THE JOHNS HOPKINS
Center on Aging and Health

The School of Public Health Gerontology Interest Group

Presents

Research on Aging Showcase

FRIDAY, MAY 8TH, 2009
1-4PM
FEINSTONE HALL, JHSPH

JOHNS HOPKINS BLOOMBERG SCHOOL of PUBLIC HEALTH
JOHNS HOPKINS MEDICINE
JOHNS HOPKINS UNIVERSITY School of Nursing

Friday, May 8, 2009

We are excited to welcome you to the second annual Research on Aging Showcase, featuring current work by students, post-doctoral fellows, faculty, and research associates at Johns Hopkins. We thank you for joining us, and hope that today's session will help spark connections and promote additional cooperation among researchers across the university's diverse departments and schools.

We are grateful to the Johns Hopkins Alumni Association, the Center on Aging & Health, JHSPH Student Assembly, and the School of Medicine Geriatrics Interest Group for their generous support of this event.

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

Emily Agree, PhD
Karen Bandeen-Roche, PhD
Chad Boult, MD, MPH, MBA
Lynn Burek, PhD
Michelle Carlson, PhD
Matt McNabney, MD
Eleanor Simonsick, PhD
Elizabeth (Ibby) Tanner, PhD, RN
Paul Willging, PhD
Qian-Li Xue, PhD

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

Sincerely,

The Gerontology Interest Group

Jennifer Deal (Epidemiology)	Sarah Debrey (Epidemiology)	Michal Engelman (Population, Family, and Reproductive Health)
Alden Gross (Mental Health)	Zenobia Moore (Epidemiology)	Jennifer Schrack (Epidemiology)

ABSTRACTS

Students

Junior Faculty, Post-Doctoral Fellows and Research Associates

Priscilla Auguste
MHS Student, Epidemiology
Johns Hopkins Bloomberg School of Public Health

The Association between Cystatin C and Cognitive Change: The ARIC Study

Cystatin C, a marker of kidney function used to overcome the limitations of serum creatinine in older adults, may inhibit A-Beta aggregation and protect against the development of Alzheimer's disease. We studied the relationship of cystatin C to change in three cognitive tests (Delayed Word Recall (DWR), Digit Symbol Substitution (DSS), and Word Fluency (WF)) collected at two visits 7-8 years apart in 1,638 Atherosclerosis Risk in Communities (ARIC) participants. Cystatin C level, categorized by quartiles, was significantly associated with change in both DWR and WF after adjustment for age, education and other known confounders. A cystatin C level in the highest quartile (worst kidney function) was associated with, on average, a 0.37 point decline in DWR score ($p=0.021$) across these 2 visits but an apparent 1.51 point improvement in WF score ($p=0.042$). Cystatin C was not significantly associated with a change in DSS score. The contrasting results for these tests may be due to differences in the types of cerebral function measured, and suggest complex relationships between various cognitive domains and cystatin C that merit further study.

Sarah M. Debrey
MHS Student, Epidemiology of Aging
Johns Hopkins Bloomberg School of Public Health

Serum Free Testosterone, Cognition, and Physical Function in Older Women: The Women's Health and Aging Studies

Background: Functional decline is a major public health concern. Relationships between testosterone and functioning in older men are hypothesized, and replacement therapy has been suggested as a potential treatment for preventing decline in certain cases. However, testosterone research in women is limited. U-shaped relationships between free testosterone (FT) and measures of physical and cognitive function were hypothesized, with both high and low levels of FT associated with poor outcomes.
Objective: To evaluate the relationships between FT and measures of both cognitive and physical functioning in community-dwelling older women.
Methods: Relationships between FT and measures of cognitive and physical functioning were examined in community-dwelling women aged 70-80 years in the Women's Health and Aging Studies I and II (N=627). Cognitive impairment in each domain was defined as a dichotomous variable using validated cutpoints published in the literature. Domains included psychomotor speed (TMTA), executive function (TMTB), and verbal memory (HVLT). Physical function outcomes included ADL difficulty, mobility difficulty, and grip strength. Multivariate polytomous regression was used for inference-making.
Results: High log FT values were associated with impairment on TMTB (OR= 3.8, 95% CI: 1.1-13.1), even after adjustment for a multitude of covariates. Though not statistically significant ($p<.05$), trends of high FT levels and decreased functioning were shown for most measures of cognitive and physical functioning, except for grip strength.
Conclusions: In this population of high-functioning, cognitively-intact older women, an association between FT levels and executive dysfunction was shown, yet no association was found for physical functioning measures. Whether this association could be explained by vascular or metabolic pathways remains to be determined. Future studies are needed for replication and assessment of pathways.

