

The Importance of Trajectory Curves for the Implementation of Outcome Benchmarks in a Clinical Setting

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Introduction

- The development of trajectory models to inform clinical practice has become increasingly common in healthcare.
- A study is currently underway to develop trajectory models for the Life Impact Burn Injury Recovery Evaluation (LIBRE) Profile assessment of social participation.
- The intent of this review was to: 1.) understand how trajectory curves have been used and identify benefits derived from implementation; 2.) use findings to inform development and implementation of LIBRE Profile trajectory curves developed to track changes in social participation post burn injury.

Methods

- Prior to conducting a literature review, a framework for categorizing and evaluating clinical utilization of trajectory curves identified three different areas of inquiry:
 - Measuring individual patient growth;
 - Comparing progress among similar patient cohorts to provide context for personal growth;
 - Instituting predictive medicine/risk assessment for interventional care
- Manuscripts published from 2014-2019 using trajectory curves were identified using PubMed searches that included the following terms: “trajectory curves” or “trajectory models” and “clinic” or “clinical”
- An initial review of manuscripts applied the following inclusion criteria: 1.) utilization of trajectory curves; 2.) involved clinical and longitudinal research
- Retained manuscripts were qualitatively reviewed and categorized into one of the three areas of inquiry.

Results

- The initial literature review identified 141 manuscripts; 107 manuscripts did not meet inclusion criteria.
- The 34 remaining manuscripts were evaluated and categorized based on the three areas of inquiry.
- Examples of trajectory curves that can inform LIBRE Profile development were identified.

Conclusions

- Existing literature provides several examples demonstrating effective clinical utilization of trajectory models across the three areas of inquiry.
- These findings will be applied to inform the development and implementation of LIBRE Profile trajectory curves to monitor social participation post burn injury.
- Next steps will employ focus groups of clinicians and persons with burn injury to determine trajectory models that are most effective for communicating LIBRE Profile assessment findings.

Fig 1: Systematic Categorization of Literature Involving Use of Trajectory Curves

