

(CI) = 0.01-0.13,  $p = 0.02$ ) and not associated with physical activity or sleep problem or hours of sleep ( $p > 0.05$ ). Animal fluency score was associated only with HEI (Adjusted B = 0.05, 95% CI = 0.01-0.09,  $p = 0.02$ ). DDS score was not associated with HEI, PA, or sleep problem ( $p > 0.05$ ) but associated with hours of sleep ( $p = 0.03$ ). Stratified analysis by race/ethnicity showed that CERAD total score was associated with HEI only in White (Adjusted B = 0.08, 95% CI = 0.01-0.15,  $p = 0.02$ ). DISCUSSION/SIGNIFICANCE OF IMPACT: CERAD total score was associated with HEI and not associated with PA or sleep problem. Promoting healthy eating is important for improving cognition in elderly population. Culturally sensitive and linguistically appropriate programs that involve community and care providers are needed to promote healthy eating for elderly population.

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### Heart Rate Variability as a Predictor of Post-Operative Cognitive Dysfunction in Older Adults

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OBJECTIVES/SPECIFIC AIMS: The objective of this project is to determine whether HRV, collected peri-operatively, is predictive of cognitive decline among older adults who undergo elective surgery/anesthesia. METHODS/STUDY POPULATION: This project is a part of the ongoing INTUIT/PRIME study, which is collecting pre- and post-operative cognitive testing, fMRI imaging, CSF samples, and EEG recordings from 200 older adults (age  $\geq 60$ ) undergoing elective non-cardiac/non-neurologic surgery scheduled to last  $> 2$  hours at Duke University Medical Center and Duke Regional Hospital. This project utilizes data from the first 60 INTUIT participants who contributed continuous heart rate data before and during surgery. Participants undergo cognitive testing prior to surgery (baseline) and at 6 weeks after surgery. Our primary dependent variable is the change in the composite score from baseline to 6-weeks. Delirium is assessed in the hospital with the twice daily 3D-CAM tool, so we will report the proportion of individuals with 6-week cognitive decline who exhibited delirium in the days following surgery. Participants' echocardiogram (ECG) recordings are extracted pre- and intraoperatively from B650/B850 patient monitors with VSCapture software. HRV is defined as the variability between successive R-spikes or inter-beat-intervals on ECG. RESULTS/ANTICIPATED RESULTS: We anticipate that lower intraoperative HRV is associated with worse cognitive decline at 6 weeks after surgery. As secondary objectives, we will determine whether pre-operative HRV or change in HRV (from pre-operative to intra-operative measures) are predictive of cognitive decline after surgery. We expect that in-hospital delirium will be detected in a higher proportion of those with 6-week cognitive decline, compared to those with stable or improved cognition at 6 weeks. DISCUSSION/SIGNIFICANCE OF IMPACT: HRV may address the present need for pre- and intra-operative cognitive risk stratification in the elderly. Physiological indices like HRV have the potential to dramatically change our understanding of CI in older adults undergoing surgery, as they offer an accessible, cost-effective, and non-invasive means whereby clinicians, particularly those unfamiliar with the nuances of geriatric and CI/dementia-related care, can

monitor patients and refer those at high-risk of CI after surgery for early intervention.

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### Improvement in Suicidal Ideation after Repeated Ketamine Infusions: Relationship to Reductions in Symptoms of Posttraumatic Stress Disorder, Depression, and Pain

