### FREE-LIVING GAIT CADENCE MEASURED BY WEARABLE ACCELEROMETERS FOR ASSESSING FALL RISK

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Accelerometers are widespread in research applications, yet whether they are superior to structured clinic-based assessments is unknown. Using negative binomial regression, we compared traditional in-clinic measures of mobility (6-minute gait cadence, speed, and distance, and 4-meter gait speed) with free-living gait cadence from wrist accelerometers (Actigraph GT9X) in predicting fall rates in 432 older adults (age 77.29±5.46 yrs, 59.1% men, 80.2% White) participating in the Study to Understand Fall Reduction and Vitamin D in You (STURDY). Accelerometry-based gait cadence was estimated with the Adaptive Empirical Pattern Transformation algorithm. Across all participants, every 10 steps/min higher cadence was associated with a 13.2% lower fall rate (p=0.036). Mobility measures were not related to falls (p>0.05). Among higher-functioning participants (cadence ≥100 steps/min), every 10 steps/min higher free-living cadence (p=0.01) was associated with a 27.7% lower fall rate. Data collected from accelerometers may provide a more sensitive indicator of fall risk than in-clinic tests.

## Session 3295 (Symposium)

### NOVEL APPROACHES EXAMINING SLEEP HEALTH AS A MARKER OF SUCCESSFUL AGING

Chair: Soomi Lee

Discussant: Meredith Wallace

Sleep is a modifiable determinant of health. It changes with advancing age and in response to diverse contexts (e.g., related to work or one's health). Previous studies have often used single measures of sleep duration or sleep quality. However, a recent paradigmatic shift towards multidimensional sleep health emphasizes the importance of examining how multiple sleep measures are simultaneously associated with health. This approach presents many opportunities for understanding sleep phenotypes and their potential contributions to health. Yet it also presents methodological challenges in analyzing multidimensional sleep data. This symposium showcases the most recent approaches and novel ideas examining the role of sleep health in successful aging. Paper 1 examines sleep profiles (i.e., latent groups with varying sleep characteristics) in middle-aged adults and their linkages to psychological well-being and chronic conditions with differences by age groups. Paper 2 investigates 24-hour patterns of sleep-activity rhythms and their associations with physical functioning performance in older men and women. Paper 3 showcases the utility of a sleep health composite score in examining sleep disparities and their drivers in middle- and later-adulthood. Paper 4 examines whether and how a composite sleep health measure based on actigraphy data is associated with specific characteristics of adult bipolar disorder patients. These papers use different cohorts, such as the Midlife in the United States Study, Osteoporotic Fractures in Men study, and Multi-Ethnic Study of Atherosclerosis. At the end, Dr. Wallace will discuss key findings from these studies, their methodological contributions and implications for aging, and directions for future research.

### IDENTIFICATION OF LATENT SLEEP PROFILES IN MIDDLE-AGED ADULTS AND CONNECTIONS TO WELL-BEING

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For middle-aged adults, achieving adequate sleep is a challenge but essential for long-term health. The present study identified latent sleep profiles to clarify how multiple sleep variables (i.e., regularity, satisfaction, alertness, timing, efficiency, and duration) cooccur within middle-aged adults and the implications these holistic sleep experiences have for well-being. Three profiles emerged within the Midlife in the United States II dataset (MIDUS; N=4030, Mage=56.23 years): (i) good sleepers, (ii) nappers/poor night sleepers, and (iii) sufficient but irregular sleepers. Generally, good sleepers reported the best well-being, sufficient/irregular sleepers reported comparatively moderate well-being, and nappers/poor night sleepers reported the worst well-being across a variety of indicators (i.e., chronic health conditions, life satisfaction, positive affect, negative affect, and psychological well-being) after adjusting for sociodemographic characteristics. Age moderated these associations. Our findings advance understanding of sleep health as a multifaceted construct and of its connection to well-being in middle-aged adults.

### REST-ACTIVITY RHYTHM PATTERNS AND PHYSICAL FUNCTIONAL PERFORMANCE IN COMMUNITY-DWELLING OLDER MEN

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Sleep and activity patterns have been linked to physical performance in older adults. Traditional parametric models of 24-hour activity rhythms fail to adequately capture specific diurnal sleep and wake patterns; functional principal components analysis (fPCA) is a non-parametric approach that addresses this limitation. Using fPCA, we modeled accelerometry data from n = 2,960 participants in the Osteoporotic Fractures in Men (MrOS) ancillary sleep study (mean age 77y) and examined cross-sectional associations with gait speed and grip strength measurements. Lower daytime activity (expected difference = -0.049 [-0.072, -0.028] m/s), increased sleep duration and a reduced midday dip in activity (-0.015 [-0.035, 0.006] m/s) were modestly associated

with worsening gait speed. A modest association between both later sleep and wake times and increased sleep duration with worsening grip strength outcomes was observed (-1.11 [-1.90, -0.32] kg). Specific daily activity patterns may serve as predictive biomarkers for changing physical function in aging populations.

