PROBLEM STATEMENT (1 Page)

Hispanic/Latino (herein, Latino) older adults are 1.5 times more likely to develop Alzheimer's disease (AD) than White non-Hispanic older adults. Despite this increased prevalence of AD, older Latinos are still diagnosed much later than older White non-Hispanic adults, limiting their access to disease-slowing interventions that are known to work best in the early stages of AD. Advances in blood-based biomarkers of AD offer an accessible, non-invasive solution for earlier disease detection among both White non-Hispanic and Latino older adults.[1-3] The Alzheimer's Association and test manufacturers both caution, however, against using a blood test for AD on its own[4]; instead, they strongly advise using blood-based biomarkers in conjunction with brief, inexpensive clinical tests, particularly in primary care where most older adults are initially seen (for example, in a Medicare Annual Wellness Visit or Cognitive Assessment and Care Plan Service). In fact, test developers argue against using it as a "check-off-the-box" test[5], and the Alzheimer's Association Appropriate Use Recommendations[4] expect that blood-based biomarkers, together with the right combination of clinical assessment(s), have the potential to determine a patient's probability of AD. As such, one of its stated research priorities[4] is "identify the optimal combinations of easily accessible and time-/cost-effective biomarkers and tests in this setting."

Problem to be solved: While quick cognitive screens (such as the Clock Drawing Test or Montreal Cognitive Assessment) could be used in conjunction with blood-based biomarkers, such screens are not equitable across ethnicities (or race)[6-9], showing substantial differences in diagnostic and predictive accuracy between Latino and White non-Hispanic older adults even after controlling for education. As a result, neuropsychologists tend to adjust scores based on ethnicity, using different normative data for non-Hispanic and Latino patients, but the time is now "for systematic redress of the racist structures and practices that have upheld non-Latinx white normative standards [within] neuropsychological tests"[10], since "the availability of assessments for the Latino population has been lagging behind."[11] Continuing to use existing cognitive tests will likely reinforce delayed diagnoses among minoritized patients, given that currently Latino older adults typically have more substantial cognitive deficits by the time they are diagnosed compared to White non-Hispanic older adults.

Our solution: We (PI: Schaefer) have developed a novel motor test as a potential solution. We have already validated this test in numerous in-lab studies, associating it with AD clinical status[12], brain amyloid[13,14], and hippocampal atrophy[12], along with atrophy in other relevant cortical regions.[12] Motor test scores are better than cognitive tests (specifically delayed recall tests) for predicting functional decline in prodromal AD over one year.[13] The motor test involves functional upper extremity movement and takes <5 minutes to complete, making it feasible for use in primary care. The test uses household items (e.g., spoon, cups) to minimize cultural differences and overall cost (<$10). Given that we have already shown that motor test scores are *not* dependent on demographics such as sex or education level[12,14,15], we now hypothesize that our motor test is equitable across ethnicity, aligning with the goal of ARCOM 3.0 to develop and evaluate new measures across diverse and underrepresented groups. This project will leverage the MindCrowd electronic cohort, which collects demographic, lifestyle, health, cognitive, genetic, and health history data via the internet to study AD risk. Why MindCrowd? It is representative of the general population (19% Latino), and this ARCOM 3.0 project will support the addition of our motor test to MindCrowd to test the following aims:

Aim 1: Test whether motor test scores are less affected by ethnicity (Latino vs. White non-Hispanic) than cognitive test scores. We hypothesize that our motor test will have a smaller effect of ethnicity than tests in the MindCrowd cognitive battery, while controlling for age, sex, and education.

Aim 2: Compare differential validity (i.e., test bias) of the cognitive and motor tests as predictors of daily functioning in Latino and non-Hispanic White participants. Significant test bias against Latino older adults has been shown previously when using cognitive test scores to predict daily functioning.[16] We expect no significant difference between Latino and White non-Hispanic participants in the association between our motor test and daily functioning (ECog-12 score), while controlling for age, sex, and education.