



**Priority Statement Title:** Extending Biomechanical Assessment Beyond the Lab: Quantification of Activity, Compliance, and Outcomes in the “Real World”

**Priority Statement Code:** LF4A

**Domain:** Joint, Limb, Whole Body, Function, Participation

## Priority Statement

### Background and Relevance

Human movement represents the ongoing interaction between the neural control system, the musculoskeletal system, and the environment.

Lab based measurements have limitations including:

- only providing an exceedingly limited snapshot of the individual's performance
- failure to represent the complete range, of quality, and frequency of activities encountered in the “real world”
- ignores interaction between the individual and the environment
- are not readily available to all clinicians nor transportable for patients.
- are expensive and labor intensive
- time consuming for the subjects

Extending biomechanical assessment beyond the lab, into the real world, can provide several advantages:

- Monitor subjects over longer time periods in home and community environments.
- Biomechanical measurements are “real-world”, contextually relevant, ecologically valid
- Provide direct information about the individual's interaction with his/her environment.
- Field-measures can help to monitor and assess compliance with treatment and exercise programs,
- May be less labor intensive and/or less expensive
- More convenient for the subject

One example is falls, a significant problem that affects older adults with more than one-third falling each year. The capacity to monitor individuals in their community would provide insight into the factors contributing to loss of balance and falls.

Another example is osteoarthritis, where the ability to quantify load exposure during activities of daily living can provide insight into the factors contributing to disease onset and progression.

### Objectives

1. Obtain direct biomechanical measurements in the ‘real world’
2. Increase understanding of how people physically interact with the natural environment.
3. Increase the contextual validity of lab measurements with respect to real world activities.

### Recommended Actions

Develop and validate novel, user-friendly, portable, cost-effective tools for obtaining measurements in the real world environment appropriate to the requirements of specific activities of daily living. e.g. could span the range from simple (pedometer, satisfaction) to complex (joint loads, kinematics), and across WHO



domains of structure and function, activity, and participation. Development should include input from community stakeholders and potential beneficiaries.