

candidate genes with AD in LLFS and Health and Retirement Study (HRS). Our analysis revealed significant interactions between SNPs in UNC5C and other genes with AD, in both LLFS and HRS. These findings support roles of genetic interactions with UNC5C gene (implemented in axon growth and neuronal apoptosis) in AD.

METABOLOMIC PROFILE DIFFERENCES BETWEEN DEMENTED AND NON-DEMENTED APOE4 CARRIERS IN THE LONG LIFE FAMILY STUDY

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The apolipoprotein ε4 (APOE4) is the most prevalent genetic risk factor for late-onset Alzheimer's Disease (AD). Here we assessed the metabolomic profile differences between APOE4 carriers who develop AD vs. who do not in a sample of 142 participants, aged 65-99 years in the Long Life Family Study (LLFS). Of 7,321 metabolites, we applied a generalized estimating equation model and identified 137 metabolites significantly associated with AD. Subsequent multivariate analyses were performed for prediction and clustering recognition. Among annotated metabolites, 8 metabolites in the eicosanoids and docosanoids group, 3 metabolites in the fatty acids group, and arabitol were associated with elevated risks of AD (OR: 1.6-2.3). On the other hand, a different set of metabolites were associated with reduced risks of AD (OR: 0.34-0.64). These metabolomic profile differences can be used to help with early diagnosis in the population of older APOE4 carriers in the pre-clinical stage.

DISCOVERING MODALITY OF COGNITIVE FUNCTION USING CLUSTERING ANALYSIS

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In this study with Long Life Family Study (LLFS) participants, we aimed to identify patterns of performance on cognitive function assessments as specific cognitive signatures. We hypothesize that such signatures can be correlated with biomarkers and clinical outcomes. More than 4,700 LLFS participants were administered, at enrollment, a series of neuropsychological tests that measure various cognitive domains. We performed a cluster analysis to group LLFS subjects into clusters characterized by combinations of six neuropsychological test scores. The analysis resulted in 10

clusters of varying size with different cognitive signatures that (1) significantly correlated with physical and pulmonary function, and 31 blood biomarkers and (2) predicted mortality and incident medical events such as dementia, cardiovascular diseases, etc. We conclude that cluster analysis of multiple neuropsychological tests discovers cognitive signatures that are more specific than individual cognitive domains and that these can be correlated with blood biomarkers, incident medical outcomes and mortality.

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Older Adults and Hospitalization

EMERGENCY DEPARTMENT ADMISSIONS AMONG OLDER ADULTS LIVING ALONE WITH MULTIMORBIDITY

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Older adults living alone are at higher risk of mortality, morbidity and healthcare utilization. As more older adults live alone, Emergency Department (ED) admissions could rapidly increase, particularly among those with multimorbidity. We studied the association of living alone on ED admissions among older adults with multimorbidity. We used data from 16,785 older adults of the population-based Singapore Chinese Health Study (mean age: 73 years, range: 61-96 years) who were interviewed in 2014-2016 for living arrangements and medical history. Participants were followed-up for one year on ED admission outcomes (number of admissions, inpatient days and hospitalization costs). We used multivariable logistic regression to study the association between living alone and ED admission, and ran two-part models (probit & generalised linear model) to estimate the association of living alone on inpatient days and hospitalization cost. We found that compared to living with others, living alone was associated with a higher odds of ED admissions [Odds Ratio (OR) 1.28, 95% Confidence Interval (CI) 1.08-1.51], longer inpatient days (+0.61, 95% CI 0.25-0.97) and higher hospitalization costs (+322 USD, 95% CI 54-591). Compared to those living with others without multimorbidity, living alone with multimorbidity was associated with higher odds of ED admission (OR 1.64 95% CI 1.33-2.03), longer inpatient days (+0.73, 95% CI 0.29-1.17) and higher hospitalization costs (+567 USD, 95% CI 230-906). In conclusion, living alone is associated with higher odds of ED admission, longer inpatient days and higher hospitalization costs among older adults, particularly among those with multimorbidity.