Jennifer Deal, MHS
PhD Candidate, Epidemiology
Johns Hopkins Bloomberg School of Public Health

Relationship between hematocrit (Hct) and cognitive function in community-dwelling older adults

WRITING GROUP LEADER: Jennifer Deal
SPONSOR: Michelle Carlson
WRITING GROUP: Hal Atkinson, Karen Bandeen-Roche, Paulo Henrique Chaves, Steven DeKosky, Annette Fitzpatrick, Linda Fried, Calvin Hirsch, Claudia Kawas, Stephen Rapp, Judith Saxton, Russell Shinohara

Context: Cognitive impairment in older adults is a major public health concern. Knowledge of potentially modifiable risk factors is limited. Preliminary studies have suggested a link anemia with dementia and global cognitive impairment. However, data on the association between anemia and cognitive domain-specific performance in healthy older adults are scarce.
Objective: To test the hypothesis that anemia, defined as hematocrit <36% in women and <39% in men, is independently associated with poorer cognitive test performance in older adults in the domains of memory, language, construction, speed of processing/attention, and executive function.
Study Population: 3,069 high-functioning women and men aged 72-96 years who participated in the baseline assessment of a dementia prevention trial, the Gingko Evaluation of Memory (GEM) Study (2000-02).
Design: Cross-sectional study. Multiple linear and logistic regression was used to model the association between anemia and cognitive performance in 6 cognitive domains; summary scores for each domain were created based on 16 standard neuropsychological tests in these domains. Models were run separately for women and men.
Results: Anemia was associated with global cognitive impairment (p=0.01) and deficits in the construction domain (p=0.04) in women, and with language impairment (p=0.04) in men. Exploratory data analysis yielded a negative association between high levels of hematocrit and language in men (p=0.01).
Conclusion: Associations between anemia and cognitive impairment were heterogeneous by cognitive domain and gender. Longitudinal analyses of anemia and cognitive decline are warranted.

Michal Engelman, MHS
PhD Candidate, Population, Family and Reproductive Health
Johns Hopkins Bloomberg School of Public Health

Variation as a theme: Convergence and divergence patterns during mortality transitions

Michal Engelman, Vladimir Canudas-Romo, Emily Agree

Introduction: An inverse relationship between life expectancy and the variance of the age at death is an assumed corollary of survival rectangularization. We examined the distribution of ages at death for national populations, conditioning on survival to successively older ages in order to understand the age-pattern of variation during periods of mortality decline.
Data and Methods: Using period life tables spanning from 1850 to 2007, we investigated patterns of variability both within and across population groups. To compare empirical trends in variability within- and across nations over the course of their historical mortality transitions, we constructed both absolute and relative measures of standard deviation for full and truncated distributions of ages at death.
Results: In countries with rising life expectancy, the variance of the full distribution of ages at death has decreased over time, primarily due to reductions in child mortality. At the same time, the variance in the distribution of post-reproductive mortality has remained constant while variance in later-life mortality has increased. The result is a convergence around a level of post-reproductive mortality variance due to a stark divergence in trends for the young and old.
Discussion: As mortality at all ages declines, younger individuals are becoming increasingly homogenous in their mortality risk over time while older people's mortality patterns are increasingly heterogeneous.

