EPISODE 59. BUILDING THE BRAIN ECONOMY

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Garry Aslanyan [00:00:08] Welcome to the Global Health Matters podcast. I'm your host, Garry Aslanyan. Whether this is your first time listening or you've been one of our loyal listeners since 2021, I'm delighted that you've been here and are tuning in again, and if you haven't already, please follow or subscribe to wherever you'll get your podcast so you get every new episode landing straight in your feed. Today we're focusing on brain health. With an increasingly ageing population and significant demographic shifts underway, brain health is shaping the well-being of individuals, families, and societies across the world. Brain health is not simply the absence of disease, it influences whether people are able to live productive and meaningful lives, and whether the economies of countries can thrive. Despite its importance, brain health has often been addressed in a fragmented way that's beginning to change. I'm joined in this conversation by two pioneers who are crossing sectoral boundaries to advocate not only for brain health, but also for brain capital. George Vradenburg is the founding chairman of the Davos Alzheimer Collaborative, a global public-private initiative focusing on linking and scaling Alzheimer's and brain health research and delivery systems worldwide. He's also the co-founder of Us Against Alzheimer's. Joining him is Rajinder Dhamija, distinguished neurologist, professor of neurology and director at the Institute of Human Behaviour and Allied Sciences in New Delhi. He also serves as the Chair of India's Task Force on Brain Health. In this episode, we explore why brain health matters now and how prevention, policy and innovation can help build healthier and more resilient societies. Hi George, hi Rajinder, how are you today?

George Vradenburg [00:02:19] Terrific, thank you.

Rajinder Dhamija [00:02:20] Thank you, Garry. It's wonderful to be in the podcast.

Garry Aslanyan [00:02:22] Thanks for joining and we have a very interesting topic today. We're going to frame brain health from various aspects. So, George, let's start with you. I've heard you describe brain health as one of the defining global challenges of our century. Was there a moment in your family or during your advocacy work when the scale of this challenge across both young and old people really became clear to you?

George Vradenburg [00:02:55] You start with, as in my case, with the loss of three generations of my family to various forms of Alzheimer's or dementia. And the scope and scale simply of that emotional loss, the very slow decline in your loved one over a period of years gives you a sense of, at a personal level, the sense of scope and scale of the disease on an individual family. It's not just the person with the disease, its a wide variety of family and friends who are emotionally, financially affected by the disease. So that's just on a one-person level. But then you begin to look at how many people have this disease or are at risk for this disease. And it's quite extraordinary. It's now 57 million estimated to actually have dementia. But that really does not even express the scale of this disease globally. We now know this disease starts 20 to 30 years before symptoms, and the estimate of 57 million people living with the disease are those with symptoms. First, you've got to think about the family members. So that's 57 million families, and those families are not just one person, they're a wide variety of people affected financially and emotionally. And then you have to think of the people that have the pathology of this disease before symptoms and now the estimates are close to a half a billion people. So, this disease, in terms of its scope, its scale, and the cost, both to governments and to individual families, is quite extraordinary, well over a trillion dollars five years ago and probably doubling every 10 years.

Garry Aslanyan [00:04:43] These are 57 million numbers you quoted are global numbers, right?

George Vradenburg [00:04:48] They are global numbers. In the United States, the number of people estimated to have a symptomatic dementia is perhaps seven to eight million. But the United States and Europe are really just a small piece of this problem. The problem is by and large, now two thirds to three quarters of the people with dementia are in the global south, and that number and percentage is going to increase in the next 25 years.

Garry Aslanyan [00:05:15] Rajinder, in India, you see both sides of the spectrum. You have you struggling with anxiety, depression, and addiction, you've talked about this, and then you have the older adults, something which George already presented facing the rising tide of dementia. If we were to focus on where you are and from where you work, is there a story from your work that captures how brain health affects all of the generations differently? Help us understand better what's happening in India.

