EAN 2023

Review of the 9th Annual European Academy of Neurology (EAN) Congress 2023

Location:	Budapest, Hungary
Date:	1st–4th July 2023
Citation:	EMJ Neurol. 2023;11[1]:10-16. DOI/10.33590/emjneurol/10304204. https://doi.org/10.33590/emjneurol/10304204.

The 9th Annual Congress of the European Academy of Neurology (EAN) unfolded in the city of Budapest, Hungary, spanning 4 insightful days between 1st–4th July 2023. Paul Boon, Ghent University, Belgium, commenced the opening ceremony by extending a heartfelt welcome to all participants. Drawing attention to Budapest's historical significance as one of the capitals of the Austro-Hungarian dual monarchy, Boon underscored the city's allure as an additional attraction, complementing the exceptional science and education to be offered during the congress. Boon expressed gratitude to colleagues from the Hungarian Neurological Society (HNS), and all those involved in the organisation of the congress.

This year's EAN congress exhibited an impressive line-up of 460 invited speakers, accompanied by a record-breaking submission of 2,318 abstracts, as well as 2,000 eLearning materials. The scientific core of the EAN was represented by over 3,000 panel members across 28 scientific panels, showcasing a notable increase of 30% in panel members since early 2022. Additionally, the EAN is currently involved in 32 ongoing research projects and guidelines. These key figures speak to the EAN's commitment to fostering scientific advancements and collaborations.

Recognising the growing community of the EAN, Boon expressed their appreciation for the organisation's substantial membership, which stands at an impressive 45,000 members, hailing from 27 countries. Boon specifically celebrated the rapid growth of young neurologists, including residents and research fellows, acknowledging their pivotal role as the future of the field, stating: "The future is with us […] You are our future, and we are very happy to have you here."

> **"The EAN envisions itself as the home of neurology, dedicated to advancing high-quality patient care."**

Exploring the EAN's vision, mission, and core pillars, Boon expressed that the EAN envisions itself as the home of neurology, dedicated to advancing high-quality patient care, with a mission to alleviate the burden posed by neurological diseases. The organisation's framework rests upon four fundamental pillars: science, education, membership, and advocacy. Importantly, the EAN is committed to operating within a broader network.

Drawing attention to the Brain Health Strategy, Boon underscored the fact that a significant portion of the population may not currently exhibit any neurological disorders, but could still be susceptible to future diagnoses. In an effort to consolidate their knowledge and insights on the prevention of neurological disorders, the EAN has compiled a publication, entitled 'The

> **"Boon highlighted the Brain Health Mission, a collaborative initiative aimed at prioritising brain health."**

EAN Brain Health Strategy: One brain, one life, one approach', which Boon enthusiastically recommended for all neurologists to peruse. The publication serves as a valuable resource, encompassing diagnosis, treatment, and prevention strategies.

Boon highlighted the Brain Health Mission, a collaborative initiative aimed at prioritising brain health. As part of this mission, the inaugural Annual Brain Health Summit was successfully launched on 19th May 2023 in Vienna, Austria. The summit serves as a platform for inclusive discussions and joint efforts to elevate brain health as a key priority. Notably, the Brain Health Mission seeks to engage members of the European Parliament (EP) and patient organisations in an ongoing dialogue, aiming to influence the health policies of the European Union (EU).

Recognising the prevailing imbalance favouring larger specialities, the EAN is taking proactive steps to address this. They aim to bridge existing research gaps by undertaking a comprehensive European neurological research agenda that encompasses all sub-specialities, which will outline their top seven neurological areas of focus. These priorities encompass a wide variety of topics, including neuro-infections, neuro-immunological diseases, multiple sclerosis, headache/pain, epilepsy, Alzheimer's disease and dementias, stroke, and movement disorders.