HOSPITAL-ASSOCIATED DISABILITY ASSOCIATED WITH DELIRIUM AMONG OLDER ADULTS

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Hospital-associated disability (HAD), defined as a loss of activities of daily living (ADLs) occurring during hospitalization, is a common complication among older adults. Delirium is also a common complication during hospitalization and is associated with multiple long-term sequelae. We sought to determine the effect of delirium and known covariates on the risk of incident HAD in hospitalized older adults. We examined electronic health record (EHR) data for 35,201 older adults ≥ 65 years of age admitted to the general inpatient (non-ICU) units of UAB Hospital from January 1, 2015 to December 31, 2019. Delirium was defined as a score ≥ 2 on the Nursing Delirium Screening Scale (NuDESC) during hospital admission, and HAD defined as a decline on the Katz ADL scale from hospital admission to discharge. Generalized linear mixed models were used to examine the association between delirium and HAD, adjusting for covariates and repeated observations for individuals with multiple admissions. We found that 21.2% of older adults developed HAD during their hospitalization and experienced higher delirium rates as compared to those not developing HAD (25.2% vs. 16.3%). Presence of delirium, medical comorbidity score, baseline cognitive status, and baseline ADL function were associated (all $p < 0.001$) with incident HAD. Mediation analyses also showed that 8% of the effect of comorbidity on incident HAD was due to delirium ($p < 0.001$). Reducing rates of delirium can be one component of a comprehensive approach to reduce rates of HAD in older adults.

PREDICTING UNSCHEDULED EMERGENCY DEPARTMENT REVISITS LEADING TO ACUTE HOSPITAL ADMISSIONS AMONG OLDER ADULTS

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Background: Unscheduled emergency department (ED) revisits leading to acute hospital admission (RVA) are tantamount to a failed discharge, associated with physician error, mis-prognosis, and inadequate care planning. Previous research has shown RVA to be associated with adverse outcomes such as ICU admissions, long hospitalizations and mortality. Given the limited impact of pre-existing screening tools for older adults, we developed and validated a machine learning model to predict individual patient risk of RVA within 72 hours and 9 days of index ED visits. Method: A machine learning model was applied to retrospective electronic health record (EHR) data of patients presenting to 2 geographically and demographically divergent urban EDs in 2019. 478 clinically meaningful EHR data variables were included: socio-demographics, ED and comorbidity diagnoses, therapeutics, laboratory test orders and test results, diagnostic imaging test orders, vital signs, and

utilization and operational data. Multiple machine learning algorithms were constructed; models were compared against a pre-existing adult ED-RVA risk score as a baseline. Results: A total of 62,154 patients were included in the analysis, with 508 (0.82%) and 889 (1.4%) having 72-hour and 9-day RVA. The best-performing model, combining deep significance clustering (DICE) and regularized logistic regression, achieved AUC of 0.86 and 0.79 for 72-hour and 9-day ED-RVA for older adult patients, respectively, outperforming the pre-existing RVA risk score (0.704 and 0.694). Discussion: Machine learning models to screen for and predict older adults at high-risk for ED-RVA may be useful in directing interventions to reduce adverse events in older adults discharged from the ED.

REJECTION OF CARE IN HOSPITALIZED PERSONS LIVING WITH DEMENTIA: THE IMPACT OF NURSE COMMUNICATION

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Rejection of care (RoC) by persons living with dementia (PLWD) has yet to be measured in the hospital setting. Elderspeak communication (i.e., baby talk or infantilization) is an established antecedent to RoC in nursing home dementia care. The purpose of this study was to determine the impact of elderspeak communication by nursing staff on RoC by hospitalized PLWD. Eighty-eight care encounters between 16 PLWD and 53 nursing staff were observed for RoC using the Resistiveness to Care scale in one Midwestern hospital. Audio-recordings of the care encounters were transcribed verbatim and coded for semantic, pragmatic, and prosodic features of elderspeak. Over one-quarter (28.7%) of the duration of nursing staff speech towards PLWD constituted elderspeak and nearly all (96.6%) of the 88 care encounters included some elderspeak. Almost half of the observations (48.9%) included RoC behaviors by PLWD. Rejection of care was modeled as present or absent using a GEE method. Characteristics of the PLWD (e.g., pain, delirium) and the observation (e.g., environmental simulation) were evaluated as potential covariates. After adjusting for pain, length of stay, and gender, a 15-percentage point decrease in the proportion of elderspeak communication by nursing staff reduced the odds of RoC by 62% (OR=0.38, 95% CI=0.21-0.71, $p=.002$), and a one unit decrease in pain reduced the odds of RoC by 63% (OR=0.37, 95% CI=0.22-0.63, $p<.001$). This study identified that pain and elderspeak are two modifiable factors of RoC. Person-centered interventions are needed that address communication practices and approaches to pain management for hospitalized PLWD.

UNDERSTANDING THE ROLE AND VALUE OF PROCESS QUALITY INDICATORS IN HOSPITALIZED OLDER SURGICAL PATIENTS

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