Rajinder Dhamija [00:05:47] Thanks Garry. I think this is a very, very important subject. I'm very passionate about this, as you know, the brain health is a compelling reason for global action now and India being one of the largest country in terms of numbers in population now, and we have double whammy as you rightly said that India has a younger population less than 35 years is substantially more than half and then we also have a growing ageing population, which is now more than 10%, its going to be doubled by 2050 and in terms of 1.45 billion people absolute numbers are quite high whether it is 10% or 20% means around 330 million people over the age of 60 years would be living in the next 20 years and these individuals will not be normal individuals they will have many health problems with comorbid conditions with cognitive decline and so on and so forth. So, it's very important in terms of the brain is a very most complex organ in the human body and its number one cause of neurological disorders or number one cause of disability and second cause of death worldwide. One of three of us will develop a brain disorder at one point of our life. So, every third individual is going to have a brain disease or a disease affecting our system. Again, in terms of dementia, 150 billion rupees is the economic expenditure on treatment of dementia in India alone and that is a very very high. If you talk about global numbers in terms of economy 2.1 trillion dollars which is the two-third of Indian economy, Indian total GDP is an economic loss because of the dementia alone. So these are the numbers which are very very important for us and India being a very role model in terms of advancement in IT, and advancement in terms of healthcare research, I think we have life course examples and stories including children with autism spectrum disorders, ADHD or even neurodevelopmental disorders and from then on to communicable neurological disorders like epilepsy, meningitis, encephalitis even neonatal encephalitis. These are very very high number of morbid conditions and causing a great loss. Even in the midlife, people with epilepsy, people with mental health disorders, and younger people with strokes now coming up. So, in India, the strokes are happening a decade earlier than the Western population. So is the Parkinson's disease. So is dementia. So, we have that kind of lifestyle diseases happening now, and that is giving rise more and more number of neurological disorders. Lastly, I think we have a lot of young people riding motorbikes. Those trauma related neurological disorders, particularly traumatic brain injury and spinal cord injuries, they are again huge numbers, and they are all preventable causes of morbidity and mortality.

Garry Aslanyan [00:08:50] Thanks for that, Rajinder, because laying all of these different stages and all of the ways this really comes around with brain health. Going back to George again, helping us a little bit with definitions around this and I'm sure our listeners would appreciate something that we all probably don't understand well. George, WHO defines brain health as more than cognition, so it says it includes emotional, behavioural, sensory, social functioning across the life course, and I've already heard from both of you that this is a broader thing that across the live course, we need to be better understanding. When you talk to policymakers or public health people or decision makers, what do you wish people to understand better about what brain health really means?

George Vradenburg [00:09:45] The way the WHO looks at it, the way that a family looks at it, it is the capacity to work, to be productive in life, to enjoy your family, to love. All of those characteristics of what makes a life worth living, in some sense of the word, derives from the brain, our emotional capacity and our productive capacity too often. But in addition to the about brain disorders, which Rajinder laid out really beautifully, is the fact that brain is resilient. What we have learned through neuroscience in the last decade or so is that the brain actually can be restored, the brain can be built, and if you think about the brain as an instrument which can be built as well as can decay, then you think about, as Rajinder is pointing out, the whole life course of a disease. The ability to detect in an infant whether there are gut microbiome disturbances that will affect their brain during their entire life. Autism and mental health disorders, which are not only disabling during the course of those disorders but also have a deep effect on the capacity of a person to love and to work. So, if you talk to a policymaker, they think in terms of cost, quite frankly, or in terms of constituent complaints or concerns. So, a policymaker in terms of an elected official is thinking about, do my constituents care? Our polling and just asking the number of Americans, this is American poll, over one half of Americans say that they have had this in their family or have it now. So, the constituency for action on this is significant. But beyond that, the cost to governments themselves in the United States, the costs of our United States government every year is $350 billion to Medicare and Medicaid. But we're only investing $4 billion to try and solve that problem. So, they think in terms of the physical consequence. That's what a policy maker would think about. Another way a policymaker might think about it is whether or not if I could build the resilience of the brain. Think about AI and human intelligence as a combination and think about how to build those two in parallel. And I can get greater productivity out of my economy. Then I will be nationally more competitive. I will have more economic and material wealth for my people. So, they think in terms of either fiscal costs, constituent concerns, or in fact their national competitiveness. Now we can talk about what business thinks about it and whether the sectors think about it, but that's what policymakers tend to think. Fiscal costs, constituent complaints, and national productivity.