Lauren Graham
Medical Student, Johns Hopkins School of Medicine
MPH program: Johns Hopkins Bloomberg School of Public Health

Effect of Friday Discharge on Hospital Readmission of Older Adults

Lauren E. Graham, Alicia I. Arbaje

Background: Inpatient discharges occurring on Friday may be associated with earlier hospital readmission due to 1) higher discharge volume 2) decreased time for discharge planning and 3) increased wait-time to receive post-discharge services.
Objective: To determine whether Friday discharges are associated with hospital readmission of older adults.
Methods: Retrospective cohort study of patients aged ≥ 65 years admitted to an academic teaching hospital from January to December 2007 (N=6,580). The primary outcome measure was time to hospital readmission within 180 days post-discharge. We created a Cox proportional hazards model comparing patients discharged on Friday to all others, adjusting for demographics, healthcare utilization and multi-morbidity.
Results: The most discharges occurred on Friday (20%), and the majority of patients were discharged home with self-care only (72%). Overall, 1,552 of 6,580 patients (23.6%) were readmitted within 180 days. Friday discharge was not significantly associated with an increased hazard of readmission (HR=1.07, 95% CI 0.94-1.23). Admission in the month prior to the index hospitalization (HR=2.00, 95% CI 1.45-2.75), presence of a transition-sensitive condition (HR=1.15, 95% CI 1.00-1.33), admission to a medical service (HR=1.40, 95% CI 1.25-1.57) and discharge home (HR=1.30, 95% CI 1.13-1.49) were significantly associated with time to hospital readmission.
Conclusions: Study findings do not suggest that older adults experience increased risk of hospital readmission associated with Friday discharge; however, a disproportionate amount of discharges occur on Friday. In addition, primary diagnosis, prior utilization, type of admission, and discharge disposition may be important to identify those at risk for hospital readmission.

Alden L. Gross, MHS
PhD Candidate, Mental Health
Johns Hopkins Bloomberg School of Public Health

Depression and subsequent cancer risk: 24 years of follow-up of the Baltimore Epidemiologic Catchment Area sample

Alden L. Gross, Joseph J. Gallo, William W. Eaton

Objective: The objective was to characterize the relationship between depression and incident cancer. There are few studies of the question which have used population-based prospective data which have examined subtypes of cancer.
Method: A population-based sample of 3,177 cancer-free adults from the Baltimore Epidemiologic Catchment Area Study that has been followed for 24 years. Cox proportional hazards models were used to estimate relative hazards for both overall and subtype-specific cancers among those with and without a history of depression.
Results: The risk set contained 334 incident cancer cases and 40,530 person-years. DIS/DSM-III major depression was associated with a higher hazard for overall cancer (HR: 1.9, 95% CI: 1.2, 3.0) and a strong but nonstatistically significant increased hazard for breast cancer (HR: 3.4, 95% CI: 0.8, 13.8). There was a weak positive association between history of depression and prostate cancer, but not enough cases to generate a significant finding. No reliable associations were found between colon, lung or skin cancers and depression. There was a similar pattern of results for dysphoria, but not for phobia or any other mental disorder studied.
Conclusions: Results reveal a specificity to the association between depression and hormonally mediated cancers, which provides support to hypotheses about a common biological pathway between depression and cancer. Further research can build on observational studies to examine the mechanisms through which our emotions affect our health.

Justin Johnson
Medical Student, Year III
Johns Hopkins University School of Medicine

Role of eNOS Uncoupling in the Pathophysiology of Age-Related Erectile Dysfunction

Justin Johnson, Trinity Bivalacqua, Gwen Lagoda, Travis Strong, Arthur Burnett II, Biljana Musicki, Johns Hopkins Brady Urological Institute

