Think **Brain Health**
ACT EARLY!

Personalized plans, blood biomarkers and early conversations

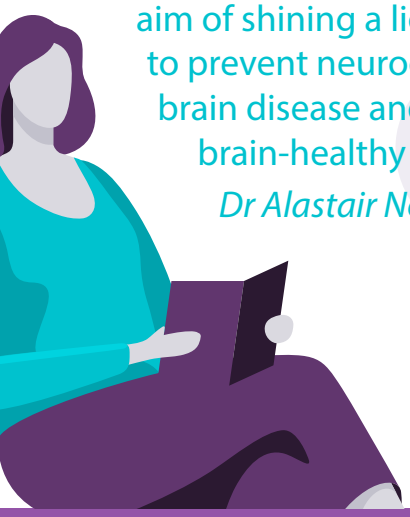
Think Brain Health
conference highlights

The delay and prevention of neuro-degenerative brain diseases through lifestyle changes and the anticipated benefits of ongoing research were the topics of a 2-day virtual conference, ***Think Brain Health*** *– a policy, clinical and research challenge*, held in November 2020. The event featured a series of stimulating and informative presentations and panel discussions highlighting opportunities and unmet needs in areas that are central to the **Think Brain Health** initiative.

Acting early before symptoms appear can reduce the risk of brain disease

Dr Alastair Noyce and **Professor Philip Scheltens**, co-Chairs of the event, opened their sessions by introducing the **Think Brain Health** mission statements and highlighting the need to **act early** to:

- **promote** public understanding that preventing brain disease is possible and that "what is good for the heart is good for the brain"
- **prepare** healthcare professionals to manage people with or at risk of neurodegenerative brain disease
- **prioritize** research and build infrastructure to enable prevention, early detection and management of neurodegenerative brain disease.



Think Brain Health has an overall aim of shining a light on opportunities to prevent neurodegenerative brain disease and promote brain-healthy approaches.

Dr Alastair Noyce

We need to help people modify the risk of neurodegenerative brain disease and seek out those for whom risk reduction is most important.

Biomarkers will help us understand what kind of disease is present and will lead to a window of opportunity for early adjustment of modifiable risk factors.

Professor Philip Scheltens

Adopting behaviours that decrease dementia risk can reduce health spending

Dr Naaheed Mukadam introduced the **12 potentially modifiable risk factors for dementia** described in a recent **Lancet Commission paper**[1] and discussed them in the context of a shift in our understanding of dementia development over the past decade. Interventions aimed at alleviating some risk factors (namely hypertension, hearing loss and smoking) could reduce dementia prevalence by 8.5% and save up to £1.9 billion per year in England.[2] Importantly, many interventions can be delivered by primary care services, which should therefore play a fundamental role in future efforts towards early intervention.

Use of hearing aids may reduce dementia risk – a finding that stimulated discussion. **Dr Mukadam** and **Dr Dorina Cadar** explained that reduced sensory input resulting from hearing loss is associated with a decrease in brain stimulation and diminished brain volume, which may underlie the increased risk of dementia.

> Our understanding of dementia has shifted away from thinking of it as a largely inevitable consequence of ageing to realizing that potentially modifiable risk factors can affect dementia risk.
>
> *Dr Naaheed Mukadam*

Identifying individual risk can help with adherence to intervention strategies

Overall dementia risk will vary based on many factors, including **geographical region, ethnicity and socioeconomic status**.

Professor Frank Jessen expanded the concept of variable risk by exploring **how individual risk scores** could help healthcare professionals to manage populations with or at risk of neurodegenerative brain disorders. He highlighted examples of risk scores based on elements such as the CAIDE (**C**ardiovascular risk factors, **A**geing and **I**ncidence of **DE**mentia) score,[3] blood-based biomarkers and genetic biomarkers. Findings from the FINGER (Finnish Geriatric Intervention Study to Prevent Cognitive Impairment and Disability) trial[4] showed that a multimodal intervention to control cardiovascular risk could reduce cognitive decline in 'at-risk' populations. An additional diagnostic framework – the ATN (**A**myloid, **T**au, **N**eurodegeneration) criteria – has the potential to aid prognosis in individuals showing signs of mild cognitive impairment for whom interventions should be most effective.