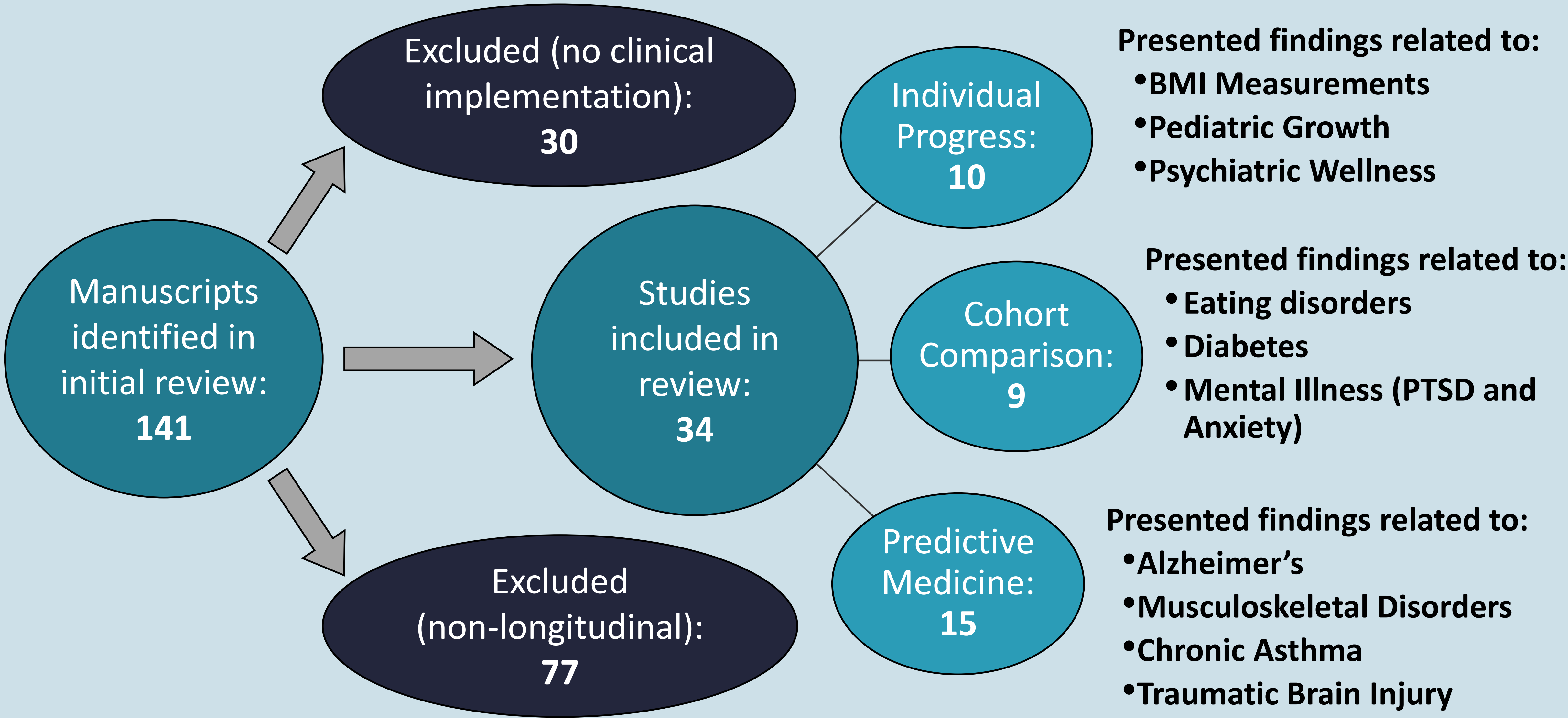
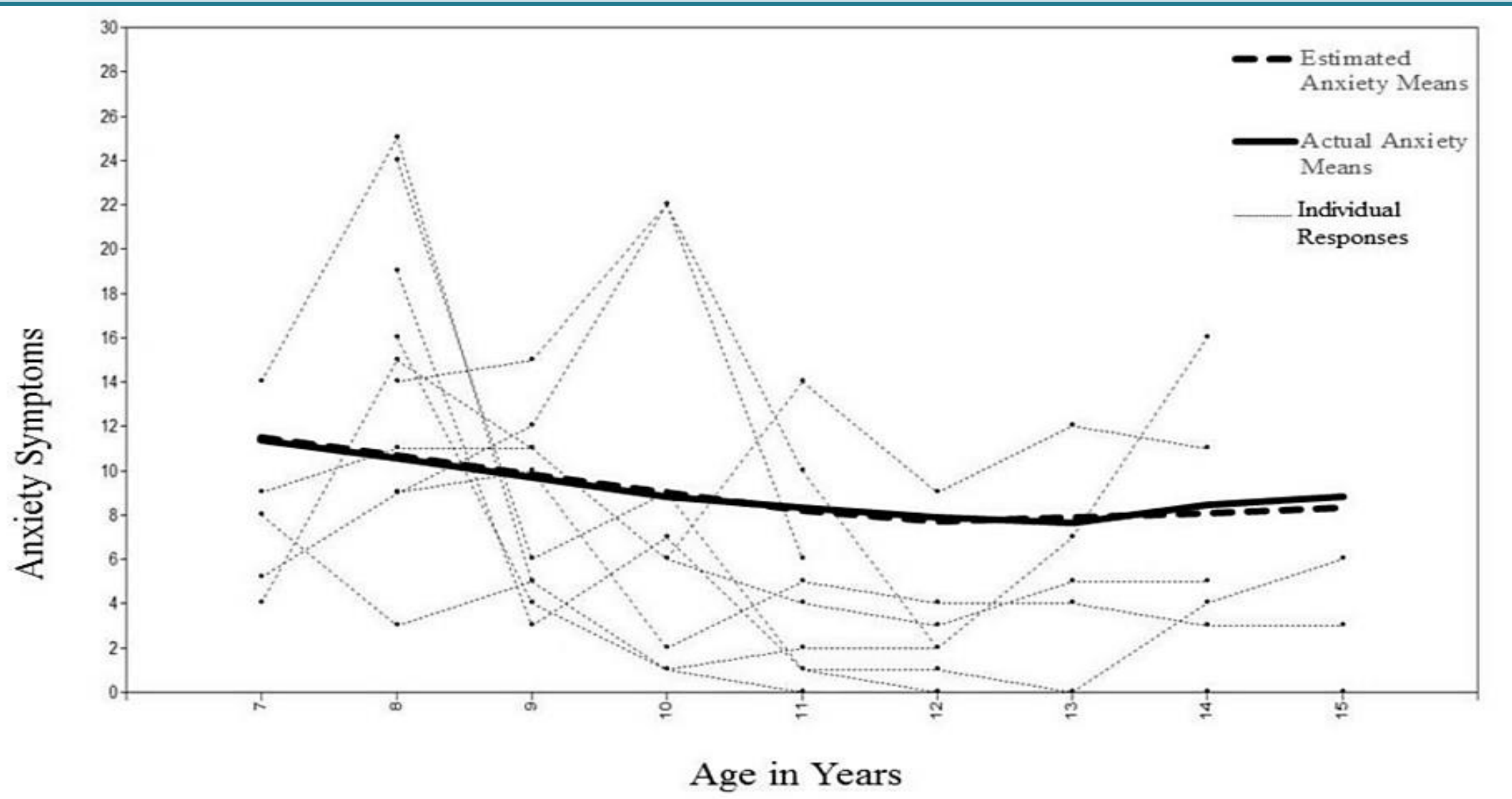