Claudio Bassetti, University Hospital Bern, Switzerland, introduced Thomas Südhof, Stanford University, California, USA, who delivered the opening lecture, titled 'Towards a cell biology of Alzheimer's disease'. Südhof delved into conceptual questions surrounding Alzheimer's disease, and shared practical insights from a cell biology project conducted in their laboratory. They discussed puzzles within the field, and offered potential approaches to their solutions, emphasising the importance of a conceptual understanding of synapse loss, neuroinflammation, and neuronal cell death in Alzheimer's disease through a cell biology lens. Südhof also highlighted the need for a focus on

better trial designs, recognising that the ultimate definitive 'experiment' lies in a positive clinical trial outcome.

Following the lecture, Boon proceeded to introduce the honorary EAN members for 2023, namely Thomas Brandt, Munich University Hospital, Germany, and Jes Olesen, University of Copenhagen, Denmark, who are renowned for their notable contributions in their respective areas of expertise.

Boon then extended an invitation to the President of the HNS, László Csiba, Debrecen University, Hungary. Csiba welcomed the attendees and provided an overview of the HNS' focus, which includes postgraduate teaching, patient information, and grants, as well as important updates on guidelines, diagnosis, and therapy advancements. Csiba described Budapest as a city of bridges, and emphasised Hungary's strategic geographical location, positioning the HNS as a bridge between East and West Europe. They expressed the HNS's desire to strengthen cooperation with the EAN, particularly in the field of education.

The EAN congress showcased the commitment to advancing the field of neurology, fostering collaborative efforts, and providing a vibrant platform for the exchange of knowledge. EMJ had the pleasure of participating in this congress, and is eagerly anticipating the next edition, scheduled to take place on 29th June–2nd July 2024 in Helsinki, Finland.

The current issue of *EMJ Neurology* provides concise summaries of pertinent press releases and abstracts presented at EAN, complemented by informative features focusing on the latest EAN guidelines, as well as the concept of neurodiversity in brain organisation. Notably, this issue also includes insightful interviews with members of the EAN teaching course sub-committee and local organising committee, including the Chair of the Local Organising committee, László Csiba. We encourage you to continue reading for further insights from this year's congress. ●

The Global Impact of Brain Conditions on Health Loss

NEW data from the Global Burden of Disease (GBD) study reveals that brain conditions contribute to more than 15% of all health loss. The findings from this ongoing study were presented at the 9th Annual Congress of EAN, in Budapest, Hungary.

Brain conditions contribute significantly to morbidity and mortality across the globe, and cause a high financial burden for both patients and healthcare systems. The most recent results from the GBD study highlight that in 2021, brain conditions resulted in 406 million disability-adjusted life years (DALY) of health loss. This was similar to the health loss associated with cardiovascular disease (402 million DALYs), and much higher than the health loss related to cancer (260 million DALYs). Furthermore, the GBD study revealed that diagnoses including stroke and Alzheimer's disease have increased by 98% and 178%, respectively, since 1990.

A key contributor to the disease burden of brain conditions is the ageing population, with projections that there will be >50 million people aged 65–79 years by 2050. The GBD study has been co-ordinated by the Institute for Health Metrics and Evaluation since 2007.

Epidemiologist and Client Services Engagement Manager, Shayla Smith, Institute for Health Metrics and Evaluation, University of Washington, Seattle, USA, remarked: "We expect the burden to increase in the coming years, creating new challenges for health systems, employers, patients, and families."

To date, a preliminary analysis has estimated that income loss for patients living with brain conditions is 1.22 trillion USD, and the direct healthcare cost is 1.14 trillion USD. Given these costs and concerns regarding an ageing population, Smith commented: "Data such as that derived from our study, and associated efforts, are critical to informing evidence-based planning and resource allocation."

Novel therapeutics could play a role in reducing this burden of disease. Smith discussed that improved prevention and treatment strategies for brain conditions to help reverse the anticipated increase in health loss are a goal for the future, and concluded that further research is needed to understand the best way to maintain brain health. ●

> **"In 2021, brain conditions resulted in 406 million disability-adjusted life years (DALY) of health loss."**

Brain Fog Examined in Novel Study

THE FIRST digital study carried out on a large scale has examined the correlates of subjective brain fog, which causes difficulty concentrating, focusing, and accurately following conversations. This is a condition that has been reported increasingly since the COVID-19 pandemic began, and which can have a profound effect on wellbeing, productivity, and mental health, including raised levels of anxiety and depression. The condition is often intermittent, and affects a large demographic of individuals, including the young.