Findings from key studies have also shown that adherence rates to separate components of interventions varied (**Table 1**).[5]

Table 1. Summary of adherence rates observed during dementia risk-reduction intervention trials.[5]

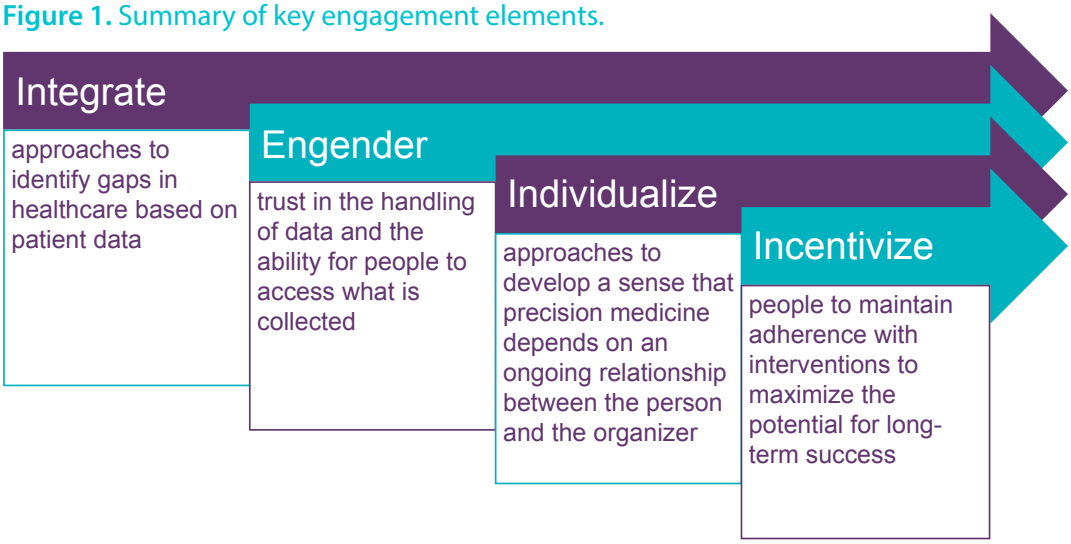
Trial	Intervention	Adherence
FINGER	Cardiovascular monitoring	~ 90%
	Nutrition	~ 90%
	Physical activity	~ 60%
	Cognitive testing	~ 50%
	Simultaneous adherence to all components (≥ 50%)	~ 40%
MAPT	Omega-3 supplementation/placebo	~ 70%
	Multidomain sessions	~ 50%
	Simultaneous adherence to all components (≥ 75%)	~ 50%

FINGER, Finnish Geriatric Intervention Study to Prevent Cognitive Impairment and Disability; MAPT, Multidomain Alzheimer Preventive Trial.

> It is important to create approaches to motivate individuals to engage in active risk reduction and to establish financial structures to aid initiation of brain health programmes.
> *Professor Frank Jessen*

These findings highlight the need for public health strategies to be personalized and consumer-focused to ensure that people engage. **Dr Charles Alessi** championed the need for a shift away from what he called "medicine by body part" and towards precision health, with a view to living better as well as longer. He also expanded on the need to embrace technology and digital approaches in this area as part of the continuum of care throughout the life course. Examples from Finland, Israel, Japan and Singapore have demonstrated elements that appear to garner engagement (**Figure 1**).

Figure 1. Summary of key engagement elements.



Multifaceted approaches are needed to implement public brain health programmes

A theme that emerged during day 2 was how research innovations can help to develop methods for **early identification** of people at risk of dementia. **Professor Craig Ritchie** explored the idea that the diseases that cause dementia have a genesis at least in midlife. He also described the practical considerations that are needed to implement public health programmes. The **Brain Health Scotland** initiative aims to put such research into practice by using artificial intelligence approaches to model the complex interplay of risk factors and to expand brain health services to everyone. It does so by **combining risk profiling and early disease detection to help to develop personalized prevention plans**. Such approaches will also require access to high-quality data sets to help to determine where and when interventions should be targeted.

