Resilience is defined as the ability of a physiologic system to recover from a stressor that has pushed the system into a state far from its original state of equilibrium. The level of resilience can be understood by whether or not the system's essential identity and function are retained following the stressor. The study of resilience in older adults has potential to provide clinically relevant insights into our understanding of who will or will not recover when encountering a stressful medical procedure, especially those common to older patients. The main Study of Physical Resilience and Aging (SPRING) at Johns Hopkins includes prospective data collection of determinants, phenotypes, surrogates, dynamic stimulation measures, and outcomes of resiliency among older persons undergoing knee replacement surgery, or the initiation of hemodialysis, or bone marrow transplantation. SPRING also includes analyses of existing data sources to inform these prospective studies. This symposium briefly presents the conceptual framework and design of SPRING, and focuses on the results of secondary analyses from three existing data sets that mirror the ongoing stressor studies: FORCE-TKR (knee/joint replacement, N=9006), CHOICE (dialysis initiation, N=487), and a database of patients undergoing treatment for hematologic malignancies (bone marrow transplantation, N=1011). For each clinical population, we present results on phenotypic and/or biomarker trajectories, as well as the factors associated with resilience phenotypes and how these are predictive of clinical outcomes. These analyses display the utility of resilience phenotypes for predicting risk of adverse outcomes and complement the new data being collected in our main study.

RESILIENCE IN INCIDENT HEMODIALYSIS: CHARACTERIZATION AND OUTCOME PREDICTION

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The Resiliency in Dialysis Initiation (ReDI) Study aims to develop physical resilience signatures in older adults initiating hemodialysis. Study design—comprising a pilot, confirmatory study, and secondary data analyses—will be presented. So also will a method for characterizing resilience phenotypes—using mixed-model analysis of SF-36 subscale trajectories—among participants of age 55 and older who had undergone hemodialysis in the Choices for Healthy Outcomes in Caring for ESRD study (n=485). Analyses revealed stable, improving, and declining phenotypes. In Cox models, both baseline phenotypic status and trajectory type predicted mortality after adjusting for age, CVD status, and CHF (global Wald test for trajectory type P-value=0.020 for vitality; 0.030 for general health). These analyses evidence usefulness of resilience phenotypes as markers of adverse outcome risk and foreshadow application to novel ReDI data.

RISK FACTORS FOR POOR RECOVERY AFTER TOTAL KNEE REPLACEMENT AMONG OLDER ADULTS IN THE FORCE-TJR COHORT

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Total knee replacement (TKR) is a common procedure in older adults with broad variability in outcomes. We sought to identify factors that contribute to resilient outcomes in 7,239 older adults (age 60 or older) who underwent TKR in the TJR-FORCE, a prospective registry of total joint replacement. Outcomes utilized were bodily pain and physical component score (PCS) from the Short Form 36 Health Survey (SF-36), at pre-op, 1-year, and 2-year post-procedure. Participants were grouped according to their outcome trajectories as "improving", "worsening", "variable," or "stable." Multinomial regression (with 4 outcome categories) was used to evaluate demographic risk factors (age, gender, BMI, marital status, education, smoking history, comorbidity count, household income). Older age, larger comorbidity count, low-income, smoking, and being unmarried were significant risk factors for poor recovery (not "improving") in terms of bodily pain and physical component score. Next steps include evaluating risk factors for resilience outcomes in prospective studies.

PREDICTING SURVIVAL AFTER BONE MARROW TRANSPLANT USING TIME SERIES OF ROUTINE LABORATORY BIOMARKERS

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Bone marrow transplant (BMT) is a curative therapy for patients with hematologic malignancies. However, there is still a high rate of relapse and mortality after BMT. It would be tremendously valuable if we can identify older adults at high-risk for mortality using readily available information. A number of biomarkers are routinely collected during follow-up for clinical care, but this information is seldom used in prediction models. We examined the data from 1011 patients who had BMT at Johns Hopkins between 2013 and 2019. There were 364 death over a median follow-up of 431 days. We considered 4 biomarkers: albumin, hemoglobin, lymphocytes count, and platelets. Biomarker data from one week pre-BMT to 8 weeks post-BMT was used for prediction using a random survival forest model. The model performed quite well and had a 5-fold cross-validated c-index of 0.733 (95%CI: 0.724-0.739). Routine laboratory biomarkers can help identify poorly resilient older BMT patients.