, to reduce future incidence of dementia in populations at high risk. Alongside increased awareness of the dementia global burden, concerns are growing around perceived increased risk of neurodegenerative disease, through participation in contact sports, resulting in numerous news headlines and demands from media and governments for research into this issue.

Recent studies are showing that mild TBI in the context of contact sports, does pose a great risk for neurodegenerative disease in late life. For example, a recent study (Lee, 2019) provided robust epidemiological data demonstrating that former professional footballers had considerably higher neurodegenerative disease mortality than matched controls (Mackay et al, 2019), with a 4.5-fold increase in the risk for Alzheimer's dementia relative to other neurodegenerative diseases. Mid-life retired contact sports athletes, therefore, represent a population with known but poorly understood 'high

risk' of neurodegenerative disease with potential to provide insights into early indices of disease with relevance to non-athlete populations.

It currently is unknown, with very few longitudinal studies in this space, how sports related TBI impacts cognition and brain health in mid-life, prior to the development of dementia symptoms, and whether protective lifestyle factors (that build cognitive reserve) can offset the negative impact of TBI in mid-life, to slow down or even prevent future disease incidence in retired athletes.

Neuroimaging will be a highly sensitive tool for capturing subtle changes in information processing that is not visible through behavioural output, with potential utility as earliest indices of neurodegenerative disease, (relative to non-athlete controls in mid-life already recruited through our highly successful ongoing population study called PREVENT Dementia). The work in this space has great potential to lead to policy change for in medicine, sports and other domains of public life.

PLENARY DISCUSSION

Following the short input, a plenary discussion on brain injury and brain health and in particular modifiable risk factors took place and the main themes that emerged were:

- **Lack of care pathway**

There is a complete lack of a pathway for patients with TBI in low-and middle-income countries, especially moving from acute care to other services. Patients only get follow up, if for example, they have seizures, but there is no on-going treatment or rehabilitation available. However, it was also pointed out that there is also a lack of co-ordinated care and a pathway for people with traumatic and non-traumatic brain injury in high income countries too. This is very challenging for patients and their families due to the lack of access to the appropriate treatment and rehabilitation. Acute phases of care largely focus on the physical rehabilitation and symptoms and less so on the cognitive rehabilitation and long term challenges the person faces. This is a global issue and adds considerable burden to the person and their family who live with lifelong consequences.

- **Change to policy and practice**

Currently there is a lack of hope around brain injury. People's lives are very severely affected, and the policy and service response has been limited. A brain health perspective would bring a new focus. There are things that we can do to prevent brain injury and treat it when it does happen. Rehabilitation offers hope. A different policy approach could help to reframe and rethink brain injury in a much more positive way. Attitudinal change to brain injury in policy terms would change practice and help a more joined up and co-ordinated response.

- **Modifiable risk factors**

Addressing modifiable risk factors in early and mid-life to prevent dementia are also highly relevant to preventing brain injury including Chronic Traumatic Encephalopathy (CTE) in athletes, aggressive management of hypertension, diabetes and chronic kidney disease. There is a real opportunity to address these novel modifiable risk factors. There is a lot we don't know about TBI and prevention and

we need to grow the expertise and evidence in this area. Preventing falls for example is an obvious modifiable risk factor especially in the older population. There is also a need to understand the role that interpersonal violence, alcohol and drug addiction, assaults and violence plays in contributing to the causes of brain injury.

Brain injury is a significant threat to brain health, an acute and sometimes chronic, modifier of brain health. Taking a proactive approach to build brain health following injury, through targeting cognitive, sensory, social-emotional, behavioural and motor domains is essential. Unfortunately, brain injury largely is invisible and people with a brain injury very often fall through the cracks.

- **Brain injury as a process not an event**

An acquired brain injury, including traumatic and non-traumatic brain injury, is defined as an injury to the brain that is not hereditary, congenital, degenerative, or induced by birth trauma. This definition, particularly the exclusion of degenerative sources of ABI, can result in a failure to appreciate the interconnectedness of ABI and neurodegeneration for prevention and rehabilitation goals.