Erectile function is mediated by Nitric Oxide (NO) induced vasodilation, which allows engorgement of the penis. Nitric Oxide is normally produced in the penile vasculature by endothelial Nitric Oxide Synthase (eNOS). Aging vasculature, however, is characterized by decreased bioavailability of NO and subsequently decreased endothelial function. The result is, of course, erectile dysfunction (ED). One possible mechanism for these decreases in endothelial NO with aging is termed "eNOS uncoupling" and refers to the transition from producing NO to producing reactive oxygen species (ROS). One potential explanation for eNOS uncoupling in aging is the depletion of tetrahydrobiopterin (BH4), a known cofactor for eNOS. It is thus hypothesized that eNOS uncoupling - the process whereby less NO is produced in favor of more ROS - mediates ED in the aged penis. Sepiapterin, a precursor to BH4, is hypothesized to improve eNOS function and reverse this process of uncoupling. However, neither of these hypotheses has been confirmed in vivo. This project sought to definitively prove first that eNOS uncoupling occurs with aging in the rat penis and, second, that sepiapterin treatment should recover both eNOS and erectile function. Results showed that aged rats exhibit ED. Treatment with sepiapterin, though, reversed ED in the aged rats. Also, eNOS was shown to be uncoupled in the aged rat penis. This uncoupling was not reversed, however, with sepiapterin treatment. TBARS testing revealed a decreased amount of ROS with sepiapterin treatment, so BH4's role in improving age-related ED may simply be from antioxidant effects. Further study must be done to more clearly elucidate this role.

Monica N. Modi
Johns Hopkins School of Medicine, Class of 2010

Lung Transplantation in Older Patients with Cystic Fibrosis

Introduction: The average lifespan for Cystic Fibrosis (CF) patients is increasing. As a result, a greater number of older CF patients are presenting for lung transplantation.
Methods: We retrospectively reviewed data for all CF patients who had double-lung transplantation at Johns Hopkins Hospital (JHH) between August, 1998 and October, 2006. Patients were stratified by age at transplant (<35 and ≥35). The outcomes studied were rejection episodes, infections resulting in medical treatment, pulmonary function values, and all- cause mortality.
Results: In the first post-transplantation year patients in the ≥35 yrs group experienced fewer biopsy-confirmed rejections than patient in the <35 yrs group (average of 0.3±0.5 rejection/patient in ≥35 yrs group, 1.3±1.3 rejections/patient in the <35 yrs group, p = 0.073). In the first post-transplant year, the younger group had significantly higher number of pulmonary infections/patient than in the older group (2.4±1.6 pulmonary infections in the <35yrs group, 0.83±0.98 in the ≥35yrs group, p= 0.036). FEV_1 % predicted after 1 year was higher in the older CF patients than in younger CF patients (94.16% predicted for the ≥35 yrs group, 61.83% predicted for the <35 yrs group, p=0.008). The 1 year actuarial survival did not significantly differ between the two groups (78.95% for the <35 yrs group, 83.33% for the ≥35 yrs group).
Conclusion: Our analysis revealed that JHH CF patients ≥35yrs at transplantation had fewer rejection episodes, fewer pulmonary infections, and greater pulmonary function than CF patients <35yrs at transplantation group. Lung transplantation can be performed safely in older CF patients.

Jennifer Schrack
PhD Candidate, Epidemiology
Johns Hopkins Bloomberg School of Public Health

Short on Fuel? Aging and the Conservation of Energy.

Jennifer A. Schrack, Eleanor M. Simonsick, Luigi Ferrucci

"Energy cannot be created or destroyed but can only be changed in form." As individuals age, energy production declines while energy demands for basic survival increase, resulting in a progressive shrinking of energy available for essential and voluntary activity. Walking, the most common component of discretionary activity, is fundamental for independent living. Walking speed declines with age and has been linked to negative health outcomes. We hypothesize that with age, walking speed is reduced to conserve available energy. To examine the relationship between the energy expended during habitual paced overground walking and customary walking speed, we measured average energy expenditure (ml/kg/min) during 2.5 minutes of overground walking at a preferred speed in 364 (51% female) BLSA participants aged 32-96 (meaN=69). The average energy expended per minute (ml/kg/min) during habitual walking did not show any evident trend across age (12.5 $\pm$ 2.7, p=.70). However, when adjusted for distance walked, the energy cost of walking per meter (ml/kg/m) increased ($p<0.001$) and walking speed declined ($p<0.0001$) after age 60 independent of sex and height. These findings suggest that the energetic cost of walking increases with age, and that speed is traded for energy conservation as individuals slow down to reduce energy expenditure.