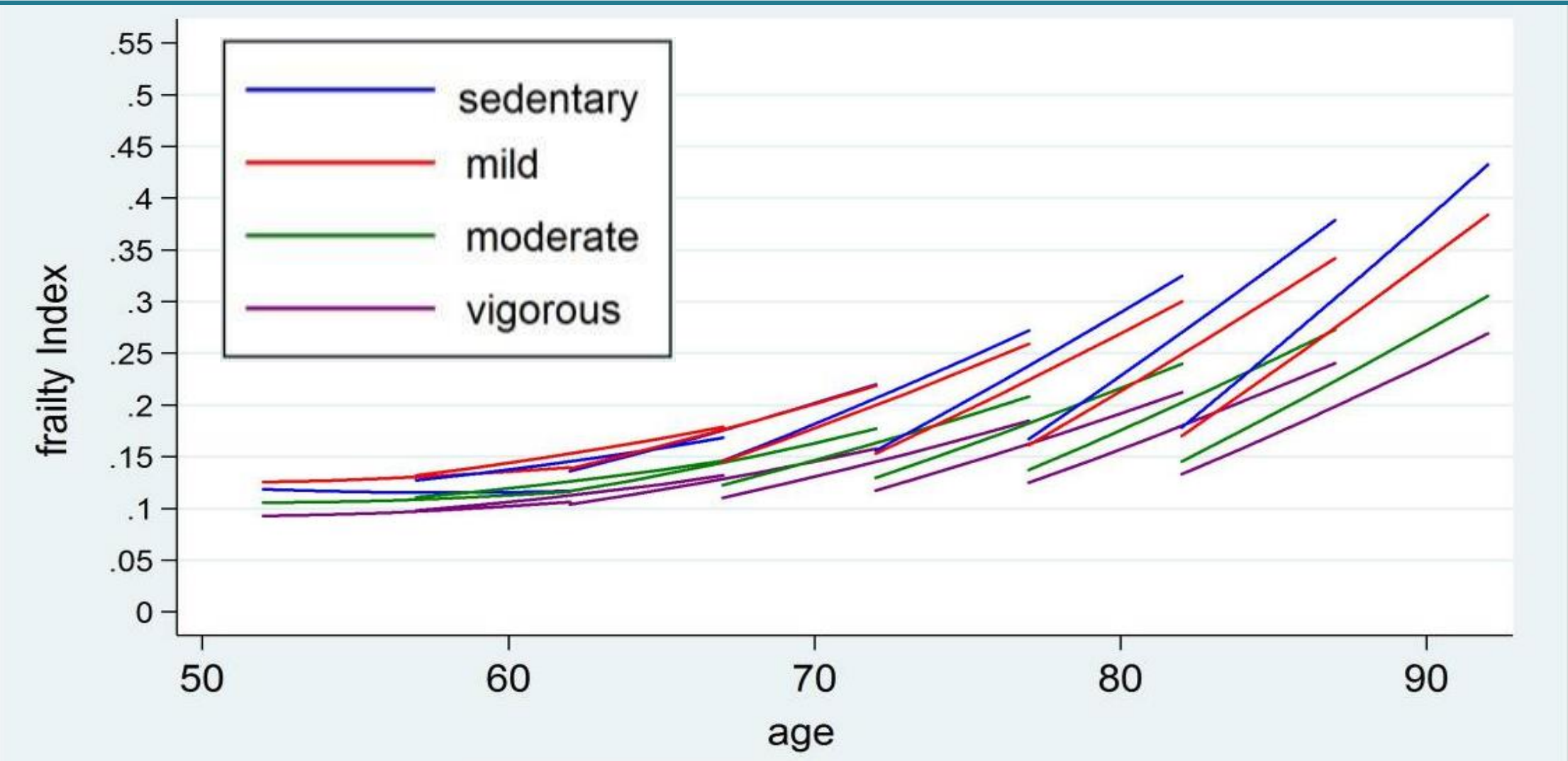