Garry Aslanyan [00:12:36] Rajinder, did you want to add anything to this question? I want to hear from you on this as well.

Rajinder Dhamija [00:12:41] Yes, sure. You know, the brain health is critical for having a fuller and longer life. So, it's a state of brain functioning across multiple domains, allowing a person to realise their full potential over the life course, irrespective of presence or absence of neurological disorders. That's very important, many people confuse between brain health and mental health. So, it's very important to differentiate and to have the, what is, how they are related to each other, how the important determinants of brain health and mental health are together. On the finer side, the mental health is a state of mental well-being that enables people to cope with the stresses of life, realise their abilities, learn well and work well and of course contribute to their economy. So, the brain health is an important determinant of the mental health across the life course. So that's the definitions of brain health and mental health which have evolved in the last 10 years since we have been talking about the brain.

Garry Aslanyan [00:13:37] And Rajinder, India is actually one of the first countries to, you told us to have a national brain health strategy based on what you earlier said, a live course approach. Can you tell us a bit more how this strategy realised across different dimensions like prevention or treatment for patients, for families within the health system? Can you, tell us how these strategies are working?

Rajinder Dhamija [00:14:05] So, it's not the brain health strategy, but we have the National Task Force on Brain Health.

Garry Aslanyan [00:14:10] Ah, okay.

Rajinder Dhamija [00:14:12] I'm the chairperson of that National Task force of the Brain Health, which is actually from the Government of India. And I understand that India is the only country to have a National Taskforce on the Brain health from the government side.

Garry Aslanyan [00:14:24] So this is on federal level.

Rajinder Dhamija [00:14:26] Yes, it's on the national level.

Garry Aslanyan [00:14:27] National level. Yes. Okay.

Rajinder Dhamija [00:14:29] And we have the many stakeholders in that, including the neurologist, the psychiatrist, the policymakers, the professional associations from the neurologists and neurosurgeons and psychologists. So, there's a huge number of stakeholders and we have been having a deliberation from international experts and on a pilot project we have already started what we call it district brain health services or district brain health clinics. You know, India geographically is a very heterogeneous country, we have more than 750 districts which have the district health systems or the district health hospitals. So we have already started as a pilot project, as I said, in 12 districts across the country, and that brain health clinics are now running in a very full swing, and that includes the prevention, what we call the screening for the neurological disorders, including the cognitive decline. And then, of course, the treatment for some of the neurological disorder, like epilepsy, strokes, and Parkinson's. And then of course rehabilitative and supportive services, not only this provides the pillars of surveillance, treatment, rehabilitation, and policy, but also it gives them a data to make a policy for the national at the national level. So, it is started in some of the district, now we are planning to extend it across the country, and that is something which we are looking at. And that national task force on brain health has given its recommendation. Some of the recommendations are already being implemented. But that is some thing which the government of India has to take a call on this. And mind you, this national task force is constituted by the Planning Commission of India, which is headed none other than the Honourable Prime of India.

Garry Aslanyan [00:16:21] Interesting.

George Vradenburg [00:16:22] We were the Davos Alzheimer's Collaborative, which I chair, has had conversations with India about a national prevention strategy which would involve an approach on lifestyle factors to actually do research across India in different sectors or different geographic areas of India to understand differential risk factors that bear upon brain health. And then to pilot some intervention strategies that might try and change that behaviour. India has a sophisticated digital payment system and the possibility of actually using that payment system to incent people to change their behaviours in ways that would in the long term reduce the incidence and prevalence of some of these brain disorders is a very attractive potential strategy that we intend to pursue with India. We have announced in Africa a six by five plan where there are six priorities over five years across all of Africa with a similar approach, which is to use cell phone technology to basically detect any brain impairments that might be occurring or brain resilience factors and then be able on an individualised basis to provide strategies and incentives for individuals to change their behaviours and change their lifestyle factors in a way that would affect their health. AI, machine learning, the cell phone as the most ubiquitous instrument which you can use to detect brain disorders and potentially deliver changes in, or at least recommended changes at a personal level to how to change your behaviour to reduce your late life factors or increase your brain resilience are new technologies that could be used. India has been in the

forefront of doing this in the digital payment's world, but in fact that can be extended to now potentially other brain health considerations.