If ABI is viewed as an event, it is a cross-sectional investigation at the point of injury. However, any trauma to the head has potential to induce pathological processes in the brain, particularly if there are brain health/health issues prior to the injury. The (brain) health status of the person prior to their brain injury is significant for understanding brain pathology that is induced by ABI even in mild cases. This calls for longitudinal studies that seek to better understand the health status preceding brain injury and how it impacts the trajectory of recovery and outcomes.

In Canada, more than 90 percent of TBI cases are considered mild TBIs or concussions, which do not always warrant follow up and in some cases, people might not be seeking care to begin with. However, this is not to say that there are no long-term consequences of such injuries. For example, every brain injury increases the risk of consecutive injury, which has significant implications for brain health and degeneration. This is an area that warrants more study to better understand what is happening to the injured brain over the life course.

Taking a brain health approach to brain injury would support the need to view the injury as a pathological process and not just as a single event.

THEME 2: BRAIN INJURY AND BRAIN HEALTH: REFLECTIONS ON THE OPPORTUNITIES AND CHALLENGES

SHORT INPUT: DR. KATY TOBIN

Katy highlighted some of the challenges and opportunities around brain injury and brain health in her short input.

Reflecting on how the two concepts of brain injury and brain health are linked together isn't necessarily revolutionary; however, work in bringing the two terms together is limited and most likely to be from the recent past. In addition, the discussion is more around TBI.

As this field of brain health continues to gain traction, there is an opportunity for us to influence the inclusion of brain injury as a core component in the brain health conversation. So if there is an opportunity, one of the challenges involved is how to do this.

Some questions to consider include:

- How can brain injury be integrated into the expanding field of brain health?
- Are there opportunities to include brain injury in existing large scale, longitudinal studies? This could be easier to think about with certain types of brain injury, but more challenging if assessment isn't well-defined.
- Thinking about service development, is it possible that we could develop brain injury services within the existing brain, health and dementia framework. Would that work? It could result in increased awareness of brain injuries and more research opportunities but is that too challenging to think about or to implement?

Brain injury research is another area of both opportunities and challenges. In general, brain injury is under researched. We've limited epidemiological data and clinical data, underdeveloped services and supports and limited policy responses. These limitations give rise to widespread health inequities in many regions, and one that is not limited to low- and middle-income countries, or the most or more deprived groups.

- What is the role for research to elevate brain injury as a brain health issue?
- What are these regional barriers to successfully embedding brain injury in the brain health conversation?

The World Health Organisation (WHO) (2022) position paper on brain health takes a life course approach. In GBHI we are also discussing the importance of the life course perspective to brain health. Questions to address include:

- How does brain injury fit into the brain health over the life course?
- What are the special considerations for including brain injury in this life course perspective on brain health?

SMALL GROUP DISCUSSION

The group broke into four small groups for further discussion on the opportunities and challenges theme. The main points discussed included:

- **Defining brain injury**

A discussion took place on the definition of brain injury. What conditions does it include/exclude? It is important to have clarity on the definition. The World Health Organisation's definition of health focuses on the complete physical, mental and social well-being and not an absence of disease. It is useful to

think of brain injury as a disturbance of any part of health, including brain health. Depending on the severity and the context, a brain injury can influence one area of health more than another.

We need to look to see what is included in the definition of '*acquired* brain injury'. There are so many variances, causes and factors including varying degrees of TBI from mild, moderate to severe, stroke and the consequence of stroke, that fall into a brain injury category as do infectious brain diseases and neurodegenerative diseases.

- **Brain injury and a brain health approach**

There is no doubt that brain injury should be part of the conversation on brain health. It is already happening in both conversation and care models, but it is not always named or referenced as brain health *per se*.

Everyone should be encouraged to maintain brain health. However, if someone is living with a significant risk factor/risk/disease then this should be encouraged even more. Brain injury will affect brain health and pose an increased risk for a range of other health conditions (dementia, depression, mental health issues). Secondary public health approaches should be applied to boost brain health in other domains as a priority following a brain injury. This could be integrated into standard care - i.e., taking a brain health approach to treatment and rehabilitation.