Fig 2: Examples of Trajectory Models Used in Other Fields of Medicine



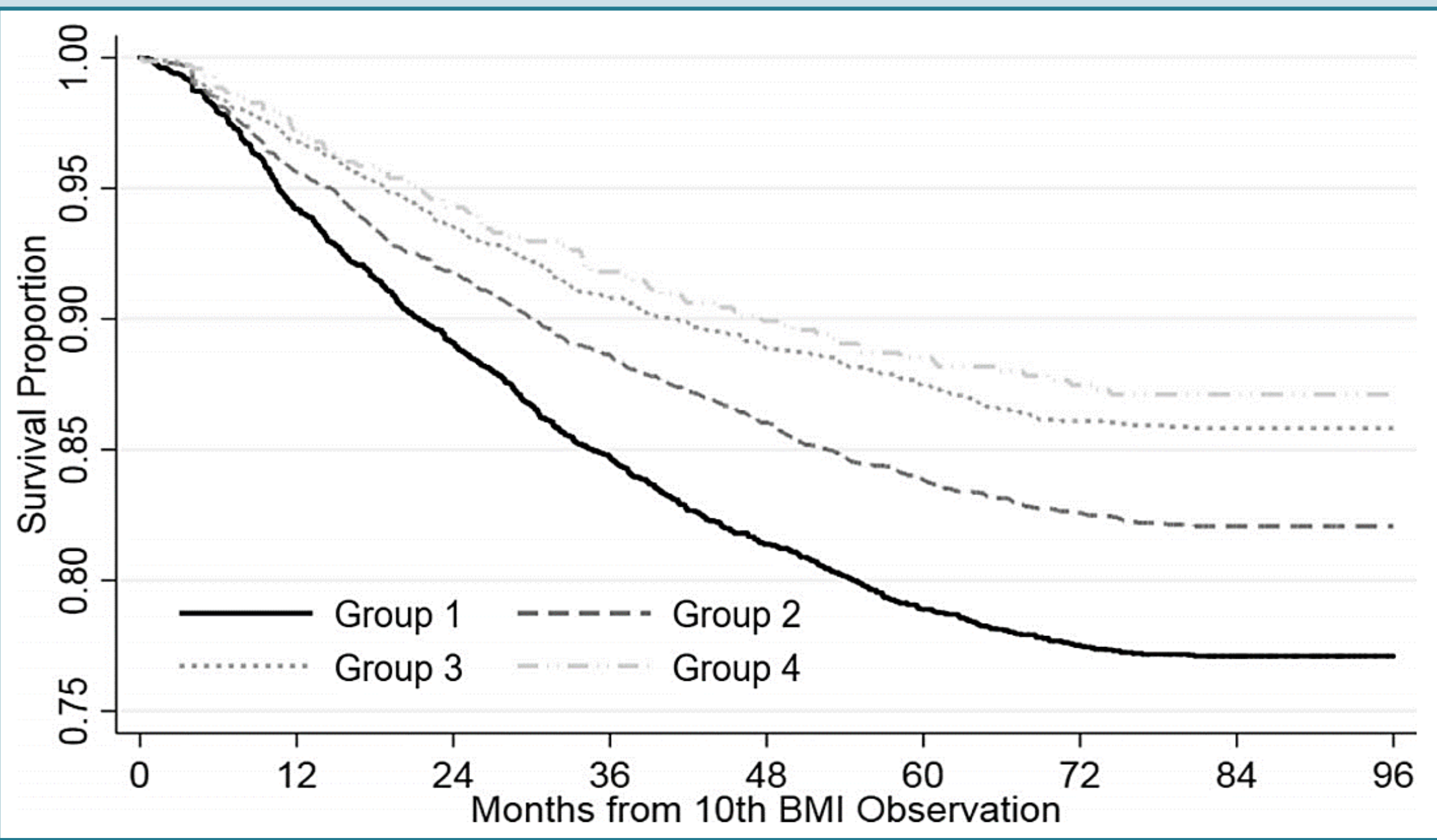
I. Individual Progress: Examining an individual's score on an adolescent/teen anxiety assessment compared to established mean anxiety scores for different age groups. This allows an individual to assess progress based on their age.

Cohen JR, Andrews AR, Davis MM, Rudolph KD. Anxiety and Depression During Childhood and Adolescence: Testing Theoretical Models of Continuity and Discontinuity. *J Abnorm Child Psychol*. 2018;46(6):1295-1308



II. Cohort Comparisons: Examining the frailty index as a function of age for those with secondary multiple sclerosis. Cohorts are established based on activity level and comparative information is provided for the population.

Rogers NT, Marshall A, Roberts CH, Demakakos P, Steptoe A, Scholes S. Physical Activity and Trajectories of Frailty Among Older Adults: Evidence from the English Longitudinal Study of Ageing. *PLOS One*. 2017;12(2):e0170878.



III. Predictive Medicine: Presenting longitudinal predictions for survival in a South African HIV population, stratified by initial Body Mass Index. These figures are useful in presenting information for degenerative or chronic conditions in order to address potential future outcomes.

Brennan AT, Berry KM, Rosen S, et al. Growth Curve Modeling to Determine Distinct BMI Trajectory Groups in HIV-positive Adults on Antiretroviral Therapy in South Africa. *AIDS*. 2019;33(13):2049-2059.