



Together with

The School of Public Health Gerontology Interest Group

Presents the 4th Annual

Research on Aging Showcase

Friday, April 15th, 2011

1-4pm

Feinstone Hall, JHSPH



JOHNS HOPKINS
BLOOMBERG
SCHOOL of PUBLIC HEALTH



JOHNS HOPKINS
MEDICINE

Friday, April 15, 2011

Good Afternoon,

We are excited to welcome you to the 4th annual Research on Aging Showcase!

This year the session features current work by students, post-doctoral fellows, faculty, and research associates at Johns Hopkins University, the University of Maryland and the National Institute on Aging. We thank you for joining us and hope that today's event will help spark connections and promote cooperation among researchers across diverse departments, schools, and institutions.

We are grateful to the Center on Aging and Health and the Division of Geriatric Medicine and Gerontology at the School of Medicine for their continued support of our student initiative. We would also like to thank the Johns Hopkins Epidemiology and Biostatistics of Aging Training Program and the Johns Hopkins Claude D. Pepper Older Americans Independence Center as well as the JHSPH Event Planning and Housekeeping teams for helping to make the showcase possible.

Finally we would like to thank our esteemed panel of judges, including:

Karen Bandeen-Roche, PhD, MS
Michelle Carlson, PhD
Neal Fedarko, PhD
Thomas Glass, PhD
Jay Magaziner, PhD, MSHyg
Matt McNabney, MD
George Rebok, PhD, MA

Dorry Segev, MD, PhD
Richey Sharrett, MD, PhD
Eleanor Simonsick, PhD
Sarah Szanton, PhD, MSN, CRNP
Elizabeth Tanner, PhD, MS, RN
Qian-Li Xue, PhD
Sevil Yasar, MD, PhD

We hope that you enjoy today's poster session, and look forward to seeing you at future events.

Sincerely,

The Gerontology Interest Group steering committee -

Jennifer Deal
Michal Engelman
Zenobia Moore

Priya Palta
Jennifer Schrack
Alison Turnbull

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OWHOFASA AGBEDIA, MD
MPH CANDIDATE
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Socioeconomic Differences in Salivary Cortisol Patterns: The Brain Health Study

Background: Socioeconomic status (SES) plays an important role in individual health. It influences the coping strategies and adaptability of persons to on-going and cumulative stress patterns over the life-course. The cumulative effects of SES are visible across multiple biological systems. Cortisol levels and its diurnal pattern are indicative of Hypothalamic-pituitary-adrenal (HPA) axis activity, which is a major biological regulatory system. We evaluated whether higher levels and the diurnal pattern of salivary cortisol are cross-sectionally associated with socioeconomic status.

Methods: Ninety eight elderly persons, 60-82 years old, from the Brain Health Study participated in this study between 2006 and 2009. Four saliva samples were collected for cortisol measurement over a 24-hour period: immediately after wake-up, between 1/2-1 hour after wake-up, before dinner and at bedtime. Outcomes of interest were awakening response, area under the curve, diurnal amplitude and rate of decline of cortisol level over the 24-hour period. All cortisol concentrations were log-transformed. We examined education, income and perceived location on the SES ladder as SES variables.

Results: There was no significant difference between the socioeconomic status groups in levels of wake-up cortisol and cortisol awakening response. The low SES group had a blunted pattern over the course of the day. Area under the curve was not significantly associated with SES. All analyses included adjustment for biobehavioral confounders.

Conclusions: This study found an association between salivary cortisol and SES in an older population. Further work to determine the impact of this association on health outcomes is needed.

Key Words: Socio-economic Status; salivary cortisol; stress; diurnal pattern; awakening response.

BLAKE BENNETT

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Effects of Baltimore particulate matter exposure on heart rate regulation vary with age in DBA/2J mice.

Exposure to ambient particulate matter (PM) is associated with increased cardiac morbidity and mortality, which includes heart failure and increased heart arrhythmias, especially in the elderly. The purpose of the current study is to determine if exposure to PM would cause an increased susceptibility in older DBA/2J (D2) male mice with respect to heart rate (HR) and heart rate variability (HRV). At 4 and 12 months of age, mice were implanted with electrocardiographic (ECG) telemeters and allowed to recover for 20 days. The mice were then exposed to 100 μg of Baltimore fine PM by aspiration. Control mice were aspirated with saline. Before aspiration, mice were measured for several parameters, including HR, HRV, temperature, metabolism, and ventilation, which are known indicators to evaluate homeostasis. After the aspiration, a 3-min ECG sample was recorded at 15-min intervals for 4 hours. Temperature, metabolism, and ventilation was also collected for 4 hours following the aspiration. There was a significant ($p < 0.05$) decline in HR in the 12 month mice that did not occur in the 4 month mice. The decline in HR occurred within the first hour and persisted for 3 hours. Also, this HR decline was accompanied by significant ($p < 0.05$) increases in HRV (SDNN and rMSSD). Body temperature, metabolism, and tidal volume also declined following the aspiration. These data suggest that older D2 mice, which show no prior difference in homeostatic indicators, are more responsive and likely susceptible to acute Baltimore PM exposure. (Support: AG-21057 and RD-83241701)