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OBJECTIVES/SPECIFIC AIMS: Given the heightened risk for suicide seen in individuals with PTSD+MDD, this report explored the effect of repeated ketamine infusions on SI in a cohort of veterans. METHODS/STUDY POPULATION: Veterans with PTSD+MDD ( $n = 15$ ) received six intravenous infusions of 0.5 mg/kg ketamine on a Monday-Wednesday-Friday schedule over a 12-day period. All subjects endorsed SI at baseline. Outcome measures included the Montgomery-Asberg Depression Rating Scale (MADRS) total score, MADRS suicidal ideation item, and PTSD symptom Checklist for DSM-5 (PCL-5) subscales (intrusion, avoidance, negative alterations in cognition and mood, and marked alterations in arousal and reactivity), and visual analog scale of pain. Measures were collected immediately before and 24-hours after each infusion. RESULTS/ANTICIPATED RESULTS: Significant improvement in SI was observed 24-hours after the first infusion ( $Z = 3.21$ ;  $p = .001$ ) and remained significantly improved at all other post-infusion time points. Improvement in SI at the conclusion of the infusion series was significantly correlated with PTSD subscales of avoidance ( $r(12) = .610$ ,  $p = .021$ ), negative alterations in cognition and mood ( $r(12) = .786$ ,  $p = .001$ ), alterations in arousal and reactivity ( $r(12) = .729$ ,  $p = .003$ ), and pain ( $r(12) = .591$ ,  $p = .013$ ), even when controlling for improvement in symptoms of depression. DISCUSSION/SIGNIFICANCE OF IMPACT: The present analysis provides evidence of improvement in SI in a cohort of veterans with PTSD+MDD. Improvements in suicidality were correlated with PTSD symptom subscales and pain independent of improvement in depression. This report extends the interpersonal theory of suicide as it applies to posttraumatic pathology by demonstrating a significant association between improvements in all subclusters of PTSD, improvement in pain and improvement in suicidal ideation.

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### Improving Individual Clinical Outcomes in a Sequential Multiple Assignment Randomized Trial (SMART)

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OBJECTIVES/SPECIFIC AIMS: This work develops an algorithm that identifies patients in a Sequential Multiple Assignment Randomized Trial (SMART) who should switch treatments prior to the end of a stage because clinical effectiveness via their current intervention is unlikely. This algorithm uses as inputs patient baseline and interim measurements to assign a probability that a patient should switch or stay on their current intervention. First, the algorithm will be derived assuming both a linear and non-linear patient trajectory. Second, the performance of the algorithm will be assessed

using trial data from the Establishing Moderators and Biosignatures of Antidepressant Response in Clinical Care† (EMBARC) study. The primary objective of the algorithm is to switch treatment in patients who will not reach clinical effectiveness by the end of the stage, and the secondary objective is to avoid accidentally switching treatment in patients who will reach clinical effectiveness by the end of the stage. †Trivedi et al. *Journal of Psychiatric Research* 78 (2016) 11-23 **METHODS/STUDY POPULATION:** First, the algorithm was derived assuming a linear or non-linear trajectory. Next, performance of the algorithm was assessed using data from the Establishing Moderators and Biosignatures of Antidepressant Response in Clinical Care† (EMBARC) study. This two-stage SMART design measured the effectiveness of sertraline in 242 patients with non-psychotic Major Depressive Disorder (MDD). The algorithm was applied to baseline and interim measurements from the EMBARC study to predict end-stage Hamilton Depression (HAM-D17) scores, the primary outcome of the study. True positive rate (TPR) and false positive rate (FPR) were used to measure respectively the primary study objective (switching treatment in patients who will not reach clinical effectiveness by the end of the stage), and the secondary study objective (avoiding accidentally switching treatment in patients who will reach clinical effectiveness by the end of the stage). TPR and FPR were calculated for the following prediction scenarios: (1) three separate two-point predictions: Baseline and Week 2, Baseline and Week 4, Baseline and Week 6, and (2) a single three-point prediction: Baseline and Weeks 2 and 6. †Trivedi et al. *Journal of Psychiatric Research* 78 (2016) 11-23 **RESULTS/ANTICIPATED RESULTS:** When using two-point prediction, we found TPR to increase and FPR to decrease as the interim measurements approached closer to the end of the stage. We also found TPR to increase when using a three-point prediction, but at the expense of FPR also increasing. Across these scenarios, TPR ranged between 70 and 90%, and FPR ranged between approximately 20 and 50%. **DISCUSSION/SIGNIFICANCE OF IMPACT:** Although SMART designs ultimately assign patients to more effective treatments, this process can take time and leave a patient (currently on an ineffective treatment) waiting until the end of a stage to try a potentially superior treatment. This disadvantage of the SMART design is currently addressed by this algorithm. By introducing a regression and likelihood approach to predict whether a patient should switch or stay on their current treatment, we move closer to the goal of designing rigorous, patient-centered studies. This work has the potential to improve individual clinical outcomes for patients enrolled in pragmatic clinical trials.

