



**Priority Statement Title:** Translating Biomechanics Research Findings into Clinical Practice: Avoiding the “Valley of Death”

**Priority Statement Code:** LF2B

**Domain:** Multi

### Priority Statement

#### **Background and Relevance**

Translating the findings from basic biomechanics research into clinical practice is often a slow and haphazard process. As a result, many research discoveries reside in the so-called “valley of death” because they lack the necessary funding and skilled management to progress into the proof of effectiveness phase (1). At the same time, clinical practice places emphasis on evidence-based, cost-effective, and accountable health care. While most rehabilitation interventions, assessments, and devices are tested with a small subset of patients, increasing the sample size to the level of a randomized controlled trial (RCT) often does not occur. Because RCTs reduce spurious causality and bias, they are currently considered to be the most reliable form of scientific evidence in the hierarchy of evidence that influences healthcare policy and practice. Unfortunately, the growth of biomechanics research from lab-based findings into clinical practice and interventions is often hampered by the reliance on RCT study. While the RCT process for technology-based interventions and products (e.g. drugs, assistive devices, etc.) is well-defined, the role of the process for knowledge-based findings (e.g. balance training, gait analysis, etc.) is unclear and often impractical. This in turn delays or prevents patients from receiving interventions due to the unwillingness of insurance companies to pay for services. The development of acceptable alternatives to the RCT process is critical for clearing the reimbursement hurdles imposed by insurance companies and providing enhanced patient care. Avoiding the valley of death in translating research findings into clinical practice necessitates constructing bridges that can connect the existing gaps between basic research and clinical application.



#### *References*

1. <http://www.nature.com/news/2008/080611/full/453840a.html>

#### **Objectives**

1. Successfully translate biomechanics research findings into clinical practice through:
  - a. development of collaborative environment across disciplines.
  - b. promotion of a mutual understanding across centers from research to policy.
2. Implement situation-specific alternatives to RCTs for establishing efficacy of new interventions and assessments.

#### **Recommended Actions**

1. Invest in training, research and infrastructure to help biomechanists engage in clinical research, including the development of a collaborative environment that supports interdisciplinary education and provides resources for knowledge translation. This may include the development of a “clinical fellowship” that would provide for an immersive rotation by a biomechanics researcher across a variety of clinical disciplines (e.g. orthopaedics, PMR, sports medicine) and practitioners.
2. Develop a multi-phase funding model wherein clinical research that is proven to be promising in a small sample can be advanced to later phases with expanded subject pools (e.g. similar to the SBIR model)
3. Identify and examine RCT alternatives to determine their adequacy for supporting clinical translation of biomechanics research. Consider different methods for performing cost-benefit analysis of a given RCT alternative.
4. Increase communication among Centers for Medicare and Medicaid Services (CMS), funding agencies, primary researchers, comparative effectiveness researchers, insurance companies and third party payers to develop mutual understanding of appropriate means to establish efficacy of the new intervention or assessment tool.

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