TYESHA BURKS

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Angiotensin II Type 1 Receptor Blockade Protects Against Disuse Atrophy in Sarcopenic Mice

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The progressive loss of muscle mass and function, sarcopenia, poses health risks for older adults that lead to a decrease in physical activity and a rise in the incidence of falls and related fractures. Rehabilitation time is often prolonged after injury, which in turn extends the duration of bed rest leading to significant disuse atrophy, an additional variable interfering with successful recovery. Notably, sarcopenic muscle lacks the ability to sufficiently recover from disuse-induced atrophy as compared to young muscle. While observations regarding the expression profile of the canonical TGF- β signaling pathway are controversial, it is well documented that loss of muscle mass during disuse in young and aged skeletal muscle is associated with an increase of the non-canonical TGF- β (MAP Kinase) pathway. Previously, we have shown that the systemic antagonism of TGF- β signaling via the angiotensin II type 1 receptor blocker, losartan, restored the ability of aged muscle to regeneration upon injury. Due to the beneficial effects of losartan on combating muscle regeneration in aging skeletal muscle, we evaluated whether losartan was able to combat disuse atrophy in aged mice that were subjected to limb immobilization. We show that immobilized mice treated with losartan are protected against loss of muscle mass. Remarkably, this protective mechanism is not mediated by TGF- β signaling, but is due to an increase of the IGF-1/Akt/mTOR pathway. Thus, blockade of the AT1 receptor exerts its favorable effects on the maintenance of muscle mass by mediating critical pathways for skeletal muscle homeostasis.

NANCY CHILES

PHD STUDENT, DOCTORAL PROGRAM IN GERONTOLOGY
UNIVERSITY OF MARYLAND BALTIMORE

Education, Cognition, and Functional Recovery from a Hip Fracture

Nancy Chiles, Ann Gruber-Baldini, Denise Orwig, Jay Magaziner

Cognitive ability impacts recovery from hip fracture. Education is positively correlated with cognition; however the details of the relationship between years of education, cognition, and hip fracture recovery remain unclear. This study hypothesizes that higher education would be an independent predictor of better cognition and improved functional recovery post-hip fracture. Data was from 163 patients with a hip fracture from an ongoing study (Baltimore Hip Studies, BHS-7, 75 male and 79 female), recruited from 8 Baltimore-area hospitals. Baseline Modified Mini-Mental State (3MS) scores were used to determine cognitive impairment. Functional Recovery was measured by lower extremity physical activities of daily living (LPADLs) at 2 months post-fracture. At baseline, 75.5% were not cognitively impaired ($3MS \geq 78$), while 12.9% were moderately impaired ($3MS 66-77$) and 11.7% were severely cognitively impaired ($3MS < 66$). Compared to non-cognitively impaired, severely cognitively impaired patients were older (Mean=85.8+/-SD=10.1 vs. M=81.0+/-7.8), less educated (M=11.3+/-2.9 vs. M=13.5+/-3.3), and more disabled (LPADL M=11.4+/-1.4 vs. M=7.0+/-3.1) (all $p < .05$). Linear regression examined the impact of education on 3MS and 2-month LPADL, adjusting for age, sex, history of dementia, and in-hospital delirium, as well as pre-fracture LPADL for the 2-month LPADL regression. Years of education were positively associated with 3MS scores ($b(SE)=1.0(0.3)$, $p < .01$, Model R-squared=0.33), as well as 2-month post-fracture functional outcomes ($b(SE)=-0.2(0.1)$, $p < .05$, Model R-squared=.35). Our findings indicate that education is associated with cognitive functioning and recovery in physical functioning following a hip fracture.

DANA K. CHRISTO, PhD MPH

POST-DOCTORAL FELLOW, GENERAL INTERNAL MEDICINE
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Does pre-existing cardiovascular disease influence survival in older women diagnosed with incident breast cancer?

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Background: There is growing interest in the effects of pre-existing vascular disease and diabetes on the diagnosis, treatment, and survivorship related to common cancers. We hypothesized that in older women with newly diagnosed breast cancer, pre-existing CVD would be a major risk factor for all-cause and cardiovascular disease (CVD)-related mortality, and possibly for death attributed to breast cancer itself.

Methods: A population-based, retrospective cohort study was conducted using the SEER-Medicare linked database. Cases were women 67 years of age or older and diagnosed with incident breast cancer as the first primary cancer in the year 2000; Medicare eligible due to age, continuously enrolled in Medicare Parts A and B, and not enrolled in an HMO for 2 years prior to breast cancer diagnosis (n= 9,217). Pre-existing CVD was defined as one inpatient claim or two outpatient claims at least 31 days apart for ischemic heart disease, heart failure, valvular disease, or arrhythmia in the 2 years prior to breast cancer diagnosis. Multivariate Cox proportional hazards models were used to estimate the effect of pre-existing CVD on all cause- and cause-specific mortality.

