ALZHEIMER'S DISEASE & RELATED DEMENTIAS

Digital Measures Development

DATAcc by DME DIGITAL MEDICINE SOCIETY

Digital Health Measurement Collaborative Community

Visuospatial memory discussion guide

Remembering where things are

This discussion guide will aid you in the development and use of the Core Digital Measures of ADRD, while presenting the importance and benefits of employing these measures in research and practice. It also offers considerations that should be assessed when employing a measure in different contexts.

Patient and care partner relevance

- Patients and care partners across the globe reported that visuospatial memory related to day-to-day living is an important concept to maintain.
  - In particular, one meaningful aspect of health reported by patients is *remembering the location of objects*.
- There are different ways to assess this ability in ADRD populations. A task that assesses key aspects of day-to-day life, such as object placement tasks, can provide a measure of this concept while retaining patient and care partner relevance.
  - A researcher/developer should consider and document how closely the selected task mimics naturalistic behavior.
  - Less naturalistic tasks (e.g., visuospatial paired associates learning) could be considered where cultural neutrality is important. While these tasks target similar underlying cognitive mechanisms, they are less related to the patient experience.

Use in clinical research as a clinical outcomes assessment (COA) endpoint measure

- Naturalistic measures of visuospatial memory can be used as a COA endpoint measure to assess the efficacy of treatment in preventing decline in dementia.
  - Following the concept of patient-focused drug development, such endpoints are relevant and interpretable.
  - To obtain a reliable estimate, visuospatial memory tasks can be implemented at home for several consecutive days. This process can lead to a more stable estimate of patient ability as compared to a single assessment in clinic.
  - The period of assessment chosen should be linked to a clinic visit to obtain maximum external information. This information can be used for additional validation work where gaps exist by comparing the outcome of the digital measure to clinical assessments or other COA assessments (as examples).
  - It is important to ensure that the task selected is both relevant and appropriate

for the specific ADRD population under investigation (i.e., considering disease stage, specific diagnosis).

Use in clinical research as a digital biomarker

- Although this measure was selected based on patient relevance, completion of a visuospatial task could produce several digital features that can be used as a digital biomarker of disease stage of predicted progression.
- Where an exploratory COA endpoint may be underpowered to detect group differences in early phase trials:
  - Digital biomarker information may help with the selection of patients for trial inclusion,
  - Digital biomarker information can assist with go/no-go decision-making for pivot trial work, and
  - Early phase, under-powered COA-based data collected in early phase work can help calculate the sample size needed in larger trials.

Use in clinical practice

- Measuring patient-relevant concepts in clinical practice can help healthcare providers (HCPs) track the patient journey and can be used as a discussion tool.
  - This approach can help to change the conversation in healthcare and allow individuals to talk with their HCP about aspects of health important to them.
- Longitudinal within-person assessment can be used to track visuospatial memory over time and continue treatment discussions with the HCP.
- Where normed data exist for a general population, scores can be presented as deviations from the normed sample.
- If employed as a digital biomarker, measures of visuospatial memory can aid in the screening of individuals with ADRD for further assessment.

Importance of metadata

- Sleep disturbance and disorders, cardiorespiratory and metabolic conditions, symptoms of anxiety and depression, stress, time of day, and other aspects of an individual's life can impact cognitive function.
  - In research, metadata should be selected and used as covariates in analyses to control for these factors.
  - In clinical practice, taking these factors into account can help the clinician appraise the patient's visuospatial memory score and score trajectory.
- Other important metadata to consider in research include technology type and model, scoring algorithm, and software versioning.
  - These elements can impact the results of the task, particularly if they vary between individuals or within-individual over time.