Bonnielin Swenor
MPH Program - Epidemiology/Biostatistics Concentration
Johns Hopkins Bloomberg School of Public Health

The Impact of Fish and Shellfish Consumption on Age-Related Macular Degeneration

Bonnielin Swenor, MPH, Susan Bressler, MD, Laura Caulfield, Ph.D, Sheila West, Ph.D.
Dana Center for Preventive Ophthalmology,

Objective: To determine if there is an association between fish and shellfish consumption and age-related macular degeneration (AMD) status in the Salisbury Eye Evaluation (SEE) Study population, that has historically high fish and shellfish consumption.
Methods: A food frequency questionnaire was used to estimate weekly fish/shellfish consumption for each participant. AMD status was determined from fundus photographs obtained during the ophthalmologic exam. Images were graded by two masked readers for drusen size and location, as well as retinal pigment epithelium abnormalities and choroidal neovascularization or disciform scarring.
Participants: A random sample of 2,520 Salisbury, MD residents age 65 to 84, who scored ≥17 on a Mini-Mental State Examination.
Results: The distribution of weekly fish/shellfish consumption was not statistically different among categories of AMD (p for trend 0.228). Similarly, AMD categories did not vary by type of weekly fish/shellfish consumption (crab, shellfish, oysters, tuna, other fish, or fried fish) compared to controls (p values for trend ranged from 0.128 for shellfish to 0.757 for oysters). Consumption of high omega-3 fatty acid containing fish/shellfish was also not statistically different between AMD categories and controls (X^2 p value = 0.253).
Conclusions: Weekly fish/shellfish consumption was not associated with a decreased risk of AMD among the SEE study participants. However, this population historically consumes elevated levels of fish/shellfish, and therefore the protective effect of dietary omega-3 fatty acid consumption could be obscured by a high baseline level of this nutrient. A lower prevalence of neovascular AMD compared another study population supports this hypothesis.

Keri Althoff, PhD, MPH
Department of Epidemiology
Johns Hopkins Bloomberg School of Public Health

Immunologic and Virologic Response to Treatment in HIV-Infected Adults by Decade of Age and Regimen

Keri N. Althoff, PhD, MPH, Stephen J. Gange, PhD, and Kelly Gebo, MD, MPH for the North American AIDS Cohort Collaboration on Research and Design (NA-ACCORD)

Background: Previous data suggests decreased immunologic and increased virologic response in older (aged ≥50 years) compared to younger HIV-infected adults who take highly active antiretroviral therapy (HAART); however no large studies have investigated the impact of age on HAART response by regimen class (boosted protease inhibitors (boosted PIs), unboosted PIs, and non-nucleoside reverse transcriptase inhibitors (NNRTIs)).
Methods: 20,784 adults from participating NA-ACCORD cohorts who had a viral load (VL) and CD4 measured within six months prior to HAART initiation, and were started on boosted or unboosted PI-based or NNRTI-based regimens were included. Mixed linear models estimated change in CD4 count from HAART initiation to 12 months after initiation. Poisson regression models with robust variance and generalized estimating equations estimated the relative prevalence of undetectable VL (≤1,000 copies/mL) at 12 months after initiation in younger compared to older adults with a VL >1,000 copies/mL at initiation. Analyses were stratified by 10-year age groups (20-29, 30-39, 40-49, 50-59, ≥60) and HAART regimen class (boosted PI, unboosted PI, and NNRTI). The models were adjusted for: pre-HAART CD4, pre-HAART VL, year of HAART initiation, sex, race, cohort, history of injection drug use, pre-HAART antiretroviral therapy use and pre-HAART AIDS.
Results: The mean age was 42 years (range 20-87). After adjustment, immune response was less robust with increasing age. The unadjusted proportion of adults with VL suppression at 12 months decreased with decreasing age and the adjusted relative prevalence (aPR) reflected the same trend (age 20-29: aPR=0.66; 30-39: aPR=0.72; 40-49: aPR=0.78; 50-59: aPR=0.87; ≥60 aPR=1.00; p-values <0.05). Change in CD4 count by age differed across HAART regimens, more specifically, the boosted PI-based regimens resulted in a greater mean increase in CD4 count in younger adults, but the effect diminished with age (figure 1). Adults taking boosted PI- and NNRTI-based regimens had a greater proportion with VL suppression by age compared to unboosted PI-based regimens.
Conclusions: Older adults have less robust immune response and a greater relative prevalence of VL suppression than younger adults 12 months after initiating HAART. There were differences in immunologic and virologic response to HAART by age across HAART regimen classes. Future studies will need to examine these relationships further to determine if treatment guidelines specific to older individuals are needed.