Results: Prevalent cardiovascular disease was detected in 27% (n=2,481) of women with incident breast cancer. Women with pre-existing CVD were older (median age 79, Interquartile range (IQR), 74-84 v. 75, IQR, 71-81 years) than women without CVD; the distributions of race and geographic location were similar between groups. During five (5) years of follow up, 42% of women with pre-existing CVD compared to 26% of women without CVD died from all causes. In Cox proportional hazards models adjusted for age, , race, marital status, SEER registry, census tract level education and median income, screening, tumor stage and grade, chemotherapy, radiation, surgery, diabetes, and hypertension, women with pre-existing CVD were 54% more likely to die from all causes than their counterparts without CVD (Hazard Ratio [HR] 1.54 (95% Confidence Interval [CI], 1.41-1.68)). As expected, the risk of death from cardiovascular disease was significantly elevated for women with pre-existing CVD relative to those without CVD (adjusted HR 2.18; 95%CI 1.86-2.54). However, the risk of death attributed to breast

cancer was similar for women with vs without pre-existing CVD (HR 1.11, 95% CI 0.96-1.28).

Conclusions/Significance: In older women with newly diagnosed breast cancer, pre-existing CVD confers a higher risk of all-cause and CVD mortality, but not mortality attributed to breast cancer. As breast cancer patients increasingly survive their diagnosis, improved care coordination is critical among all health providers to maximize attention to CVD and other comorbidities and thereby improve overall survival. Whether breast cancer treatment may accelerate pre-existing CVD deserves further investigation.

SARAH DUTCHER

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Urinary Incontinence and Falls among Older Medicare Beneficiaries

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Objective: To examine the relationship between frequency of urinary incontinence (UI) and occurrence of falls in a nationally representative sample of older Medicare beneficiaries.

Methods: This cross-sectional study pooled 2003-2005 data from the Medicare Current Beneficiary Survey. Included individuals were ≥ 65 years old and community-dwelling. Information on annual UI symptom frequency and number of falls was obtained via self-report. Other characteristics included: demographics, comorbidities, medication use, functional status, and living situation attributes. Bivariate analyses and χ^2 tests assessed the unadjusted relationship between UI frequency and falls. A negative binomial regression model quantified the adjusted relationship, with generalized estimating equations to account for within-respondent correlation.

Results: 26,641 person-years met the inclusion criteria, representing 16,011 unique beneficiaries. The mean age was 76.8 (± 7.5) years and 56.7% were female. In the previous year, almost 28% of beneficiaries reported any UI and 22.5% reported falling. The proportion of those who fell was highest among those with UI symptoms more than once per week (36%) and declined to 19% among those with no UI ($p < 0.0001$). Multivariable analyses demonstrated a 35% (95%CI 1.18-1.54) (UI \leq once per month) to 63% (95%CI 1.40-1.89) (UI \geq twice per month) increased rate of falling annually, compared to no UI. Female sex, non-white race, and Hispanic ethnicity were associated with a lower rate of falling; age, certain comorbid conditions, and antidepressant or narcotic use demonstrated increased fall risk.

Conclusions: Higher UI frequency is associated with an increased rate of falls among older Medicare beneficiaries. Decreasing UI through behavioral or environmental modifications, or pharmacotherapy are potential interventions through which the risk of falling may be lowered.

CHAD HOCHBERG

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Restriction of Out-of-home Travel in Glaucoma and Age-related Macular Degeneration: Direction Measurement using a Cellular Network-based Tracking Device

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Introduction: Documentation of real-life activity restriction in patients with eye disease has rarely been reported. Here we examine travel outside the home in patients with glaucoma and age-related macular degeneration (AMD) using a cellular tracking device.

Methods: Glaucoma patients with bilateral visual field (VF) loss, patients with bilateral AMD and visual acuity of 20/32 or worse in each eye, and control subjects without significant central acuity deficits or visual field loss were studied. Subjects were between 60 and 80 years of age. Participants wore a cellular network-based device which recorded their spatial location over 15 minute intervals over one week of normal activity.

Results: 74 subjects with glaucoma, 30 with AMD and 50 control yielded 950 person-days of data. Glaucoma and AMD subjects did not differ from control subjects with regards to gender, employment status or educational level ($p > 0.2$ for all). AMD subjects were older (74.41 vs. 69.9 years, $p = .002$) and more often white ($p = 0.005$) than the controls. The range of average daily excursions was 0-2.9 with a median of 1.14 (IQR=0.8-1.5).

When compared to controls, both glaucoma subjects (median=1.00 vs. 1.33; $p = .025$) and AMD subjects (median=1.00 vs. 1.33; $p = .04$) took fewer daily excursions outside the home. In multivariable models, both glaucoma subjects (OR=2.56, $p = 0.045$, 95% CI: 1.02-6.4) and AMD subjects (OR=3.6, $p = 0.033$, 95% CI: 1.1-11.6) were more likely than controls to leave their homes less than once a day.