Garry Aslanyan [00:18:21] Can you tell us a bit more about that commission that you mentioned? The Davos commission, you said?

George Vradenburg [00:18:26] The Davos Alzheimer's Collaborative is a global mechanism announced in 2021 at the World Economic Forum with the charge to link developments in the global south and the global north. Too much of the research here has been done on white Caucasians in the Global North, but we've learned from a wide variety of both infectious diseases and the COVID example, how the global South is sort of regarded as an afterthought. And so, the World Economic Forum and the business community said, let us try and link what we can do in the global north and the south. The global south will require us to think about lower cost, more accessible means of detecting a brain disorder and lower cost and more accessible ways of treating those disorders. Whereas in the Global North, you have a lot of neurologists, you've got a specialist, which are high cost. The equipment to detect PET scans and other technologies are high cost and low accessibility. They won't work in the global south. So, we have to be thinking about how the global South actually can innovate both for itself and quite frankly teach the global North much more innovative mechanisms for detecting and treating brain health disorders or brain health as a resilience factor.

Garry Aslanyan [00:19:45] This is an interesting aspect here, how you make an issue like this, a global health issue, so to say, where it is recognised. And previous season, season four, we had an episode where framing an issue such as oral health and how they've done it was quite interesting to a lot of our listeners who also work in various areas, how we frame the problem as a global health problem can either unlock political will or keep an issue invisible sometimes. So, brain health is often framed around ageing. What framing or reframing you had to do that was most effective in convincing leaders through the work that you've said earlier or others, to kind of look at it as a societal or broader economic priority, not just a medical priority.

George Vradenburg [00:20:47] Policymakers, per se, respond to constituent interests, they respond to fiscal challenges, and they respond to national competitiveness. Framing this both as a brain health issue, but brain health in the sense of productivity leads you to the concept of brain capital, where, in fact, you think of the brain as an asset, which if well developed can produce more output than a brain that is disordered or is not fully resilient because you lack educational systems or other mechanisms to build the brain resilience of the population. So, we approach this both as a brain health issue but also as a business issue where we actually engage with business to say that if you could improve the brain health of employees, that would be a capital asset that would make you more productive or more competitive. So, what we have done is actually have a brain health index now that businesses can use to assess the brain health of their employee population. And then we are going to link that this year with the stock market performance of the companies whose brain health Index says that they're doing a good job here. There is already an exchange-traded fund, an ETF to invest in the companies that seem to be able better to produce the brain health of their employees. So we're making this a business issue, which if you could do at a national level and conceive of it as a national or international level, you can say the world's productivity as we go through an ageing demographic where fewer and fewer people of the working age in the global north are going to be able to work, we got to get this a more productive economy. The Global South has a different issue, they have both ageing populations and, as you pointed out, Garry, they have a large young population whose brains they want to develop for their own country's competitiveness and their own well-being. So, they have the issue of how to develop and make resilience and make more productive their young population, as well as protecting against the brain disorders of

ageing. Whereas the global North has the problem that its working age population is shrinking and needs to make them the working age, population more productive in order to maintain their material well-being through time. So this is an issue that has a different flavour in the North and the South, but in fact, in different contexts of the North in the South, but in fact both the North than the South have the same interest in getting at, both resilience and productivity and brain capital as well as brain health.

Garry Aslanyan [00:23:34] Rajinder, can you add from your experience, what messages resonate most with Indian policymakers and state leaders, or when you are advocating for a brain strategy or brain health strategy and all of the context you have in India in terms of shortage of health workers sometimes in rural urban divides and other issues that you have, and also this age difference from the North, what works in India when it comes to messaging and when it comes to framing this issue?