### MULTIDIMENSIONAL SLEEP HEALTH: CONCEPTS, ADVANCES, AND IMPLICATIONS FOR RESEARCH AND INTERVENTION

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Sleep is a complex process, sensitive to aging, with theoretical and evidentiary basis for influence on multiple health outcomes. Recent scholarship has argued for a 'multidimensional' approach to sleep health, that is, a recognition that healthy sleep consists of more than its quantity (duration) and is more than the absence of sleep disorders. This new conception of sleep health acknowledges sleep's complexity yet presents challenges for methodological treatment. How do we operationalize/analyze multiple dimensions of sleep, some of which are correlated due to physiological reasons, common measurement tools, or sensitivity to common stressors? Is it sensible to talk about 'sleep health' as a single, composite entity with multiple components, akin to a dietary pattern rather than a collection of individual nutrients? Exemplar data from a racial-ethnic disparities project in aging adults suggest the utility of a composite approach, and the value of considering inter-correlations among sleep metrics.

### FINDING A COMPOSITE MEASURE FOR DATA FROM WRIST ACTIGRAPHY IN BIPOLAR DISORDER

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Actigraphy can objectively measure sleep in studies on Bipolar Disorder (BD) where subjective sleep ratings might be influenced by affect. Actigraphy data are complex necessitating data reduction approaches. We created a composite score of actigraphy sleep metrics (total sleep time [TST], wake after sleep onset [WASO], and percent sleep [PS]) in BD. We computed z-scores of sleep measures for n=51 BD vs. n=80 healthy subjects and averaged scores. We examined associations with participant characteristics and used LASSO to identify metrics best explaining composite variability. Higher composite scores (better sleep) were seen in employed vs. unemployed (t=2.40, df=34, p=0.02), and correlated with higher medication load (r=0.41, p=0.004), lower mania symptomatology (r=-0.33, p=0.04) and lower interleukin (IL)-6 levels (r=-0.32, p=0.02). TST best explained variability in medication load and PS best explained employment, mania symptoms and IL-6. Given observed specificity of associations, selecting theory-driven sleep metrics may be more appropriate than a composite.

## Session 3300 (Symposium)

### PHYSICAL ACTIVITY AND SEDENTARY BEHAVIOR PATTERNS PRIOR TO AND DURING THE COVID-19 PANDEMIC

Chair: Nancy Gell
Co-Chair: Dori Rosenberg
Discussant: Andrea LaCroix

Understanding patterns in the types of activities older adults engage in during physical activity and sedentary time could help shape intervention designs. Few studies have adequately described the physical activity and sedentary pursuits older adults undertake, including during the COVID-19 pandemic. To answer these questions, this symposium uses data from three recent studies: Adult Changes in Thought (ACT),an epidemiologic study with self-reported and device-based measures of physical activity and sedentary time including time spent in various domains of activity; Objective Physical Activity and Cardiovascular Disease Health in Older Women (OPACH), an epidemiologic study with device and self-report measures of sedentary behavior; and an ongoing clinical trial, the Healthy Aging Resources to Thrive (HART) study with device and self-reported data on sitting time and patterns as well as physical activity. The first session in this symposium will present a description of the rates of meeting the aerobic, strength, and balance recommendations among older adults in the ACT study. Next, we will have a presentation describing sedentary activities in older adults by age, sex and device-based sitting patterns in the ACT study. In the third presentation we will use OPACH data to examine patterns and context of sedentary in relation to aging-related outcomes. Finally, we will describe changes in physical activity and sedentary time in the HART trial in the cohort enrolled prior to the COVID-19 pandemic vs. those enrolled during the pandemic. Our Discussant will provide new insights on the roles of sedentary behavior and physical activity in aging and health.

### DEVICE-MEASURED SEDENTARY PATTERNS AND PHYSICAL ACTIVITY BEFORE AND DURING THE COVID-19 PANDEMIC

Dori Rosenberg,[1] Mikael Anne Greenwood-Hickman,[2] Jing Zhou,[1] Julie Cooper,[3] David Arterburn,[1] and Andrea Cook,[1] *1. Kaiser Permanente Washington Health Research Institute, Seattle, Washington, United States, 2. Kaiser Permanente Washington, Seattle, Washington, United States, 3. kaiser Permanente Washington Health Research Institute, Seattle, Washington, United States*

Little is known about objective levels of sitting time (ST), patterns of ST, and physical activity (PA) among older adults before compared to during the COVID -19 pandemic. We used data from the Healthy Aging Resources to Thrive Trial to examine differences in activPAL-assessed ST, standing time, breaks from sitting, and steps in study enrollees prior to