Conclusion: Having glaucoma or AMD is correlated with less travel outside of the home. Decreased out-of-home travel is associated with frailty, higher mortality, and less independence, pointing to a higher risk of specific health and quality of life impairments in these eye diseases.

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Stroke Survivor and Caregiver Congruence and Treatment Seeking for Post-stroke Depressive Symptoms

Introduction: Lack of depressive symptom recognition may delay treatment seeking for post-stroke depression. Agreement about the presence of illness symptoms between patients and caregivers positively influences treatment seeking. The purposes of this study are to describe the congruence of recognition of depressive symptoms and determine whether congruence was associated with caregiver or stroke survivor (SS) reporting symptoms to the SS healthcare provider (HCP).

Methods: SS-caregiver dyads (N=44) provided cross-sectional data via self-report questionnaires. SS were 3-6 months post stroke, mean age 68.52 ± 8.87 years, 50% male, 55% African American, well-educated and had high physical functioning. Caregivers were 58.73 ± 15.15 years, 75% female, and 57% spouses. Both caregivers and SS completed the CES-D as a measure of the SS depressive symptoms.

Results: Mean CES-D scores about SS were SS: 10.80 ± 7.40 and caregiver: 12.18 ± 8.60 . There was moderate overall agreement between SS and caregiver for the CES-D ($\rho_I = .41$, $p = .002$). Of the subset of SS who scored ≥ 16 on the CES-D (n=11) or caregivers who rated the SS ≥ 16 (n=11), four dyads were congruent regarding these high scores. Most dyads with exact item agreement were congruent about the absence of a depressive symptom. Congruence about the presence of high depressive symptoms was related to the SS reporting the symptoms to the HCP ($p = .02$), but not to caregiver reporting ($p = .57$).

Conclusions: Caregivers and SS had better agreement about depressive symptoms when there was an absence of symptoms. HCPs need to carefully assess for post-stroke depressive symptoms especially when discordance of symptom recognition appears between SS and caregivers.

NICOLAS D. KNUTH, PHD

POST-DOCTORAL FELLOW, LONGITUDINAL STUDIES SECTION, CLINICAL RESEARCH BRANCH
NATIONAL INSTITUTE ON AGING, NATIONAL INSTITUTES OF HEALTH

**Preservation of Muscle Mass is Predicted by Low 3-Methylhistidine
Excretion in Elderly Men**

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Urinary excretion of 3-methylhistidine has been postulated to be a marker of muscle protein breakdown and therefore may be useful in evaluating the development of sarcopenia in older adults. However, little is known about the relationship between 3-methylhistidine excretion and longitudinal muscle change. Twenty-four hour urinary excretion of 3-methylhistidine (3MH) and creatinine were measured in 302 participants age 65 and older (53% women, mean age 72, range 65 – 91) in the InCHIANTI study. Muscle cross sectional area (CSA) at the 66% tibia length was measured by peripheral quantitative computerized tomography (pQCT) at baseline, 3, 6, and 9 years. To assess the relationship between baseline 3MH excretion and longitudinal muscle CSA, we fit a longitudinal sex-stratified model using generalized estimating equations controlling for creatinine excretion and age at baseline. Compared to men in the highest tertile of 3MH excretion, men in the lowest tertile showed significant muscle preservation with age (Low-3MH*time: $\beta = 161$, $P < 0.05$). No association was found in women. This data suggests that in men high urinary excretion of 3-methylhistidine (i.e. high muscle protein breakdown) predicts accelerated decline of muscle with age.

PREETI KOHLI

BA CANDIDATE, PUBLIC HEALTH STUDIES
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Evaluating the Use of Assisted Living Facilities Within the PACE Model

The purpose of this study is to evaluate how assisted living (AL) is utilized by the Program of All-Inclusive Care for the Elderly (PACE). The main objective of PACE is to provide quality and coordinated care for aging patients in a community-based setting. To evaluate this relationship, three focus groups of staff members at one PACE site were conducted. The three groups consisted of clinical staff (nurses, therapists), administrative and social work staff, and direct care aides and van drivers. Discussion focused on how PACE utilizes AL in the care of older adults, including the perceived advantages and disadvantages associated with this inclusive clinical strategy. A chart review is also being conducted in order to collect baseline information about the medical conditions, disabilities, and living situations of the participants. In addition, the study prospectively follows PACE participants in their movement in and out of assisted living facilities. By comparing and contrasting the different sets of data, the researchers aim to identify major themes centered around patient- and program- related factors related to assisted living usage.

After transcribing the focus groups, categorization of the staff perspectives reveal that PACE programs have many incentives to optimally utilize AL care, which include ensuring the quality of care and controlling costs. The demographics of the focus group participants were: average age 50.3 years; 91% women, 78% white. Analysis of the transcripts indicate that patient characteristics that led to AL usage included: 1) increased medical and daily care needs; 2) short-stay rehab and respite needs; 3) need for supervision or concern for safety at home; and 4) insufficient support from caregivers. The program-related factors were 1) inability to coordinate care in home setting (especially if associated with recurrent or unnecessary hospital use); and 2) cost-effectiveness of care (compared to NH and hospital). Currently, additional data is being collected through the chart review and prospective analysis to support these findings.