Rajinder Dhamija [00:24:09] We have a different kind of a disease profile, so although the disease of ageing are there, but at the same time, communicable diseases like typhoid malaria, tuberculosis are also still prevalent, although the prevalence is coming down and the prevalence of neurodegenerative disorders and disorders of ageing and in particularly the lifestyle disease like diabetes, hypertension and heart disease and strokes are going up. So, the message which we provide to the policymakers, or we sell the ideas to them is that prevention at the primary level yields much more results than the investing in terms of a large infrastructure. So obviously, we also need the large hospitals, but we also have to strengthen our primary health care system where we can do the screening of disorders of ageing, as well as the diabetes, hypertension, and the other lifestyle diseases. So that's number one. Secondly, of course, the policy makers have taken cognizance of the brain health as a top-most priority in terms of numbers because we have more than 570 million people with neurological conditions in India. So, this is a huge number. So obviously, there are preventable diseases of the brains and some of them are life-limiting diseases also. So not only the curative, preventive, promoted but also, we need to have the rehabilitation services which are not very well structured in the country. As George rightly said that we have to use our resources which are very much IT based, whether it is digital payment or it is cell phone penetration in the county, so we're coming up with many, many apps which will predict the risk behaviour and the lifestyle patterns of individuals using cell phone, using social media and their sleep patterns and their heart rates and their physical activities and cognitive activities. Policymakers are looking at the results, where is the result which will give me the numbers, which how will you reduce the strokes, how will you reduce dementia, how you reduce epilepsy, how do you reduce Parkinson's, how will you reduce the infections of the nervous system. So, to just to tell them that the interventions which are highly productive yield much more results and then we have to invest in those. So, policymakers are looking at the outcomes at the same level as we see in investment.

Garry Aslanyan [00:26:31] If you had a chance to outline, let's say, three immediate actions that they can take to shift us from crisis response towards more of a building true brain capital approach, what would these three actions be if you were to give them that advice?

George Vradenburg [00:26:51] Well, I think one is to adopt a very open innovation friendly policy that is invest in research, invest in regulatory systems with respect to pharmacological interventions or technology interventions can rapidly assess the effectiveness and the absence of any safety signals quickly, so an innovation friendly way of looking at this. This is a big challenge to now think about the brain economy, which is even a bigger concept than brain capital. Because we know that in fact, as Rajinder has outlined, that it's not just the medical world that is trying to deal with this, but we know the nutrition has an important impact on stunting in Africa or in other parts of the global South and other factors which bear upon the ability of an infant's brain to develop. So thinking about this not as just a medical problem, but as a nutrition problem, as an education problem, as a built environment

problem, as a climate change problem, because we know that heat has adverse effects on brain health, as pollutants and a variety of insecticides, and in fact, the agricultural sector workers are adversely affected because of their exposures to insecticides, so what we're talking about is thinking about this through a brain lens, because in the end, your country is going to succeed or your country is going the fail with the success or failure of the brains of its people. This century, particularly with AI coming down the pipe, has got to be focusing on human intelligence alongside artificial intelligence, using the tools of AI to address these issues, but remember that we have to, in fact, educate our people on how to use AI, and how to actually expand their own productivity, and that has required some training and education. So you have to think about this thing as both a fiscal issue, as an economic competitiveness issue, but it is about the future of your country and where it stands in the world because it's going to be based upon the brains of your people and you better pay attention to all of the factors that bear upon the resilience and health of that brain.

Garry Aslanyan [00:29:16] Thanks for that, George. Rajinder, is there an example of a model, again, building on this, what would actions be looking like at country level, where you've learned some lessons that can help guide other countries with similar kind of maybe limited resource or limited specialists or limited capacity, sometimes situations to take care of this issue at the community or state or other kind of levels. Are there any examples you want to share with us?