Vladimir Canudas-Romo, PhD
Assistant Professor, Department of Population Family and Reproductive Health
Johns Hopkins Bloomberg School of Public Health

The Crossover between Life Expectancies at Birth and at Age One

Historically, the expectation of life at age one (e1) has exceeded the expectation of life at birth (e0). The crossover between e0 and e1 only occurred in the second half of the twentieth century in the developed world. Life tables for populations that have not achieved this crossing between life expectancy at birth and at age one are referred to here as imbalanced. The timing of this crossover is when infant mortality is equal to the inverse of life expectancy at age one. This simple relation between mortality at age zero and mortality after age one divides the world into countries that have achieved the crossover in life expectancies and those that have not. It is a within population comparison of mortality at infancy and after age one. However, results of these within comparison can be used for comparison between populations. This is illustrated in the paper with several examples.

Ariel Green, MD
Internal Medicine resident
Johns Hopkins School of Medicine

Psychometric Properties of the Patient Activation Measure Among Multi-Morbid Older Adults

Ariel Frank Green, MD, MPH, Richard L. Skolasky, ScD, Chad Boult, MD, MPH, MBA, Lisa Reider, MHS, Daniel Scharfstein, ScD, Stephen T. Wegener, PhD

Objectives: The Patient Activation Measure (PAM) quantifies the extent to which people are informed and involved in their health care. Our objectives were to determine the psychometric properties of the PAM among multi-morbid, older adults, and to confirm the theoretical, four-factor structure of patient activation.
Methods: A cross-sectional analysis was used to assess the psychometric properties of the PAM. Internal consistency was assessed using the Spearman-Brown formula. Construct validity was explored by using the general linear model to compute correlations between the PAM and measures of health-related behaviors, health-related quality of life, and engagement with the health care system. Latent class analysis was used to evaluate the theoretical four-factor structure of patient activation.
Study sample: Participants in a randomized trial of Guided Care (N= 855), a model of primary health care for older adults in the upper quartile of risk for using health services heavily during the coming year.
Findings: The PAM was correlated with measures of engagement with the health care system, health-related quality of life, and some adaptive health behaviors. The latent class analysis offered support for the multistage theory of patient activation.
Conclusions: PAM scores appear to be valid indicators of patient involvement in health care among multi-morbid older adults.