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Hearing Loss and Incident Dementia

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Background: Earlier studies have suggested that hearing loss may be a risk factor for dementia, but this hypothesis has never been investigated prospectively.

Methods: We performed audiometry in 639 participants (age 36 – 90 y) of the Baltimore Longitudinal Study of Aging who were dementia-free in 1990-1994 and prospectively followed them for incident dementia. Hearing loss was defined by a pure-tone average of hearing thresholds at 0.5-4 kHz in the better-hearing ear (normal <25 dB, mild loss 25-40 dB, moderate loss 41-70 dB, severe loss >70 dB). Diagnosis of incident dementia was made by consensus diagnostic conference. Cox proportional hazard models were used to model time to incident dementia according to the severity of hearing loss.

Results: During a median follow-up of 11.9 years, 58 cases of incident all-cause dementia were diagnosed of which 37 cases were AD. The risk of incident all-cause dementia increased log-linearly with the severity of baseline hearing loss (1.27 per 10 db loss, 95% CI: 1.06 – 1.50). Compared to normal hearing, the hazard ratio for incident all-cause dementia was 1.89 for mild hearing loss (95% CI: 1.00 – 3.58), 3.00 for moderate hearing loss (95% CI: 1.43 – 6.30), and 4.94 for severe hearing loss (95% CI: 1.09 – 22.4). The risk of incident AD also increased with baseline hearing loss but with a wider confidence interval (1.20 per 10 dB of hearing loss, 95% CI: 0.94 – 1.53).

Conclusions: Hearing loss is independently associated with incident all-cause dementia. Whether hearing loss is a marker for early stage dementia or is actually a modifiable risk factor for dementia deserves further study.

FRANK R. LIN, MD PHD

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Hearing loss prevalence and risk factors among older adults in the United States

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Background: Hearing loss has been associated with cognitive and functional decline in older adults and may be amenable to rehabilitative interventions, but national estimates of hearing loss prevalence and hearing aid use in older adults are unavailable.

Methods: We analyzed data from the 2005-6 cycle of the National Health and Nutritional Examination Survey (NHANES) which is the first cycle to ever incorporate hearing assessment in older adults ≥ 70 years. Audiometry was performed in 717 older adults, and data on hearing aid use, noise exposure, medical history, and demographics were obtained from interviews. Analyses incorporated sampling weights to account for the complex sampling design and yield results that are generalizable to the U.S. population.

Results: The prevalence of hearing loss defined as a speech-frequency pure tone average >25 dB in the better ear was 63.1% (95% CI: 57.4 – 68.8). Age, sex, and race were the factors most strongly associated with hearing loss after multivariate adjustment, with black race being substantially protective against hearing loss (OR 0.32 compared to white subjects [95% CI: 0.19 – 0.53]). Hearing aids were used in 40.0% (95% CI: 35.1-44.8) of adults with moderate hearing loss, but in only 3.4% (95% CI: 0.8-6.0) of those with a mild hearing loss.

Conclusion: Hearing loss is prevalent in nearly two-thirds of older adults ≥ 70 years in the U.S. population. Additional research is needed to determine the epidemiologic and physiologic basis for the protective effect of black race against hearing loss and to determine the role of hearing aids in those with a mild hearing loss.

MINGHAO LIU
MD CANDIDATE 2013
JOHNS HOPKINS UNIVERSITY SCHOOL OF MEDICINE

Age is associated with patient and provider misperceptions of frailty among potential surgical candidates.

Minghao Liu, BSc, Reside L. Ros ScM, Nathan T James MHS, Jacqueline Garonzik-Wang, MD, Bernard Jaar MD, Colleen Reft CRNP, Dorry L. Segev, MD, PhD

Introduction: Frailty, a phenotype of decreased physiological reserves and lowered resistance to stressors, is strongly associated with adverse surgical outcomes in older patients. While frailty predicts outcome, we hypothesized that misperceptions of frailty might inappropriately influence the decision to undergo surgery. The goal of this study was to correlate measured frailty with patient and provider perceptions therein.

Methods: We studied 105 potential kidney transplant candidates and their providers. This was an ideal population in which to study age/perception interactions because of the high prevalence of frailty in dialysis patients of all ages. Patients and providers were given descriptions of frailty and asked to categorize accordingly. Frailty was then measured using the validated 5-domain Fried scale (weight loss, grip strength, walking speed, physical activity and physical exhaustion). Modified Poisson regression was used to analyze associations between perceived frailty and other covariates.

Results: Only 26% of patients and 40% of providers predicted frailty correctly. Patients over 65 were 54% more likely to underestimate their own frailty (95% CI: 1.15-2.06, $p < 0.01$). Providers were 69% more likely to underestimate frailty in patients ≤ 65 (RR=1.69, $p < 0.05$) and 58% more likely to overestimate frailty in patients with each increasing decade of age (RR=1.58, $p < 0.01$), independent of patient sex, race, and disability.