> **"The first digital study carried out on a large scale has examined the correlates of subjective brain fog."**

The study, by researchers from London, UK, included 25,796 participants, all of whom described their lifestyles, comorbidities, and brain fog symptoms using a smartphone application designed to collect data remotely. Researchers studied links between 29 different variables against the self-reported presence of brain fog, using both machine learning and univariate methods. These variables included functional deficits, cognitive scores, and lifestyle factors. The Mindstep app, designed by a team of National Health Service (NHS) doctors in the UK, was used to collect data between 15th September–18th November 2022.

Research presented at the 9th Annual Congress of EAN in Budapest, Hungary, revealed that the highest overlap of brain fog comes with long COVID, migraine severity scores, and history of concussions. In the cohort, 7,280 (28.2%) reported brain fog symptoms (average age: 35.7 years; majority female), and a lower sleep quality was also associated with their comorbidities. The machine learning training accuracy was found to be 84%, with a cross-validated accuracy of 74%.

Lead author Ali Alim-Marvasti, University College London (UCL) Queen Square Institute of Neurology, UK, and Mindstep, commented: "Our conclusion is that brain fog is best defined as a difficulty to focus and concentrate, and this may affect activities of daily living, including completing paperwork, planning ahead, and mental arithmetic." They went on to describe the possibility of using machine learning in future to further explore this condition: "With further prospective data, extreme gradient-boosted algorithms show promise in identifying individuals at risk of subjective brain fog." ●

14   Neurology • August 2023 •   EMJ

Whether the Weather Impacts Migraine

MIGRAINE is impacted by weather variations, according to research presented at the 9th Annual Congress of EAN by Costanza Sottani, Policlinico Gemelli Hospital, Rome, Italy. Characterised by recurrent attacks, migraine is a relapsing/remittent pleomorphic disorder that can be triggered or precipitated by numerous factors.

The aim of this study was to confirm if meteorological parameters influenced migraine attacks over a 2-year period. Sottani and colleagues collected clinical data of 1,742 patients who presented with migraine with and without aura at the emergency department (ED). The data was collected between March 2010–March 2012, and it was correlated with data from the Italian National Weather Service for the same period.

> "As migraine is typically managed in a non-emergency setting, these ED visits are particularly important."

The results indicate that a subgroup of patients with migraine is very sensitive to meteorological variations, with an increase of temperature the day before presenting at the ED directly correlating with the number of admissions. Humidity level from 2 days before the migraine attack is also directly linked to admissions, and atmospheric pressure 2 days prior is also inversely correlated.

As migraine is typically managed in a non-emergency setting, these ED visits are particularly important. Sottani explained that this could mean that the attack is more severe, presents with different characteristics, or the patients' regular medication is not working.

The researchers believe that weather variation could interfere with neuronal excitability of the trigeminal-vascular system, or at least the structures linked to it, which leads to migraine attack. However, Sottani noted: "It could be possible that quantitative variations of trigger factors may enhance the response of migraineurs to environmental stimuli."

The fact that ED admissions could be correlated with weather variation for 2 years "reflects the fact that is it not about absolute values or specific degrees, but really about the sudden changes," said Sottani. While this study only focused on weather conditions, Sottani noted that it reasonable to think that global warming could have a negative impact on patients with migraine and other neurological conditions. ●