Rita Rastogi Kalyani
Postdoctoral fellow in Endocrinology, Johns Hopkins School of Medicine
MHS Student, Johns Hopkins Bloomberg School of Public Health

Comprehensive Assessment of Physical Disability in Older U.S. Adults with Diabetes: The National Health and Nutrition Examination Surveys (NHANES) 1999 - 2006

Rita Rastogi Kalyani, Christopher D. Saudek, Frederick L. Brancati, Elizabeth Selvin

Diabetes is associated with greater physical disability in older adults. Previous studies have not comprehensively examined the association of diabetes with physical disabilities nor examined how comorbidities contribute to this association in older adults with diabetes. We analyzed data from 6,097 people ≥ 60 years of age in NHANES 1999-2006, a nationally representative cross-sectional study. Diabetes and comorbidities were determined by self-report or examination. We defined physical disability according to difficulty in 19 physical tasks, categorized into five domains: lower extremity mobility (LEM), general physical activities (GPA), activities of daily living (ADL), instrumental activities of daily living (IADL), and leisure and social activities (LAS). Older adults with diabetes (N=1,166) had a high prevalence of difficulty in all 19 tasks; for example, walking quarter mile (48%, 95% CI 45 - 52), prolonged standing (54%, 51 - 58), getting in or out of bed (24%, 20 - 28), doing house chores (39%, 36 - 42) and social participation (23%, 20 - 26). Individuals with diabetes were 2 - 3 times more likely than similar individuals without diabetes to have difficulty across all five domains. In multivariable models, the association of diabetes with difficulties in LEM and GPA domains attenuated such that it become nonsignificant after adjustment for diabetes complications and obesity. In contrast, the association of diabetes with difficulties in ADL (OR 1.77, 1.30 - 2.43), IADL (OR 1.42, 1.12 - 1.80), and LAS (OR 1.37, 1.05 - 1.77) domains partially attenuated but persisted after adjustment for diabetes-associated comorbidities. Our findings suggest that aggressive control of diabetes complications and diabetes-associated obesity can reduce the burden of physical disability among older adults with diabetes.

Tara Loyd, MPH
Research Program Coordinator
Wilmer Eye Institute

Developing Objective Measures of Mobility

Objective: We hypothesize that numerous age-associated diseases result in social isolation as a result of less out-of-home travel. Here, we pilot test an assisted global positioning satellite (A-GPS) device for its ability to measure real-world travel and validate the device's accuracy against a subject-kept travel log.
Design: Prospective observational study.
Participants: Thirty-five healthy volunteers between the ages of 18 and 61.
Methods: Subjects were tracked by the A-GPS device at 15-minute locate intervals between 7am and 11pm over a 1-week period during which they logged the times and destinations of their travel. The gold standard was defined as patient-kept activity logs combined with confirmatory phone calls to resolve data conflicts.
Results: Battery life lasted a median of 92 hours and at least 64 hours (the equivalent of 4 study days) for all participants. 21,999 locates were performed with 70.2% successfully yielding location information. The median percentage of successful locates was 69.4% (range 55.3-85.8%). 98% of the time, the duration between successful locates was less than 30 minutes. Only 45 of the 21,999 successful locates were more than 60 minutes apart. Once destination order errors were filtered, 91.6% (370 of 404) excursions from home were successfully captured.
Conclusion: A-GPS devices are capable of accurately monitoring subject's out-of-home travel over several days with minimal interruption, relatively few errors, and no recharging of the device battery. Development of objective measures of mobility offers alternatives to relying on participant recall or subjective determination of mobility indicators with regard to dehabilitating conditions over time.

Jeanine M. Parisi, PhD
Postdoctoral Fellow, Department of Mental Health
Johns Hopkins Bloomberg School of Public Health

Determinants and Effects of Engagement in Adulthood

Engagement in activities that place demands on intellectual resources may maintain or even enhance cognition, however, findings are inconsistent. As activities vastly differ in terms of meaningfulness among individuals, it may not only be the extent of participation but also the way in which these activities are approached and experienced that is key to aging successfully. The present investigation explored engagement in adulthood through an application of a novel methodological approach, the Day Reconstruction Method (DRM), which allows for the characterization of the experience associated with the diverse activities of people's lives. Community-dwelling, older adults (N= 192, M = 72 years of age) were administered the DRM, as well as personality (Mindfulness, Need for Cognition, Openness to Experience) and cognitive (working memory, processing speed, inductive reasoning, visuo-spatial processing) assessments. Although findings suggested that the extent of behavioral participation was related to cognition, the more intriguing finding was that cognitive performance could be better explained by additionally considering the level of intellectual challenge afforded by daily experiences. Individual differences in cognition could also be partly explained by personality attributes. However, age-cognition relations were not substantially reduced after accounting for activity, affect, and personality. In conclusion, this preliminary study has the potential to open many avenues of research that rely on measurement of the nature of activities, as well as the motivational basis, patterns of involvement, and personality attributes that are important for cognitive well-being in adulthood.