Conclusions: In older adults, the patients underestimate and the providers overestimate the burden of frailty. These misperceptions might inappropriately influence surgical decision-making. Measurement of frailty in patients considering surgery, and discussing the findings, might ameliorate this risk.

JENNIFER LLOYD, MA

PHD CANDIDATE, DIVISION OF GERONTOLOGY
DEPARTMENT OF EPIDEMIOLOGY AND PUBLIC HEALTH
UNIVERSITY OF MARYLAND BALTIMORE

Body Mass Index and Bone Mineral Density in Adults over 50: Results from NHANES 2005-2008

Jennifer Lloyd, Dawn Alley, William Hawkes, Shari Waldstein, Marc Hochberg, Denise Orwig

Although previous studies have reported a positive relationship between body mass index (BMI) and bone mineral density (BMD), this relationship hasn't been examined in more recent cohorts. Using data from the National Health and Nutrition Examination Survey (2005-2008), we examined the association between BMI and low BMD and osteoporosis (defined as ≥ 1 SD and ≥ 2.5 SD below young, sex-specific mean, respectively). There were 3,801 adults ≥ 50 years (mean 63 years), predominately female (51.75%), white (83.52%), and overweight or obese (72%), with a mean femoral neck BMD of 0.78 gm/cm² (SD=0.14). Both overweight and obese persons had significantly lower odds of low BMD (OR=0.33, CI: 0.28-0.39; and OR=0.14, 95% CI: 0.12, 0.17, respectively) and osteoporosis (OR=0.19, 95% CI: 0.08, 0.44; and OR=0.21, 95% CI: 0.08, 0.59, respectively). Gender and race were not significant effect modifiers. Results demonstrate the strong positive association between BMI and BMD, consistent with prior research.

KELLY D. LLOYD, PHD

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Older Adults Seriously Injured by Falls and Motor Vehicle Crashes: Do Comorbidities Differ?

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Older adults injured in falls are often frail and have a high prevalence of comorbidity. It is unknown if the prevalence of pre-injury comorbidity differs by mechanism of injury. We hypothesized that older adults with a low-energy mechanism of injury (fall on a level surface [FOLS]) have more comorbid conditions than those with a high-energy mechanism (motor vehicle crashes [MVC] or fall from a height [FFHT]). We examined trauma registry data for patients age ≥ 65 admitted to a level I trauma center in 2009 (n=628). Average age (\pm standard deviation) was 78.0 \pm 8.4 years; 51.7% were female, 80.7% were Caucasian, and 90.9% had ≥ 1 comorbid condition. Patients with FOLS and FFHT were significantly older than those in MVC (mean ages 79.0, 78.7, and 74.5, respectively). The median number of comorbid conditions was significantly higher in patients injured by FOLS and FFHT than those injured by MVC (3, 3, and 2, respectively). Mental illness and gastro-intestinal disease were more prevalent, and diagnosis of alcoholism less prevalent, among patients with FOLS than the other groups. These results suggest that patients seriously injured in low- and high-energy falls are more similar to each other with respect to age and number of comorbidities than to patients injured by MVC. However, the strength and direction of the association between injury mechanism and comorbidity differ across comorbid conditions. The association of injury mechanism with comorbidity is important when determining appropriate trauma care for older adults as underlying conditions can result in higher risk of complications and poorer long-term recovery.

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Statistical Approaches to the Analysis of Audiometric Data

Hearing loss is highly prevalent among older adults and is associated with communication impairment, social isolation, cognitive function, and dementia. Studying risk factors and possible treatments for hearing loss requires the analysis of audiometric data. Audiometry is a psychophysical measure of an individual's hearing thresholds (measured in decibels) for a series of pure tone frequencies (0.5- 8 kHz). Historically, these audiometric data have been analyzed by examining the hearing thresholds for each individual tonal frequency as a series of separate analyses and heuristically synthesizing those analyses by looking for qualitatively similar behavior. This treatment is imprecise due to subjective decisions about qualitative agreement between tests, inflates type I error by multiple testing, and wastes valuable information by ignoring the relationship between measurements taken from a given individual. We hope to improve upon this method by exploring new ways to analyze audiometric data. Our goal is to develop a better method, one that makes more efficient use of the available audiometric data and that exhibits desirable statistical properties. This will help us draw better statistical inferences from our analyses of audiometric data when studying risk factors and possible treatment modalities for hearing loss.

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Associations of plasma dietary carotenoids and depressive symptoms in older persons: the mediation role of inflammatory markers.

Objective: We examined the cross-sectional and longitudinal relationship between plasma carotenoids and depressive symptoms over a six-year follow-up in older persons, and whether this association was mediated by inflammatory markers.

Methods and Materials: This research is part of the InCHIANTI Study, a prospective population-based study of older persons in Tuscany, Italy. The sample for this analysis included 958 women and men aged 65 years and older. Plasma total carotenoids and inflammatory markers were assessed at baseline. Depressive symptoms were assessed at baseline and at the 3- and 6-year follow-up using the Center for Epidemiological Studies-Depression Scale (CES-D). Depressed mood was defined as CES-D \geq 20.

