A Patients-Like-Me Approach to Aggregating Data in Clinical Management of Adolescent Concussion.

Mathew Wingerson, Julie Wilson, David Howell.

Background: Recovery after adolescent concussion is difficult to predict, and communicating realistic recovery timelines is equally challenging. Clinicians rely on experience with "similar" patients, alongside peer-reviewed research, for prognosis. A simple "patients-like-me" framework that aggregates recovery outcomes from past patients seen in the clinic can support clinical prognosis by setting individualized, data-driven recovery expectations based on prior patients who are most similar to a current patient.

Methods: We used a reference cohort of 558 adolescents treated in a concussion clinic. Nine routinely collected demographic and injury-related variables defined a "*Like-Me Cohort*": a subset of patients most similar to a given index patient based on Euclidean distance. For validation, each patient in the reference cohort served as an index patient, and we generated a summary of the Like-Me Cohort's mean values for age, time since injury, symptom severity, and recovery outcomes (time to symptom resolution and time to return-to-play), presented numerically and with visual aids. For each index patient, we compared their values with the mean of their Like-Me Cohort and the other remaining reference patients; closer alignment with the Like-Me Cohort was interpreted as evidence that the Like-Me approach is valid.

Results: The mean Like-Me Cohort size was 55 patients (range 37-78). The mean absolute difference between patient values and group means was consistently smaller for Like-Me Cohorts versus remaining reference patients for age (1.3 vs 2.0 years; $p<0.001$), time since injury (2.4 vs 4.8 days; $p<0.001$), symptom severity (6.1 vs 11.3 points; $p=0.016$), and recovery outcomes of time to symptom resolution (9.7 vs 11.9 days; $p<0.001$) and time to return-to-play (15.7 vs 18.4 days; $p<0.001$).

Discussion: This patients-like-me aggregation approach generates sub-cohorts that better reflect individual clinical presentations and recovery trajectories, offering an interpretable, data-driven complement to clinical management and supporting patient-centered discussions of expected recovery.

First learning objective

By the end of this session, participants will be able to describe how a "patients-like-me" data aggregation framework uses routinely collected clinical variables to generate individualized sub-cohorts which support patient-centered discussions of expected recovery.

Second learning objective

By the end of this session, participants will be able to identify ways to adapt or integrate a patients-like-me framework into their own clinical, public health, or data visualization workflows to better communicate prognosis with patients and families.

Unique/diverse experiences, voices, or communities

This presentation brings together the perspectives of a scientist–in-training within a concussion research program, adolescent patients with concussion and their families, and the work of data scientists who translate complex models into simple, patient-facing tools. The project uses real-world data from adolescent athletes and active youth throughout the state of Colorado.

Connection to the health of Coloradans and the Mountain West

The work originates from concussion care delivered in Colorado, using data from a regional sports medicine clinic that treats patients across the Front Range. A "patients-like-me" data aggregation approach can support clinical decision-making, guide clinicians when communicating recovery expectations with patients and their families, and ultimately promote improved health and recovery for adolescents with acute brain injury across the Mountain West.

Interactive components for a lecture presentation

The session will include: (1) an interactive walk-through of a sample "patients-like-me" recovery summary, including all the visualization aids that currently exist for communicating expected recovery trajectories for patients; and (2) a "gut vs aggregate" game, where real patient clinical data are shown and audience members guess their potential recovery trajectories and compare that to the recovery trajectory generated by our patients-like-me summary.