Rachel E. Salas, M.D.
Assistant Professor of Neurology
Johns Hopkins School of Medicine

Effect of Aging on Motor Cortical Plasticity by Paired Associative Stimulation (PAS)

R Salas, J Galea, A Bremers, L Ajagbe, J Walston, P Celnik

The ability of the CNS to undergo continuous remodeling, neuroplasticity, has been suggested to decrease with aging. These studies evaluated neuroplastic changes resulting from behavioral performance, which may be confounded by the changes in motor performance with age. Here we tested the ability of healthy humans to sustain neuroplastic changes at different ages, while avoiding the performance confound. To this end, we use a well-known method of brain stimulation, paired associative stimulation (PAS) that can elicit long-term potentiation (LTP)- or long-term depression (LTD) -like plasticity, two processes associated with learning mechanisms. We hypothesize that as healthy individuals age, the response to PAS will decrease. Thirty-six healthy participants, age range 19 to 97, took part in 2 randomized sessions testing 2 forms of PAS to elicit LTP- and LTD-like effects. 69% of the younger group (19 to 39yo, N=13) demonstrated an appropriate response to PAS, whereas only 30% of the middle age participants (42 to 62 yo, N=10) and 8% of the older participants (72 - 97, N=13) showed the same response ($p=0.005$). These findings are consistent with prior investigations testing up to 70 year old participants. Interestingly in our study, those participants who responded to the intervention demonstrated similar magnitude of neuroplasticity changes regardless of age. These results suggest that the ability of the CNS to sustain LTP and LTD-like neuroplastic changes declines with age in an all or none manner.

Dorry Segev, MD, PhD
Assistant Professor, Department of Surgery
Johns Hopkins School of Medicine

Frailty in End-Stage Renal Disease Patients over 18 Receiving a Kidney Transplant

Introduction: End-stage renal disease (ESRD) requires continuous dialysis treatment for survival and is associated with increased morbidity and mortality and reduced quality of life. Frailty has recently been developed as a metric for evaluating the health of older adults, and has been shown to predict outcomes independent of comorbidity and disability. We hypothesized that dialysis treatment might cause a decrease in overall physiologic reserve in patients of all ages that might be reflected by a higher than expected frailty prevalence in younger adults. The goal of our study was to characterize the prevalence of frailty in a cohort of adult kidney transplant patients.
Methods: Between December 1, 2008 and April 20, 2009, frailty was measured in 63 patients over the age of 18 who received kidney transplants at Johns Hopkins. Frailty was assessed using the five domains of weight loss, grip strength, walking speed, exhaustion, and physical activity, and frailty score was calculating using a previously validated protocol developed by Fried et al.
Results: We found an overall frailty prevalence of 31.7% in kidney transplant patients. There was not a significant difference in frailty prevalence by age, with 28.6% of patients under 60 and 31.8% of patients over 60 exhibiting frailty. The youngest age group of 18-45 year olds had a 17.4% prevalence of frailty. There was a difference in prevalence by gender, with 24% of women compared to 34% of men exhibiting frailty.
Conclusions: We found a considerably high prevalence of frailty in transplant patients considering that patients considered medically eligible for transplant are generally healthier than the ESRD population as a whole. Frailty has traditionally been considered a syndrome of older adults, however, we found a high prevalence in young adults with ESRD, suggesting that kidney failure and dialysis treatment might deplete physiologic reserves and speed up aging processes. More research is needed to determine whether pre-transplant frailty status predicts post-transplant outcomes in both older and younger adults.