

New tool to help predict dementia risk in older people

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Preventing dementia is a major public health priority worldwide, and intense work is being conducted to formulate effective preventive strategies. Healthy lifestyle changes may help prevent cognitive decline and dementia, but the challenge is to detect early on those who are most at risk and to choose the most relevant preventive measures.

Recent developments in [dementia](#) prevention research include large online Brain Health Registries, multinational data discovery and sharing platforms, and internet-based prevention trials. Dealing with large amounts of health information - "big data" - is a challenging consequence of these developments. Machine learning represents a type of artificial intelligence where a group of methods is used to teach computers to make and improve predictions based on large datasets. These methods are just starting to be used in the context of dementia prevention.

A team of medical doctors and engineers from Finland and Sweden addressed these challenges using a novel machine learning approach. They developed a dementia risk index - a tool for assessing people's risk of dementia and for indicating the most relevant target areas for preventive measures. An added advantage of the tool is the ability to show detailed individual dementia risk profiles in a visual format that is easy to interpret.

Risk index predicted dementia ten years before onset

The research team used data from the Cardiovascular Risk Factors, Aging and Dementia (CAIDE) study conducted in Eastern Finland. Study participants were cognitively normal individuals aged 65-79 years from the general Finnish population who underwent detailed health-related assessments, including memory and other cognitive tests. The dementia risk index performed well in identifying comprehensive profiles for predicting dementia development up to 10 years later. The main included predictors were cognition, vascular factors, age, subjective memory complaints and apolipoprotein E (APOE) genotype.

The researchers conclude that the risk index could be useful for identifying older individuals who are most at risk, and who may also benefit most from preventive interventions. They emphasize that the risk index is not meant for [dementia diagnosis](#), but as a tool to help with making decisions about dementia prevention strategies, i.e. to whom these should be targeted, and what risk factors should be specifically addressed based on the visual risk profile.

"The results of our study are very promising, as it is the first time this machine learning approach was used for estimating dementia risk in a cognitively normal general population," says the lead researcher, Alina Solomon, MD, PhD, from the University of Eastern Finland.

"The risk index was designed to support clinical decision making, and we are very keen on exploring its potential practical use. However, we still need to validate this [risk index](#) in other populations outside Finland. We also need to investigate if it works in people older than 80 years, and if it can monitor changes in dementia risk over time, for example as a response to lifestyle interventions. These are some of the next steps we are planning now," Dr Solomon adds.

"Large health information databases contain a lot of valuable information which is still partly hidden and under-exploited. Modern

[machine learning](#) methods can be used to extract patterns of data that may be difficult to observe just by looking at the data by eye. Our objective has been to detect patterns that predict whether a person is more likely to get dementia in the future. Another area of interest has been how to present all these complex data in a simple form to make these modern technologies useful for clinicians and general public interested in dementia prevention", says Jyrki Lötjönen, PhD, one of the co-authors in the study and chief scientific officer at Combinostics Ltd.

More information: Timo Pekkala et al, Development of a Late-Life Dementia Prediction Index with Supervised Machine Learning in the Population-Based CAIDE Study, *Journal of Alzheimer's Disease* (2016). DOI: [10.3233/JAD-160560](https://doi.org/10.3233/JAD-160560)

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