Marco Cassone, MD, PhD, Research Investigator, Internal Medicine –  
*Environmental sites panels as a proxy for Nursing Home residents MDRO colonization*

Pathogen surveillance and screening programs are critical to save lives and prevent unnecessary suffering in Nursing Homes. However, the majority of such institutions are not currently equipped to put them in place. The present Pilot Project enlists six Nursing Homes in South-East Michigan to investigate a simplified and affordable surveillance screening program of methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant *Enterococcus* (VRE) based on environmental screening. We will compare its effectiveness to full-fledged resident screening in tracking the epidemiology of MRSA and VRE, and to identify colonized residents which can benefit from decontamination.

Mary Janevic, MPH, PhD, Assistant Research Scientist, Health Behavior and Health Education School of Public Health –  
*Promoting Physical Activity for Chronic Pain Management among Older Adults in Detroit: Comparing Technology-Based Strategies*

Wearable, commercially-available physical activity monitors are being increasingly incorporated into chronic pain self-management interventions as a tool to help patients set goals and to tailor intervention content based on patient progress. Yet older adults from resource-challenged communities may face significant barriers to using these monitors and reporting activity data. Our mixed-methods study will focus on wearable monitor use among older adults in Detroit with chronic musculoskeletal pain, testing the feasibility and validity of various technology-based strategies for reporting daily step count data. We will also assess whether four weeks of monitor use is associated with improvements in functioning, relative to a control group. Results will inform the design of a larger trial of a chronic pain self-management program for this population.
Mark Peterson, PhD, MS, Assistant Professor, Physical Medicine and Rehabilitation – Inflammaging and weakness as predictors of incident disability, multimorbidity and greater DNA methylation age

Using a population-representative sample of middle-age and older adults from the Health and Retirement Study, our proposed study will allow us to determine: the independent and joint effects of midlife muscle weakness and inflammation on later life physical and cognitive dysfunction; whether chronic inflammation mediates the effect of muscular weakness on poor physical and cognitive functioning; and if the presence of midlife weakness, inflammation, or both, contributes to accelerated biological aging, as determined by DNA methylation.

Lisa Sharkey, PhD, Research Assistant Scientist, Neurology – Aging and Neurodegeneration: Investigating the role of life-span extending treatments on gene expression in the aging brain

Well established diet and drug treatments can prolong lifespan in animal models, however it is unknown whether these treatments translate to increases in “cognitive health span.” Pilot RNA-sequencing experiments have identified a set of differentially expressed genes in the brains of old mice that multiple life-span extending treatments cause to revert to expression levels seen in young mice. These results suggest that diverse lifespan-extending treatments share mechanistic pathways that regulate the aging process. Our studies seek to determine whether these identified changes in gene expression highlight cellular processes that represent adaptive responses to aging-related neuronal stress.
Durga Singer, MA, MD, Assistant Professor, Department of Pediatrics –
*Sex-linked differences in lipolysis mediated adipose tissue inflammation in aging and obesity.*
*Funded in part by AG050096 from NIA*

This pilot study focuses on understanding sex-differences in metabolic and inflammatory responses to obesity and aging. Obesity induced chronic inflammation is one of the driving forces for the development of insulin resistance, type 2 diabetes and cardiovascular disease and females are particularly protected from this obesity-induced inflammation. The mechanism for female protection is not well-understood. This study will provide insight on sex-differences in lipolysis mediated adipose inflammation in both obesity and aging and will hence pave the way for future investigations into sex-linked lipid mediators involved in activating inflammatory responses in aged and obese models. A better understanding of the mediators of adipose inflammation is necessary and could facilitate the development of therapeutic approaches against inflammation-induced diseases in both men and women.

Adam Stein, MD, Assistant Professor, Internal Medicine/Cardiovascular –
*Targeting heart failure in aging Heart failure is a leading cause of morbidity and mortality among the elderly.*
*Funded in part by AG050096 from NIA*

Dramatic metabolic changes occur in the heart during failure. We have evidence that targeting mitochondrial metabolism by genetic overexpression of Sirtuin 5 in adult mice attenuates the heart failure phenotype. In this project, we will utilize an adeno-associated viral vector delivered by tail vein injection to transduce aged murine hearts with Sirtuin 5. We will then determine if Sirtuin 5 protects aged mice from failure.
Carolyn Swenson, MD, Assistant Professor, Department of Obstetrics & Gynecology – Aging Effects on the Pelvic Floor

Over 200,000 women per year undergo surgery due to pelvic organ prolapse, with the highest rates of surgery among women >70 years old. Both the prevalence and severity of prolapse increase with age; however, we currently lack an evidence-based understanding of why this association exists. This study will attempt address this knowledge gap by comparing pelvic floor support, pelvic muscle strength, and detailed anatomical structures using Stress 3D MRI between younger (<40 years old) and older (≥ 70 years old) women without pelvic organ prolapse. We hope findings from this study can be used to further our understanding of the pathophysiology of prolapse, its relationship with aging, and to ultimately develop novel interventions for the prevention and treatment of pelvic organ prolapse.

Melissa Wei, MD, MPH, SM, Clinical Lecturer, Internal Medicine-General Medicine – Cumulative impact of chronic diseases on physical functioning in older adults: development and validation of a novel measure of multimorbidity

Multimorbidity poses a major and growing challenge to aging adults, their families, and healthcare systems, yet current measures for multimorbidity fail to capture the diversity, severity, and synergy among diseases using patient-reported outcomes. A more robust measure of multimorbidity that captures the impact of multiple coexisting chronic diseases on physical functioning in older adults is crucial for clinical care, research, and health policy. This research will produce an improved multimorbidity tool that may be used to help guide and improve the management, quality of care, and prognosis of older adults with multimorbidity.