Personal care products (PCPs), non-stick cookware, and are common in everyday exposures, including drinking water, contribute to the development of age-related diseases like cancer, cardiometabolic disease, and impairments, and parabens, contribute to the development of environmental pollutants, including PFAS, phthalates, and phynates; neighborhood disinvestment and decaying infrastructure are necessary to address issues of health equity, behavior patterns of structural disadvantage. While structural solutions can make exposures to these pollutants more likely, thus increasing the burden of age-related disease in these communities that have encountered structural disadvantage. Compelling evidence from animal studies demonstrates that microvascular impairment contributes to the etiologies of several age-related chronic diseases, including sarcopenia. For example, capillary hemodynamic profiles are altered in old F344 rat spinotrapezius muscle compared with those of younger counterparts. However, a validated non-invasive measure of microvasculature geometry and structure has not yet been developed. Recently, it has been shown that R1ρ dispersion imaging at weak locking field frequencies (FSL) provides a unique way of characterizing microvessel size and density. Moreover, previous R1ρ images were acquired at strong FSL (≥500 Hz) and used to measure the age-related differences linked to macromolecular deposition, such as collagen in the extracellular matrix. Here, we aimed to develop a non-invasive 3D volume R1ρ dispersion imaging method at weak FSLs (<300 Hz) to quantify microvasculature changes in skeletal muscle. We successfully implemented the protocol and applied it to the lower leg of five F334 female rats at age 15 mo. The whole lower leg of each rat was also imaged using conventional multislice T1-FLASH, Diffusion-weighted, and T2-MGE pulse sequences. We found that R1ρ value measured in calf muscles decreased from 46.92Hz to 41.63Hz by increasing FSL from 5Hz to 240Hz, which we suggest derives from the effects of rephasing some of the signal losses that arise from diffusion in intrinsic magnetic field gradients generated from microvessels. Future direction of this ongoing study will be to compare these results with data collected from young female rats at age 6 months and further validation using ex-vivo histology.
Medication adherence is critical for disease management, yet adherence varies across diverse populations. To better understand adherence in working informal caregivers, a novel measure was developed using a validated methodological approach: the Medication Taking Instrument – Four Facets (MTI-4). This instrument assesses adherence from four perspectives: (1) individual, (2) relationship-oriented, (3) self-efficacy, and (4) life/job/marital satisfaction. It was designed to measure adherence among working caregivers who provide informal eldercare.

This study contributed to the literature by introducing a new construct and offering a psychometrically sound measure that propels more empirical research. The MTI-4 demonstrated high internal scale reliability, a strong factor structure, and discriminant validity, making it a helpful assessment tool for detecting early-onset limitations. It can be used in the clinical setting to aid in targeted research aims and guide interventions to augment adherence among aging African Americans. Ongoing data collection in the Detroit Aging Brain Study will provide additional insight into adherence among diverse working informal caregivers and can be used to inform future research and interventions.