Rajinder Dhamija [00:29:51] We have learned a lot from a model which was in the southern part of the country, in the state of Karnataka. That model was again focused on the prevention, promotion, acute treatment, and the health education model for the brain disorders at the district level. But the problem was that it started with two districts and then it was extended to all of the state with 33 districts, but then we couldn't find neurologists to man the district brain health centres. Not even a single neurologist was there, we had to train our physicians and the medical officers at the primary level to overcome the shortage of neurologists. Just to give you the numbers, we have less than one neurologist per million population in India, around 3,000 neurologists at present, only 2,500 clinical psychologists, for example. Obviously, we need to think about augmenting or strengthening our capacity in terms of health care professionals, including mental health professionals in the country, and that lesson from Karnataka gave us that you can't have the neurologists at each district when you have only 3,000 neurologists in the county and there are 750 districts. Then these 3,000 neurologists are not uniformly or equally distributed across the country, more than 70% of the neurologists are practising in the urban areas of so-called metropolitan city. So, there is a huge urban-rural divide, on the other hand, the disease profile is the same, whether you come from the rural area or you come from the urban area, the prevalence of stroke is the same, the prevalence of dementia is the same. So, in terms of resources, you have the unequal distribution of resources, but in terms of disease burden, you have equal the disease burden across the country. So obviously, the learning lessons from that model, we have refined it now and that is where we have come up new brain health clinics, what we call the ADP, the aspirational district programme, where we have chosen not so well developed district in the country, those who are the poorer parts of the country and we are trying to train healthcare workers, we're trying to train grassroot workers, just to give them the health education as well as the doctor's screening and doctors treating the neurological disorders and referring them to the higher centres. But I just to want to add that it's just not only a medical problem, as George has rightly emphasised, it's much more than that, whether it is environment, whether education, whether nutrition, you know, first thousand days in a child's life is very, very important, and George has been telling us to invest in those first one thousand days. And that is the time when we should be thinking about child's nutrition, child's social development, child safety and security, all these things are very important. It's not only the medical problem or the brain health. It's much more beyond that.

Garry Aslanyan [00:32:47] So much we've covered and this is so interesting. Perhaps to close, each of you can look into the future and help shape the hopeful side of this and say what kind of innovations that excite you, that can potentially transform the brain health in high income countries or low income countries, and also where do you see this going? So maybe. George, I can ask you to start and then Rajinder you can add to that please.

George Vradenburg [00:33:19] I have two thoughts, vaccines, there are now active trials of Alzheimer's vaccines that in fact would prevent the pathology from developing. It would be an adult vaccine and probably like shingles or hep C or other adult vaccines be administered globally, very inexpensively and hopefully at relatively low doses so that you would not have to repeat it every week, you could do it once or twice a year. So, vaccines are in development now. We have a work group ourselves with 10 companies and four regulators to identify what it is that we must expect from the clinical trials of these vaccines in order to get them approved in at least the global North. But we will be expanding that work in the 2026 to include regulators from the global South. So, vaccines is one side, very low cost, very accessible, hopefully very safe, but should have to prove that, but very safe mechanism for giving a vaccine to an adult in their midlife in order to prevent the disease. The second is something that Rajinder talked on, and I think I've mentioned, we are now validating the ability of cell phone-based voice recognition systems to detect the brain resilience of the speaker, as well as a potential brain disorder of the speaker. And that technology could mean the cell phone-based detection and screening and potentially treatment delivery if in fact you can, depending on the nature of the brain disorder, treat via cell phone or via distance and telehealth technologies. So new technology that will lower the cost of screening, lower the costs of detection of cognitive impairment or some resilience factor that is weakened or mental health concerns that you could actually develop treatment schemes. There is now a programme going on in Yemen and Somalia, which uses cell phone technology and an automatic AI-based bot to call out to the entire population, ask them a series of questions over 15 to 20 seconds, detect whether there's an immediate mental health crisis, a moderate mental health concern or no concern and then have a human follow up with those that have the most immediate emergency needs but you use cell phone based AI bot trained mechanisms to get to the population to detect the presence of a mental health disorder which then a human follows up on so that you don't have to have a neurologist in every community. You only have a Neurologist that actually can deal with the emergency cases once you've screened them. So, technology can be our friend. Right now, we're investing globally over $500 billion in building football field size data centres consuming mega gigawatts of energy, to replicate the performance of something that is three pounds in our head and works on the power of a light bulb. Why in the heck aren't we developing and investing in the human brain as we are developing and investing in artificial brains? It does seem to me that we have our policies distorted here, but so from a policy point of view at a high level, we need the development of human intelligence alongside artificial intelligence. But in terms of the excitement, it's vaccines and new technologies that will enable us to screen and potentially detect disorders and potentially treat disorders through the cell phone. Even the cell phone is not universally accessible, so we're working with space agencies on how to deliver the Internet in otherwise inaccessible areas that do not get access to terrestrial Internet service. So, there is technology, I think, that is coming down the pipe that will allow us to do this, globally and universally, inexpensively, and effectively.

Garry Aslanyan [00:37:29] Very interesting. Rajinder, what about you?