People with ABI should be targeted with a brain health strategy - physical health, healthy environments, safety and security, life-long learning and social connection as well as access to quality services, rehabilitation and treatments. Practically this would be to target brain function across cognitive, sensory, social-emotional, behavioural and motor domains.

- **Sports related brain injury**

Sports related brain injury is an area receiving a lot of public attention and growing in terms of research in the field. There is increasing public attention being paid to prevention of sports related brain injury. Treatment responses are also developing and the association with the impact on long term brain health is emerging in the research (chronic traumatic encephalopathy, dementia, motor neurone disease). Those with sports related brain injuries are ideal candidates for being part of long-term cohort studies. Sports-related brain injuries are a way to get brain injury into the brain health conversation. There is potential for collaboration with existing research projects that are already funded to add some new elements. This [New York Times](#) article was referenced in the discussion.

- **Prevention (public health messages, education, public discourse)**

Prevention of brain injuries should be made a priority from a public health perspective. Particular attention should be paid to prevention in LMICs where there are really high rates of TBI due to traffic/road related accidents. There are many examples from across the world of transport policies and road safety campaigns that impacted positively on behaviour and in turn reduced the numbers of deaths and injuries.

Awareness of how to protect your brain using a public health approach is needed. Awareness and education are needed in wider public discourse.

- **TBI in older people**

Brain injury is also a significant phenomenon in older people. Prevention strategies are needed as early as possible and to expand the focus that is currently on fall prevention. Other potential interventions for ABI prevention, especially strokes and TBIs from falls, could be medication reviews, checking for lesions even when symptoms are not present, as these can both interfere with balance and may increase the risk of stroke. A more holistic approach to ABI prevention in older people is required.

- **Research on brain injury and brain health**

We need a lot more research on brain injury particularly through the lens of brain health including a life course approach, injury, recovery, rehabilitation, and brain health in life. Another area for future research is using the social determinants of health model to understand brain injury as a brain health issue. We also need to be more connected to make sure that we are not duplicating but complementing the existing body of literature on brain injury. We need increased international collaboration in the ABI research field.

The 2017 Lancet Consensus Paper was updated this year (Maas et al, 2022) and includes particularly useful evidence on the progress and challenges on TBI research, clinical care and prevention. It also provides a direction for the future and identifies where the gaps are from a research perspective.

[The International Initiative for TBI Research](#), a coalition of scientists and other stakeholders to foster co-ordinated and collaborative TBI research, was highlighted as one of the current efforts to build the research base. The focus currently is on clinical research of brain injury and there is a need to broaden the coverage to other countries.

We need more research on the cost effectiveness of the various treatment and rehabilitation interventions in the acute and community settings, patient reported outcomes and quality of life measures (in the cognitive domain).

From a scientific research perspective, the focus is often on the different types of injuries (for example, TBI, stroke, tumours), as they have different causes, and the treatments vary. In policy research, there is benefit to framing brain injury as an umbrella concept from a policy perspective because it is a catalyst for change.

- **Rehabilitation, pathways of care, co-ordination**

Rehabilitation can maximise recovery and improve the outcomes for the person impacted by brain injury and reduce care giver burden. But what about funding for rehabilitation? What is this like in our respective countries? Who pays for this? What is available? Is rehabilitation a feature of the response to brain injury? In Canada for example, less than 1% of people with brain injury enter rehabilitation within one year of the injury, largely due to lack of funding. Funding is available for very young, or for those over 65, but there is a massive gap for the majority of the population.

In Spain, there is a lack of co-ordination between acute and post-acute care. A well-resourced stroke unit has coordination between hospitals (neurologists) and the move to outpatient clinics. However, if the patient is moved to a different treatment hospital, it is difficult to continue to follow patient, once they

are discharged. Also, the focus is largely on physical rehabilitation rather than on the cognitive issues, the latter which really impact the person's functioning in the long term.

One of the other things that may be lacking in acute settings is more holistic or nuanced investigation and recording of HOW or WHY an ABI occurred. Knowing the background or personal circumstances of an ABI and the person it has impacted, could help to prevent reoccurrence or the likelihood of falling through the cracks of neurorehabilitation.