> Brain diseases can have a long silent period before mild, moderate or severe problems emerge, but it's only a silent period if you don't listen …
>
> *Professor Craig Ritchie*

Validation of biomarkers could result in early identification of at-risk populations

The possibility for earlier intervention was described in the context of Alzheimer's disease by **Professor Wiesje van der Flier**. She presented information on advances in the development of diagnostic biomarker tests to identify individuals at risk of developing Alzheimer's disease and to quantify their risk. During patient–doctor conversations, many patients and caregivers desire more information and a larger role in shared decision-making (**Figure 2**).[6,7] Overall, patients highly value information about dementia risk estimation, so providing support for healthcare professionals in communicating these issues will be a key step in this process.

> When you know your brain is at risk, you can then act to preserve your brain health.
>
> *Professor Wiesje van der Flier*

Figure 2. Summary of information from patient–doctor conversations.

Diagnostic test results were frequently discussed (59% of conversations) but doctors rarely invite additional questions

1 in 4 patients/caregivers expressed the need for more information during a survey about diagnostic encounters

The role that biomarker information can play in identifying risk at the individual level generated great interest. This, combined with earlier points about the importance of education and large data sets, demonstrates the need for multinational research programmes encompassing:

- early diagnosis and symptomatic improvement through intervention
- fully individualized risk characterization
- implementation programmes
- public health campaigns.

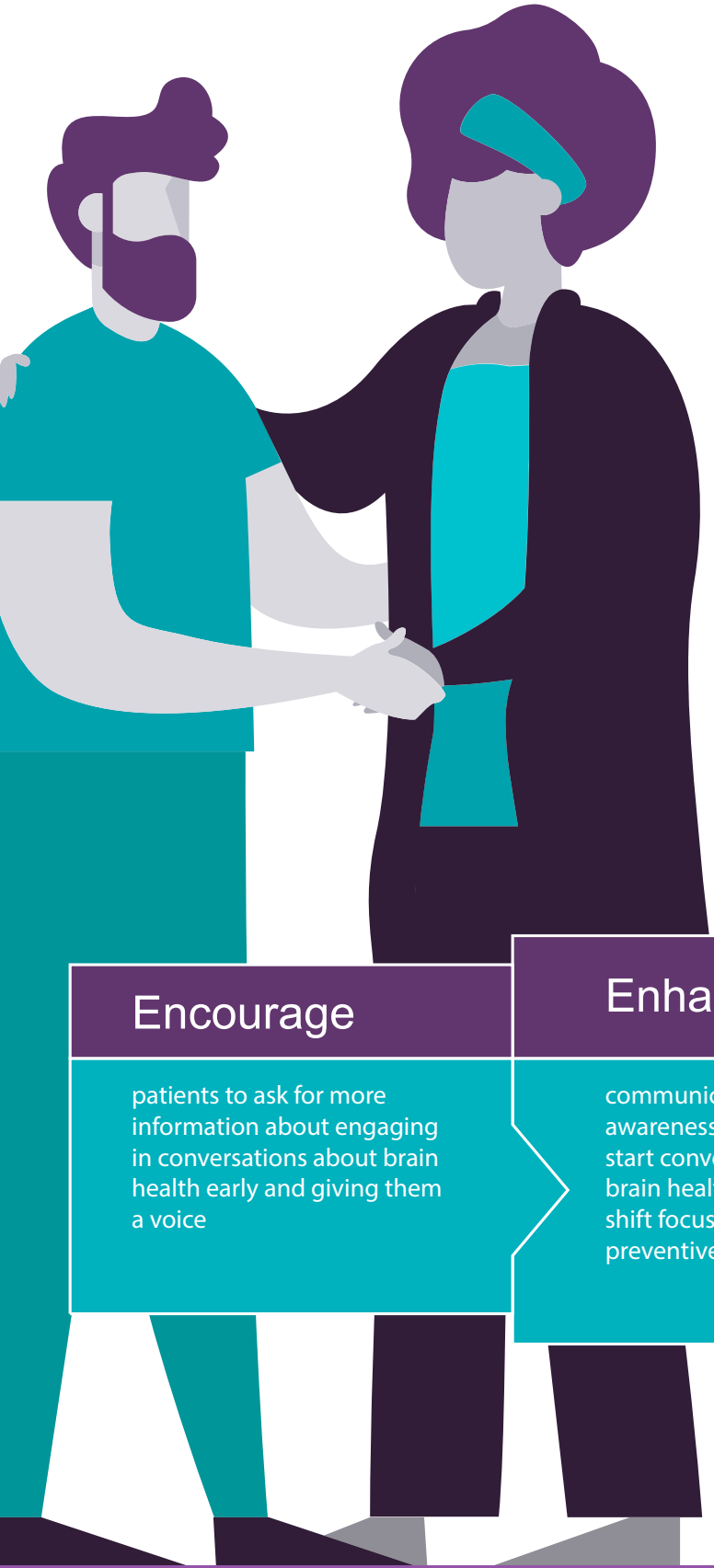
One such example is the EU Joint Programme – Neurodegenerative Disease Research (JPND) – the aims of which were outlined by **Professor Adriana Maggi**. Funding for brain research is just 10% of what is given to cancer research, therefore more investment is needed to improve our understanding of the basic mechanisms of neurodegenerative disease.