Rajinder Dhamija [00:37:33] I'll just take forward what George said, the use of technology for the prevention of Alzheimer's or dementia, like vaccines. India is a hub of vaccines and a big supplier of vaccines to all over the world. So, I'm looking at that if we can have the vaccines to prevent dementia, which would be something very, very hopeful for a healthy brain society. But I'll take it forward because

I want it to be available, accessible, affordable, and adaptable to all the countries. So, for example, we were talking about technology and early detection of the dementia using cell phones as a voice recording device. But then this has to be available to all countries. It's just not the north, it's the global north, there are countries where we don't have that much of accessibility or availability of the vaccines or even the technology. Using the technology forward for example we don't have the biomarkers as of now they're coming up in the next few weeks in India but thinking about anti-amyloid treatment or amyloid PET scans of using technology for diagnosing Alzheimer's we still don't a PET CT or an amyloid PET in India. So, the huge cost involving the patents and involving the treatments for the Alzheimer's, which is something which we need to think about how to make them available in all parts of the world, irrespective of the regional economic consideration. Just to sum up that the brain health, which we have talked about in this podcast, is very essential, not only for the healthy societies and healthy countries, but also for a smooth economic development and the social development of any nation. The term brain economy, which has been recently in circulation, and we have lot of talks about brain economy and it has taken the world by storm, that brain economy, a transition of brain negative economy to brain positive economy, that means providing the education, nutrition, healthy environment, disease-free, with the social cognition coming up, making people brain healthy and increasing the productivity. It is already said that one dollar invested in brain health can give us more than 11 dollars in productivity. So that is something we are looking at the returns and of course, it is very, very vital for all economies, all nations to have a brain healthy society.

Garry Aslanyan [00:40:05] Well, a lot of interesting stuff coming up in the coming years in this area, so, thank you very much for providing these insights and really shedding light on this interesting area and joining us today. I wish you all the best with your plans and work you're doing. We'll be watching this space in coming years.

George Vradenburg [00:40:27] Garry, thanks for covering this issue. Thanks for having us, thanks for paying attention to this. There will be a lot developing in 2026 because this is moving rapidly, and to have you cover this I think is important for your listeners.

Rajinder Dhamija [00:40:40] Thank you Garry again for highlighting the brain health, which is very, very important for us. And thanks once again.

Garry Aslanyan [00:40:49] I found today's conversation on brain health super informative. Three reflections stay with me. First, brain health is not only a medical priority, it's a social, economic, moral one, central to the future of our societies and productivity of our countries. Second, prevention and equity must guide our response, investing early through nutrition, education. Primary care and community-based services delivers far greater impact than crisis response. And third, innovation offers real promise here. From vaccines to digital tools and AI-enabled screening, new approaches could transform brain health, but only if the strengthened health systems reduce inequalities and build human capital alongside technological progress. I hope this episode encourages you to think differently about brain health and the role it plays in shaping our individual and collective future. Let's hear now from one of our listeners.

Adriana [00:42:04] Hello, this is Adriana in Uruguay. A big thank you to Garry and the team at TDR for this excellent podcast. I especially appreciate the space that you created for dialogue and important issues and interesting guests and excellent conversations. Whenever I tune into the podcast, I always learn something new. Although many of us listeners know about the most impactful global health and public health interventions, I would love to hear future guests talk about smaller or lower profile interventions or innovations or solutions that we listeners may not know about. Equally importantly, I

would like to hear about mistakes or failures so that we can learn from these as well, because as we know global health issues ultimately impact us all.

Garry Aslanyan [00:42:45] Thank you, Adriana. It's great to know we have a listener in Uruguay. Thank you for your great suggestions for future episodes. We'll surely take them into account. If you haven't already, subscribe to Global Health Matters newsletter so you don't miss the rest of our Season 5 on the future of global health. To learn more about the topic discussed in this episode, visit the episode's webpage, where you will find additional readings, show notes and translations. Don't forget to get in touch with us via social media, email or by sharing a voice message and be sure to subscribe or follow us wherever you get your podcasts. Global Health Matters is produced by TDR, a United Nations co-sponsored research programme based at the World Health Organization. Thank you for listening.