It was also noted that legal (and insurance) issues can complicate the treatment and how clinicians can respond. Co-morbidities also complicate treatment and rehabilitation and access to the appropriate services.

There are also socio-economic determinants that are common, especially related to inequality of access and utilisation of services (and outcomes) in particular for those with brain injury that might be preventable such as TBI, stroke. Many other determinants might be specific to the types of injury, for the acute and post-acute (rehabilitation) phases. Knowing those disparities and key factors might be useful to improve targeting strategies.

The rural/urban divide was also highlighted as an issue in terms of getting access to rehabilitation and treatment. This is a particular issue around the window of time between ABI onset and arrival to hospitals. The consequences of delayed hospital access can be detrimental post-ABI, which means that those living further from hospitals have a greater chance of poorer outcomes. The same can be said related to imaging technologies, whereby those who have access to hospitals with better imaging technology (e.g., MRI, CT) have a better chance of receiving more targeted interventions post-ABI and will know more about the acute consequences of the ABI.

The issue of communication, or lack thereof, between clinicians, especially surgeons, present in the acute phase of injury, with those who are involved in neurorehabilitation further down the line, was raised. It was noted that those who treat ABI survivors in the acute settings seldom have contact with the staff who work with ABI survivors if/when they return to the community. It was suggested that better understanding of what occurs in the acute setting could benefit the way in which services are administered in the community or reduced support settings. Similarly, it was suggested that staff in the acute settings should be better informed about community or reduced support services, as they often are not well informed on where to refer ABI survivors after acute treatment, which leaves survivors at risk of being 'lost' and falling out of a pathway of care.

The need for healthcare/medical education on brain injury for all staff on the care pathway is needed. Even at the acute phase, the brain injury is not diagnosed, especially if the patient has physical injuries when they were admitted.

THEME 3: RAISING THE PROFILE OF BRAIN INJURY IN GBHI AND POTENTIAL NEXT STEPS

SHORT INPUT #3: PROFESSOR IAN ROBERTSON

Ian highlighted several key issues for consideration by GBHI in his short input.

Neuro-psychological profile

The neuro-psychological profile of a very wide range of conditions shares a similar pattern with chronic brain injury. These include people with multiple sclerosis, alcohol and drug addiction, lung disease, chronic depression, cancer and more recently long-Covid. Strokes, tumours and traumatic injuries are all causes of brain injury. Given the breadth of conditions, a significant number of medical specialists are involved in brain injury in one way or another. So how do we talk to policy makers when you are dealing with this very wide spectrum? GBHI has a role in promoting solutions for brain health so how do we make it all relevant from a policy perspective?

Cognitive reserve

From a GBHI perspective, cognitive reserve is one of the key concepts that is shared regarding brain health. What are the common things we can do to build cognitive reserve? This is really important in terms of public health messages. With the notion of cognitive reserve, that even with open head injuries the premorbid IQ is the best predictor of outcome, not pathological markers. The idea that everyone can build cognitive reserve needs to become an important public education tool.

Cognitive training

Another area to explore is whether cognitive training can have an impact. There is evidence that it works in post-stroke patients and those with chronic schizophrenia. There are interventions available to mitigate some of the negative effects on brain function for all of these conditions, and also that stress and depression that's secondary to all of these conditions.

Care pathways

The chronic and ongoing care of someone with brain-related injury (regardless of the cause) needs to be addressed. Is it possible to define not by source of brain injury, but by level of functional impairment and plan using a trans-diagnostic approach? What are the policy and service implications for this? A collaborative approach would be useful here with all the diagnostic groups working collectively (and using their political capital) to impact policy and service provision.

PLENARY DISCUSSION

Following on from this short input, in the final plenary session, we discussed how GBHI can support the development of a brain health approach to brain injury. The key areas discussed included:

- **Data driven approach**

We need to have population studies on brain injury. In this approach you would study the health status of the person prior to the injury and identify which health statuses expedite, stabilise or mitigate the brain injury. In Canada, there is research that has followed people over 30 years. We need to start using a data driven approach (and move away from hypothesis-driven research) on the brain injury population to mitigate our knowledge and let data speak for itself.

