



# An AI tool to early identify an individual's multimorbidity patterns to reduce the risk of ADRD

**An artificial intelligence tool early identifies an individual's multimorbidity or multiple chronic conditions (MCC) patterns to assist in reducing the risks of Alzheimer's disease and related dementias (ADRD).**

**IP Status:** Copyrighted

## Applications

- Early identification of an individual's MCC patterns
- Personalize prevention program and treatment plans

## Key Benefits & Differentiators

- **Early identification of multiple conditions:** The AI model early identifies which MCC patterns a patient is likely to develop
- **Sufficient time for preventive management:** The tool can forecast the onset of conditions and patterns years in advance, allowing for timely and effective preventive measures and management
- **Personalized focus:** Application of the tool can shift the focus from treating general risk factors to specific conditions, enabling highly targeted and efficient prevention programs for each individual

## Technology Overview

Patients with Alzheimer's disease and related dementias (ADRD) have over 90% chance to develop Multiple Chronic Conditions (MCC), which largely exacerbate ADRD progression and accelerate cognition decline. More specifically, in most cases, these multiple conditions collectively and synergistically influence the progression of ADRD. A data-driven AI/ML tool was developed to identify these multiple conditions and their patterns that frequently co-occur in a specific type of individual, based on complex syndemic relationships among these conditions, an individual's factors, and pre-existing conditions. As a result, the tool accurately identifies MCC and enables prevention measures prior to the onset of the conditions. Our preliminary results suggest the potential for early identification of these conditions and patterns up to five years prior to MCC onset. This early timing is crucial for prevention, thereby reducing the risks of ADRD. While the US Department of Health and Human Services (HHS) emphasizes prevention, current methods based on general risk factors fail to specify which conditions to focus on, leaving clinicians insufficient information to create effective, targeted prevention programs.

## Phase of Development

**TRL: 4-5**

Prototype developed

## Desired Partnerships

**Technology ID**

2023-288

## Category

All Technologies

Life Sciences/Health IT

Life Sciences/Human Health

Software & IT/Algorithms

Software & IT/Artificial

Intelligence

Software & IT/Data Mining

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## Researchers

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## References

1. Pui Ying Yew, Ryan Devera, Yue Liang, Razan A. El Khalifa, Ju Sun, Nai-Ching Chi, Ying-Chyi Chou, Peter J. Tonellato, Chih-Lin Chi(2024) , <https://alz-journals.onlinelibrary.wiley.com/doi/10.1002/alz.13923>, [https://alz-journals.onlinelibrary.wiley.com/](https://alz-journals.onlinelibrary.wiley.com/,), 20, 4818-4827