Results: At baseline, higher total carotenoids level were associated with lower probability of depressed mood (OR=0.82, 95%CI=0.68-0.99, p=0.04) after adjustment for sociodemographic, health and inflammation. After the exclusion of participants with baseline depressed mood and use of antidepressants, higher total carotenoids level were associated with lower risk of incident depressed mood (OR=0.72, 95%CI=0.52-0.99, p=0.04) at 6-year follow-up, after adjustment for confounders plus baseline CES-D. Inflammatory marker Interleukin-1 receptor antagonist partially mediated this association.

Discussion: Low plasma concentrations of carotenoids are associated with depressive symptoms and predict the development of new depressive symptoms in older persons. Understanding the mechanism of this association may reveal potential targets for prevention and treatment.

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Socioeconomic Variations in Disease Discovery Experiences: A Mixed-Method Study of Type 2 Diabetics

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Objective: The primary aim of this research is to explore and explain socioeconomic variations in experiences of diagnosis of type 2 diabetes. Previous research has generally found strong differences in health outcomes among diabetics by socioeconomic status. Drawing on Constrained Choice Theory, this study investigates the relationship between socioeconomic status, experiences of diabetes discovery, and diabetes outcomes.

Design: This study uses a mixed-methods design. Qualitative interviews were conducted with 30 respondents (13 men and 17 women) aged 51-92 years. Respondents lived within a 60 mile radius of Detroit. Respondents were selected from a convenience sample associated with the Geriatric Center at the University of Michigan. These data were combined with survey questions that were orally administered at the same visit as the qualitative interview for a mixed-method approach.

Results: In the quantitative analysis, the father's level of education and the respondent's self-rated health predicted mean levels of adherence. Adherence did not differ significantly by financial status (current or growing up), highest level achieved by the respondent or by the respondent's mother. One's financial status growing up predicted mean differences in self-rated health and by adherence. Health status did not differ significantly by the respondent's level of education or the education of the respondent's mother or father.

The qualitative analysis provided information on the processes through which individual experiences with diabetes discovery and how it relates to adherence varies by socioeconomic status. While respondents from a lower SES background had more personal experience with diabetes prior to diagnosis, respondents from a higher SES background had more knowledge surrounding the illness and its regimen. Respondents from lower SES backgrounds were more likely to be diagnosed when problems occurred (rather than during routine checkups). This suggests a later and more traumatic diagnosis for lower SES respondents relative to higher SES respondents: lower SES respondents reported concerns regarding potential outcomes (amputations, death), while higher SES respondents reported being focused more on lifestyle change during the disease discovery process. These socioeconomic differences are reflected in different levels of adherence and subsequent health outcomes by s socioeconomic status.

Conclusions: This study provides insight into the processes by which socioeconomic disparities in diabetes adherence and outcomes are maintained. Practical implications of the findings and suggestions for future research are discussed.

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The association between body mass index, weight loss and physical function following hip fracture

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Little is known about the relationship between body mass index (BMI) and physical function after hospitalization for an acute event. The purpose of this study was to determine whether BMI at the time of hospitalization for hip fracture or weight change in the period immediately following hospitalization (3-10 days) predict physical function in the year after fracture in older women (n=136). Mixed effect models were used to examine the associations between BMI, weight change, and physical function, measured using the lower extremity gain scale (LEGS), walking speed and grip strength at 2, 6 and 12 months following fracture. LEGS score and walking speed trajectories did not differ across BMI tertiles. However, grip strength trajectories were significantly different (p=0.029), with underweight women having lower grip strength than normal weight women at all three time points. Women experiencing severe weight loss (>4.8%) had significantly lower LEGS score at all time points, slower walking speed at 2 and 6 months, and weaker grip strength at 12 months post-fracture relative to women with more modest weight loss. After controlling for potential confounders, overall differences in functional trajectories were not significant, but differences at 12 months post-fracture remained significant. Underweight women were weaker than normal weight women (-2.8 kg, p=0.049), and women with severe weight loss had an average grip strength 9.8kg lower than in women with modest weight loss (p=0.003). Results suggest that weight loss after fracture is associated with weakness during hip fracture recovery and is a stronger predictor of strength than BMI.

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HIV Infection and Immune Suppression Are Associated with Higher Burden of Multimorbidity among Aging IDUs in Baltimore, MD

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Background: HIV infection, injection drug use, and aging may each contribute to multimorbidity. Few studies, however, have investigated the prevalence or correlates of multimorbidity among an aging HIV-infected and at-risk injection drug user population.

Methods: Among 1,262 AIDS Linked to the IntraVenous Experience (ALIVE) study participants, we determined the prevalence of 7 non-AIDS-defining chronic conditions (diabetes, obstructive lung disease, liver disease, anemia, obesity, kidney dysfunction, and hypertension). Ordinal logistic regression was used to model the odds of increased multimorbidity associated with demographic, behavioral, and clinical factors. Self-reported prevalence was compared to clinically- or laboratory-defined prevalence.