- **Role of technology**

The common issue in all the conditions is executive dysfunction and cognitive symptoms and we need to look at how to deliver interventions in a scalable way at home. Currently there are tech-based, digital solutions in place for stroke patients. This could be scaled up to address the difficulty in accessing rehabilitation for a lot more people at home. Taking a transdiagnostic approach to advance equity in brain health would lessen the impact of brain injury and improve brain health.

- **Symptoms and medication**

We also need to create space, time and resources to look at the person's broader health and interventions for all patients with these common sets of brain health issues and treat the symptoms using rehabilitation and pharmacological interventions. These interventions could be part of the specialist clinics. Is there potential for 'brain health' clinics?

- **Prevention**

We really need to talk about prevention of brain injury and how do we create awareness? How do we carry out a risk assessment? How do we modify behaviour? What about the public health messages such as road safety, sports related brain injury?

- **GBHI curriculum and network**

A possible way to increase the profile of brain injury in GBHI is to include it in an expanded curriculum for future cohorts and this would help to raise the awareness of cognitive decline after brain injury, TBI, tumours. Another option is to explore the establishment of an Interest Group on brain injury in GBHI to exchange information and if possible, to advance collective brain-injury related projects.

FINAL REMARKS

Thanks was expressed to all for participating and joining in the discussion, those who gave inputs, took notes, supported the recruitment of participants, the GBHI leadership team and technical support.

The immediate next steps include:

- Report write-up and internal circulation in early 2023
- Further regrouping in 2023 to see what is possible, what's achievable and where the energy should focus
- Continue to engage and see how we can build awareness of brain injury in a brain health context in GBHI and beyond.

APPENDIX 1

Brain injury and brain health: widening the lens
Perspectives from the Global Brain Health Institute
14 December 2022 5.00-6.30pm (Irish Time)

Time	Item	Lead
17.00	Welcome and introductions	Lorina Naci
17.10	Overview and context setting	Gráinne McGettrick
17.15	INPUT 1 Brain injury and modifiable risk factors	Lorina Naci
17.20	Plenary session	ALL
17.40	INPUT 2 Brain injury and brain health: reflections on the opportunities and challenges	Katy Tobin
17.45	Roundtable discussion in small groups	ALL
18.00	Feedback from small group discussion	
18.10	INPUT 3 Raising the profile of brain injury in GBHI and potential next steps	Ian Robertson
18.15	Plenary discussion	ALL
18.25	Final remarks	Gráinne McGettrick
18.30	ENDS	

APPENDIX 2

Brain injury and brain health: widening the lens

Perspectives from the Global Brain Health Institute (GBHI) Community

Briefing for Roundtable Discussion 14.12.2022

Introduction

The field of brain health continues to develop and a recent position paper by the [World Health Organisation \(2022\)](#) states that brain health is an evolving concept, garnering increasing attention not just from the health sector but from wider society. Brain health is increasingly emerging in the science, clinical, research and policy discourses.

Brain health has relevance to those engaged in brain injury related work across the world. There is much to learn from each other in order to develop a better and clearer understanding of brain injury in the context of brain health over the life course. The roundtable event is an opportunity to come together in GBHI to discuss the emerging brain health concept and how it relates to brain injury. It is also an opportunity to see how we can further advance GBHI's aims to improve brain health globally and achieve equity in brain health.

Brain injury - causes and consequences

Brain injury refers to any type of brain damage that happens from the perinatal period and onwards. Brain injury can occur through

- sudden onset - caused by trauma (falls, road traffic accident, assault), infection, lack of oxygen, strokes or drug use episodes
- insidious onset - from exposure to alcohol or substances, tumours or degenerative neurological diseases.

The consequences of brain injury can vary hugely depending on the extent and part of the brain that is damaged. The person may experience a wide range of symptoms. Those with moderate to severe injury will live with lifelong consequences that include cognitive, psychological, emotional and physical symptoms. Many will experience communication difficulties, memory problems, sensory problems, and behavioural, emotional and personality changes. It has a massive impact on the individual and their family and has major social and economic implications for wider society.