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### Increased Monounsaturated Fat Consumption is Associated with Improved Body Composition in Subjects with Obesity and Heart Failure with Preserved Ejection Fraction

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**OBJECTIVES/SPECIFIC AIMS:** We hypothesized that increasing percent calories from MUFA (%MUFA) would be associated with an increased FFM/FM index. **METHODS/STUDY POPULATION:** Nine consecutive HFpEF patients with obesity participated in a 12-week pilot feasibility trial of UFA supplementation (NCT03310099).

Subjects were educated at baseline by a dietitian on UFA rich foods including high MUFA choices such as extra-virgin olive oil, canola oil and avocados. Participants were given a list of items, corresponding serving sizes and asked to eat at least one serving of these UFA rich foods per day for 12 weeks. Adherence was encouraged through weekly phone calls by the dietitian. Standardized 5-pass 24-hour dietary recall was performed by a dietitian at baseline and 12 weeks. The recalls were analyzed to establish intake of MUFA in percent calories (%kcal) with Nutrition Data Systems for Research software (NDSR). Body composition including FM%, fat free mass percent of body weight (FFM%) and ratio of FFM to FM (FFM/FM Index) was measured with bioelectrical impedance analysis (RJL systems) at baseline and 12 weeks. Statistical analysis was performed with SPSS (24.0). Spearman rank test was used for correlations. Values are expressed as numbers and percentages or as median and interquartile range (IQR). **RESULTS/ANTICIPATED RESULTS:** Subjects were mostly female (56%) with a median age 56 (IQR 50-59). Baseline median body mass index (kg/m<sup>2</sup>) was 36.7 (36.2-48.0), median FM% was 44.5 (IQR 32.5-53.4), median FFM% was 55.5 (IQR 46.7-67.5) and median FFM/FM Index was 1.25 (IQR 0.88-2.1). The only significant change was an increase in %MUFA from baseline 12.4% (IQR 6.9-14.3) to 12 weeks 21.8% (17.6-36.9) ( $p = 0.008$ ). Increased %MUFA was highly associated with increased FFM% ( $r = 0.783$ ,  $p = 0.013$ ) (Figure 1A), decreased FM% ( $r = -0.783$ ,  $p = 0.013$ ) (Figure 1B) and increased FFM/FM index ( $r = 0.800$ ,  $p = 0.010$ ) (Figure 1C). All correlations remained statistically significant after adjustment for changes in energy intake. **DISCUSSION/SIGNIFICANCE OF IMPACT:** Increasing dietary %MUFA is protective against negative changes in body composition in patients with obesity and HFpEF, independent of changes in caloric intake. Future work should focus on whether the correlation found in this pilot study translates in improved body composition and finally, exercise tolerance and clinical outcomes.

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### Intermittent Theta Burst Stimulation to Relieve Depression and Executive Function impairment in older adults

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**OBJECTIVES/SPECIFIC AIMS:** The objective of the study is to examine the ability of iTBS to improve depression and executive impairment in depressed older adults. If effective, this treatment will have the potential to improve the quality of life in LLD. **METHODS/STUDY POPULATION:** From 12- 2016 to date older adults (60 – 85 y/o) in a major depressive episode, with evidence of executive dysfunction (on the NIH Tool Box battery) were enrolled. iTBS protocol: This brief paradigm (3 min 9 seconds duration) was administered on weekdays for four weeks (20 sessions total). Stimulation intensity was set up to 120% of the observed motor threshold. Depression primary outcome: Change in the Montgomery Asberg Depression Rating Scale (MADRS) from baseline to the end of iTBS course. Executive function primary outcome: Change in executive measures from the electronic NIH Tool Box cognitive domain battery<sup>8</sup>. Executive secondary outcome: Change in scores from baseline to the end of iTBS on the Frontal Systems Behavior Scale (FrSBe), this self reported instrument measures dys-executive behavior. **Statistical Analysis:** paired t-test examined changes in depression and executive variables from baseline to post iTBS. Pearson correlation examined