 •
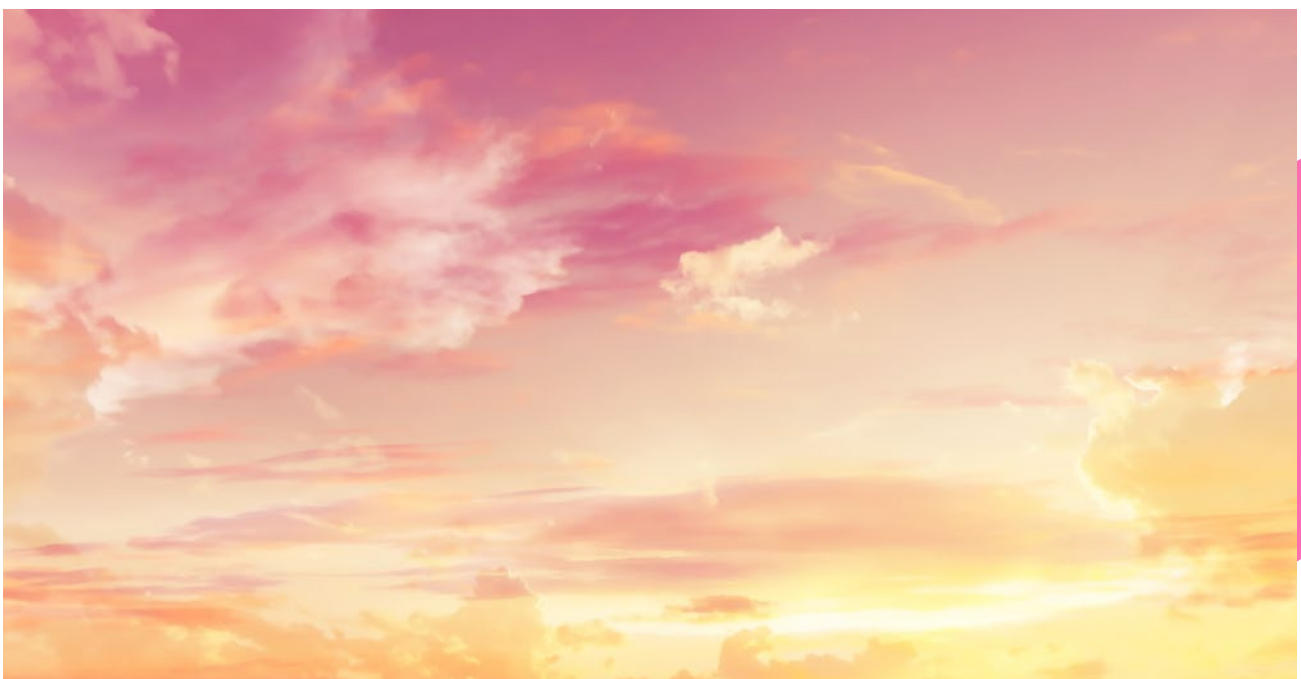
Artificial Intelligence Can Predict Brain Changes in Alzheimer's Disease

ARTIFICIAL intelligence (AI) is able to predict future brain changes up to 6 years after initial assessment of Alzheimer's disease through images obtained in fluorodeoxyglucose (FDG)-PET examinations, according to a study presented at the 9th Annual Congress of EAN. While previous studies have showed that AI could use baseline neuroimaging information to predict clinical symptomatic changes of neuropsychiatric disorders, data on predicting longitudinal metabolic changes in the brain are sparse.

A team from Germany and Iceland trained an algorithm on the first two FDG-PET scans through a convolutional neural network to predict the third scan in patients over 55 years with Alzheimer's disease. The algorithm, which predicted metabolic reduction, which reflects neuronal activity, "was able to anticipate future signal decline, i.e., metabolic reduction, reflecting loss of neuronal activity," stated Elena Doering, German Center for Neurodegenerative Diseases (DZNE), Göttingen, Germany. The tool also predicted significant signal decline in the second year in regions prone to Alzheimer's, including the posterior cingulate cortex, and the bilateral inferior temporal and parietal regions.

"Such an algorithm would allow physicians to read an anticipated 'future' FDG-PET brain scan as they would in their normal routine, but years in advance," stated Doering, which would help improve patient care. The team hopes their work will carry two clinical benefits: allowing for individual prediction of brain pathological changes over time, and improving early diagnosis or providing reliable prognosis. The data may also help the understanding of the natural course of the disease. Doering explained predictions over more extended periods of time may become available as databases increase. "Another potential application of our algorithm could be to predict drug efficacy within clinical trials, even without the need for longer follow-up or repeated imaging examinations," concluded Doering. ●

> "A team from Germany and Iceland trained an algorithm on the first two FDG-PET scans through a convolutional neural network."