Realizing Think Brain Health goals will require widespread engagement

Real progress has been made in developing methods that will allow for increasingly early future detection of brain diseases. With this knowledge comes a need to consider how best to capitalize on this early detection.

Dr Susan Mitchell summarized some considerations that will be central to achieving early detection; these include engaging with and empowering patients to seek more information while helping healthcare professionals to assess and communicate risk. The resulting individualized interventions have the potential to promote a sense of partnership between the individual and the care providers.

What will incentivize people to adhere to interventions? Information on what motivates people is needed to underpin this; experts with backgrounds in psychology and economics could potentially provide additional behavioural insights. A vital underlying consideration was captured by **Professor Maggi**, who underlined the need for funding across each of these steps.



Next steps

During the panel discussions, there was consensus on some next steps that can guide the development and implementation of suitable risk-reduction interventions. These steps embrace both population-level factors and areas of importance to the individual to encourage adherence and to ensure that nobody need be left behind.

Encourage

patients to ask for more information about engaging in conversations about brain health early and giving them a voice

Enhance

communication and raise awareness of the need to start conversations about brain health early in life and shift focus to global preventive approaches

Educate

healthcare professionals and develop resources to derive individual risk estimates and allow implementable advice while breaking down barriers between researchers and clinical care

Appendix

Bibliography

1. Livingston G *et al*. *Lancet* 2020;396:413–46. 2. Mukadam N *et al*. *Lancet Healthy Longev* 2020;1:e13–20. 3. Kivipelto M *et al*. *Lancet Neurol* 2006;5:735–41. 4. Ngandu T *et al*. *Lancet* 2015;385:2255–63. 5. Coley N *et al*. *Alzheimers Dement* 2019;15:729–41. 6. van der Flier WM *et al*. *Alzheimers Dement* (N Y) 2017;3:301–4. 7. Visser LNC *et al*. *Alzheimers Dement (Amst)* 2019;11:520–8.

If you were unable to join us for the meeting or want to revisit any of the presentations, you can find them all on the **Think Brain Health** website.

Session 1: Health promotion and clinical risk management

Tuesday 24 November 2020, 9:30–11:00 GMT

9:30 *Introduction to Think Brain Health*
Alastair Noyce, Queen Mary University of London, London

9:50 *The potential for dementia risk reduction and how to make it more equitable*
Naaheed Mukadam, University College London, London

10:05 *Supporting healthcare professionals to manage an increased population with or at risk of neurodegenerative brain disease*
Frank Jessen, University of Cologne, Cologne

10:20 *Brain health in the age of precision*
Charles Alessi, Public Health England, London

10:35 Panel discussion and audience Q&A including **Dorina Cadar, University College London, London**

10:55 Final summing up and close

Session 2: Research needs in brain health

Wednesday 25 November 2020, 10:30–12:00 GMT

10:30 *Introduction to Think Brain Health*
Philip Scheltens, University Medical Centers, Amsterdam

10:50 *Early detection as the foundation for prevention*
Craig Ritchie, Brain Health Scotland, Edinburgh

11:05 *Developments in diagnostic tests to help identify and quantify risk of brain disease*
Wiesje van der Flier, University Medical Centers, Amsterdam

11:20 *Interventions to promote brain health – current status and future opportunities*
Adriana Maggi, JPND (EU Joint Programme), Milan

11:35 Panel discussion and audience Q&A including **Susan Mitchell, Alzheimer's Research UK, London**

11:55 Final summing up and close

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Social media

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