Results: Participants were a median of 48.9 years old, 65.1% were male, 87.5% were African-American, and 28.7% were HIV-infected. In multivariable analysis, HIV-infection (OR: 1.55; 95%CI: 1.16-2.05) was positively associated with increased multimorbidity. Among HIV-infected participants, multimorbidity was increased with lower nadir CD4 T-cell count (OR: 1.14 per 100 cell decrease; 95%CI: 1.02-1.28) and higher current HIV viral load (OR: 1.30 per log₁₀ increase; 95%CI: 1.07-1.59). Older age, being female, not using cigarettes or drugs, and having depressive symptoms were also positively associated with increased multimorbidity. A substantial proportion of multimorbid conditions were unrecognized and untreated.

Conclusion: HIV-infected participants experienced increased numbers of multimorbid conditions; risk increased with advanced immunosuppression and higher viremia. These results underscore the heavy burden of multimorbidity among HIV-infected persons and highlight the need for routine assessment and integrated management of chronic diseases in this high-risk population.

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Pharmacist's Pharmaceutical Care on changes of Frequent-Medication-Use Aging Patients

Background: The purpose of this study is to reduce medical expenditures of frequent attendants by regular well-trained pharmacists' home care in the South of Taiwan.

Method: This project enrolled 66 cases. We totally enrolled 17 Pharmacists in average 3.9 patients per pharmacist. Before 2010 September 99, 58 cases were scheduled in our services at least 6 months.

Results: After analysis of targets' personalities, the collected 38 cases were divided into two groups by definition of sociopsychological theory, Burst and Gap (typical hospital shopper) and Regular (frequent attenders based on their medical needs). In pre-tests and post-tests, the control group defined as visiting care less or equal to two times and exposed group defined as visiting care performed per month at least two times, we found that Burst and Gap patients' satisfaction with this service was reducing from 72% to 44% , which means pharmacists made pressure to their visiting targets due to time limitation ($p = 0.001$). However, through this research, targets' awareness of the health risks occurred from frequent consults ($p = 0.002$) and the cost effectiveness ($p = 0.001$) were significantly increased. The most important thing was that our intervention did a great effect on typical frequent attenders 93% ($p = 0.003$) that means Burst and Gap had changed their hospital shopping completely and this study has reached its original purposes.

Conclusion: Generally, Pharmacists' home care had shown their specificity and effectiveness on typical cases.

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Genome-wide meta-analysis of Macronutrient intake

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In many modern societies, metabolic diseases such as diabetes, cardiovascular disease and hypertension are highly prevalent. Diet is one of the main modifiable risk factors for many such conditions, thus understanding the factors that contribute to eating behavior has important public health implications. While human eating behavior is driven by many psychological and social factors such as culture, economics, and health beliefs, there is evidence from family studies that specific macronutrients intake has a significant genetic component. To identify loci influencing macronutrient intake, we conducted a meta-analysis of 11 genome-wide association studies for dietary intake of fat, protein, and carbohydrate assessed by food frequency questionnaires in 37,537 individuals. One locus at 19q13.33 within the FGF21 (fibroblast growth factor 21) gene was associated with carbohydrate intake ($p=4.34 \times 10^{-8}$). A second locus at 4q28 within the MAML3 (Mastermind-like 3) gene was associated with protein intake ($p=6.45 \times 10^{-9}$). No genome-wide significant associations were observed for fat intake. Further investigation to identify the genes that underlie these associations and the biological mechanism for their association with macronutrient intake is in progress.

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Aging Pathways Modulate TDP-43 Neurotoxicity and Protein Aggregation

The nature of the role that aging plays in neurodegeneration is an open question with important ramifications. In this study, we sought to identify key aging-related genes and pathways that modulate a set of neurodegenerative diseases linked to TAR DNA-binding protein 43 (TDP-43). TDP-43 plays a key role in the neurodegenerative diseases including amyotrophic lateral sclerosis and frontotemporal lobar dementia. The nature of the TDP-43-mediated neurotoxicity associated with these diseases is not yet understood. Here we have established transgenic *Caenorhabditis elegans* models that express human TDP-43 variants in the nervous system, including the full-length wild-type and mutant proteins and a pathologic carboxy-terminal fragment. The *C. elegans* models developed severe locomotor defects associated with the aggregation of TDP-43 in neurons. In *C. elegans*, the neurotoxicity and protein aggregation of TDP-43 were regulated by environmental temperature and heat shock transcriptional factor 1, indicating that a deficiency in protein quality control is a risk factor for TDP-43 proteinopathy. Furthermore, the neurotoxicity and protein aggregation of TDP-43 can be significantly attenuated by a deficiency in the insulin/ insulin-like growth factor 1 (IGF-1) signaling in *C. elegans* and mammalian cells. These results suggest that protein misfolding underlies the aging-dependent neurodegeneration associated with TDP-43 and that the Insulin/IGF-1 signaling may be a target for therapies.