Traumatic brain injury (TBI) and stroke

TBI and stroke are the leading causes of brain injury worldwide. [The 2017 Lancet Neurology Commission on TBI](#) identified that the global incidence of TBI is rising, access to care is severely lacking in many parts of the world and monitoring and diagnosis are frequently inadequate. [Boot et al \(2022\)](#) states that stroke at a young age is an increasing problem in both developing and developed countries due to rising incidence, high morbidity and mortality and long term psychological, physical and social consequences. Stroke in young adults is expected to cause an increasing public health

problem in both developed and developing countries due to increasing incidence and the long-lasting consequences.

A brain health approach to brain injury

A brain health approach to brain injury with a focus on a life course approach to include paying attention to prevention, diagnosis and treatment, rehabilitation and recovery as well as long term care and support needs to include the risk of neuro-degeneration. There is real potential in framing brain injury as a brain health issue to raise awareness in multiple domains, policy, practice, research and advocacy. Brain injury also needs exposure as a global issue requiring a global response.

Aim of the roundtable

The roundtable aims to explore the following questions.

1. How does brain injury (including stroke) fit into the concept of brain health?
2. What are the challenges/barriers and the opportunities/benefits?
3. Can we raise the profile/increase the exposure of brain injury in GBHI?

Format

Zoom/in the room. Small group discussion and plenary sessions. Participants will include GBHI Atlantic Fellows (current & Global Atlantic Fellows) at GBHI, faculty and staff.

Chatham house rules apply - information from the session will be shared, but the identity of the person will not be revealed.

The session will be recorded for transcription purposes only.

Potential next steps

A report based on the roundtable outputs will be produced and shared internally. If there is an appetite and energy to progress this agenda and based on the outcomes of the discussions at the roundtable, other possibilities/options will be explored in 2023.

APPENDIX 3

List of Roundtable Participants

Name	Profile
Grainne McGettrick (Chairperson)	Atlantic Fellow for Equity in Brain Health, GBHI, Ireland
Katy Tobin	Assistant Professor of Biostatistics, GBHI, Ireland
Lorina Naci	Associate Professor of Psychology, GBHI and Trinity College Institute of Neuroscience, Ireland
Dominic Trepel	Assistant Professor of Health Economics, GBHI and Trinity School of Medicine, Ireland
Kim Huong Nguyen	Atlantic Fellow for Equity in Brain Health Economist, University of Queensland, Australia
Alison Canty	Atlantic Fellow for Equity in Brain Health Neurobiologist, University of Tasmania, Australia
Ian Robertson	Professor Emeritus of Psychology, Trinity College Dublin, Founding Director, GBHI, Ireland
Brian Lawlor	Professor of Old Age Psychiatry, Trinity College Dublin, Site Director, GBHI, Ireland
Ellen Conlon	Acquired Brain Injury Ireland Research Officer, Ireland
Tatyana Mollayeva	Global Atlantic Fellow for Equity in Brain Health Scientist, Canada
Raquel Gutierrez Zuniga	Global Atlantic Fellow for Equity in Brain Health Neurologist, Spain

Mindy Mattice	Curriculum Manager, GBHI, USA
Hanna Cho	Atlantic Fellow for Equity in Brain Health Neurologist, South Korea
Raquel Gardner	Neurologist, Director of Research, Israel University of California, San Francisco
Dearbhla Kelly	Global Atlantic Fellow for Equity in Brain Health Nephrologist, Ireland
Yaohua Chen	Global Atlantic Fellow for Equity in Brain Health Neurogeriatrician, France
Natalia Trujillo	Atlantic Fellow for Equity in Brain Health Psychologist, Colombia
Eleonore Bayen	Global Atlantic Fellow for Equity in Brain Health Neurologist, Researcher, University of Sorbonne, France
Anusha Mohan	Atlantic Fellow for Equity in Brain Health Neuroscientist, Ireland/India
Shaimaa El-Jaafary	Atlantic Fellow for Equity in Brain Health Neurologist, Egypt
Vanessa de la Cruz-Gongora	Atlantic Fellow for Equity in Brain Health Nutritionist, National Institute for Health, Mexico

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