

# Frailty Definition and Survey of Frailty Assessment Tools in Patients with Cardiovascular Disease

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Frailty, a geriatric syndrome related to diminished physiological reserves, which has been shown to put older adults at higher risk for adverse health outcomes such as higher hospitalization and readmission rates, adverse treatment outcomes, longer hospital stays, and increased mortality. Lack of physiological reserves makes frail individuals less likely to withstand stressors. Depending on the frailty assessment approach and the studied population, frailty is identified in 25-50% of patients with cardiovascular disease (CVD). Therefore, frailty assessment is performed before cardiac interventions (e.g., surgery) for risk stratification .

In this session, frailty will be defined, and its association with CVD will be reviewed. Furthermore, the most common frailty assessment tools that are based on physical performance and the accumulation of deficits, such as Fried phenotype, the multidimensional Edmonton frailty score (EFS), and the Deficit Index (DI) will be introduced. Frailty assessments, such as Fried frailty phenotype and DI, are subjective/semi-subjective, long to perform, and require trained clinical staff to perform or interpret the assessment. Therefore, advanced and validated methods using wearable sensors will be introduced as an objective approach for frailty assessment. These methods include sensor-based gait and activity monitoring that can objectively assess frailty during a simple walking test and a novel upper-extremity function (UEF) approach, which is feasible for older adults, especially those with mobility disorder and lack of strength to perform traditional cardiopulmonary exercise or 6-minute walk testing.

In conclusion, our goal is to introduce frailty and its association with CVD and provide an overview of common frailty assessment tools, including methods benefiting from wearable sensors.