The Role of Pre-Injury Activity Levels in Non-Sports Concussion Recovery

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Concussion and Pre-injury Exercise

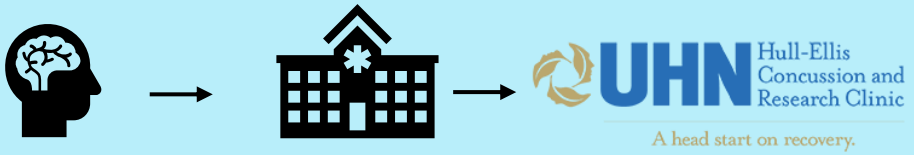
- In Canada, over half are non-sports concussion (Champagne et al, 2023)
- Early post-concussion aerobic exercise has been shown to **improve recovery** in the general population (Leddy et al, 2018)
- Murine models shows pre-injury exercise is associated with improved recovery (Silva et al, 2024)

Objective: Identify whether pre-injury physical activity (PA) levels influence recovery time and symptoms in non-sports related concussion patients

Research Methods

Recruitment → Follow-Up → Statistical Analysis

Patients are referred to the Hull-Ellis Concussion Clinic from Emergency Rooms in Toronto



- Toronto General Hospital (TGH)
- Toronto Western Hospital (TWH)
- Mount Sinai Hospital
- Michael Garron Hospital
- St. Joseph's Hospital
- Sunnybrook Hospital

Research Methods



Recovery determined by physician

	Week												
Appointment	1	2	3	4	5	6	7	8	12	16	24	36	52
Physician													
Research													

Inclusion Criteria

- Ages 17 – 85 years
- Diagnosed with acute concussion in a Toronto ER
- Glasgow Coma Scale (GCS) of 13 – 15
- Within 7 days of injury

Exclusion Criteria

- Admitted to hospital
- Neurological/ positive imaging findings
- Eligible for compensation
  - E.g., motor vehicle incident or workplace injury

Research Methods

Recruitment → Follow-Up → Statistical Analysis

Recovery Time

Kaplan Meier (KM) to find survival probability and **log rank test** for the KM for comparison

Cox proportional hazard - adjust for co-variates *(age, sex, and acute symptom burden)*

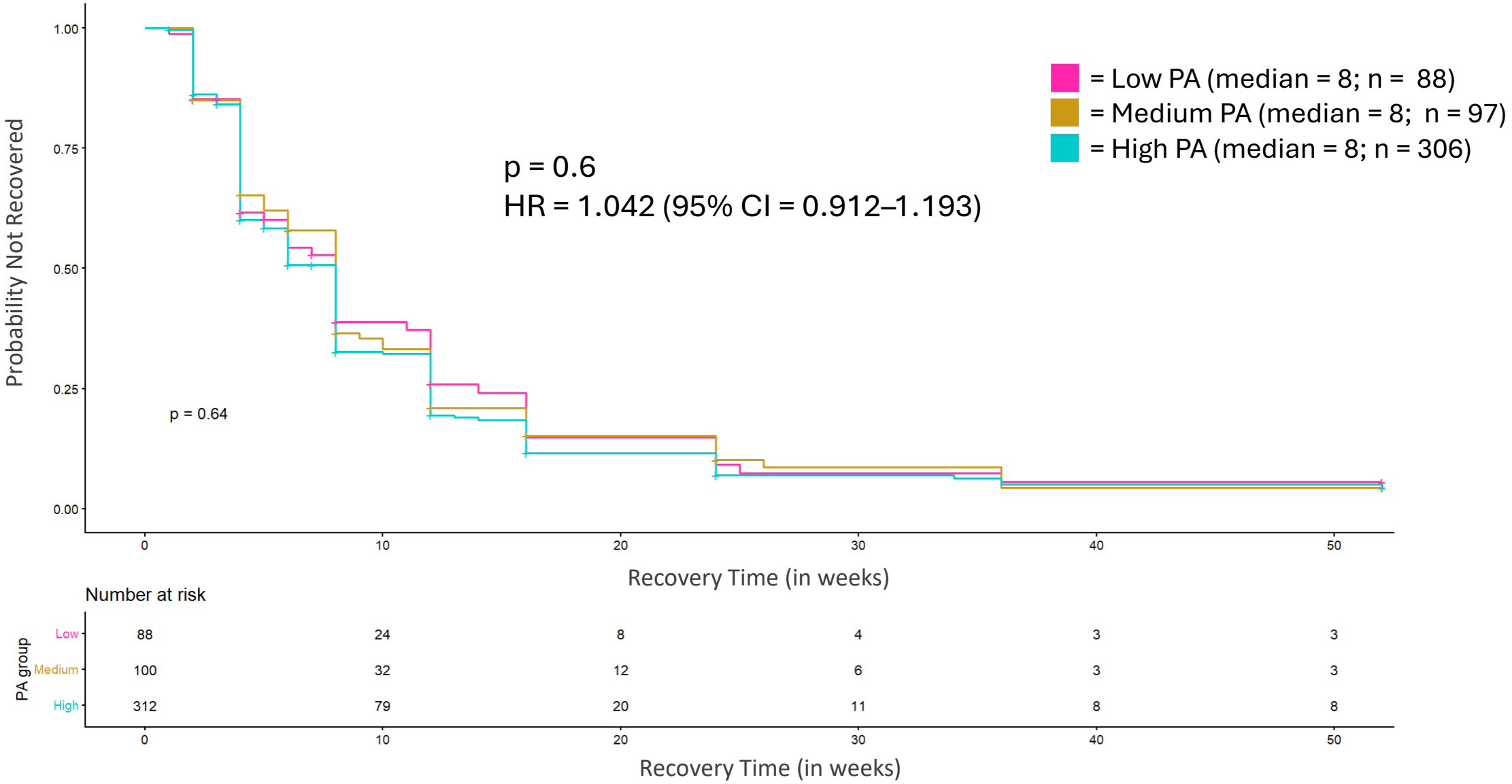
Censored @ last appointment or week 52 if not recovered

Symptom Severity

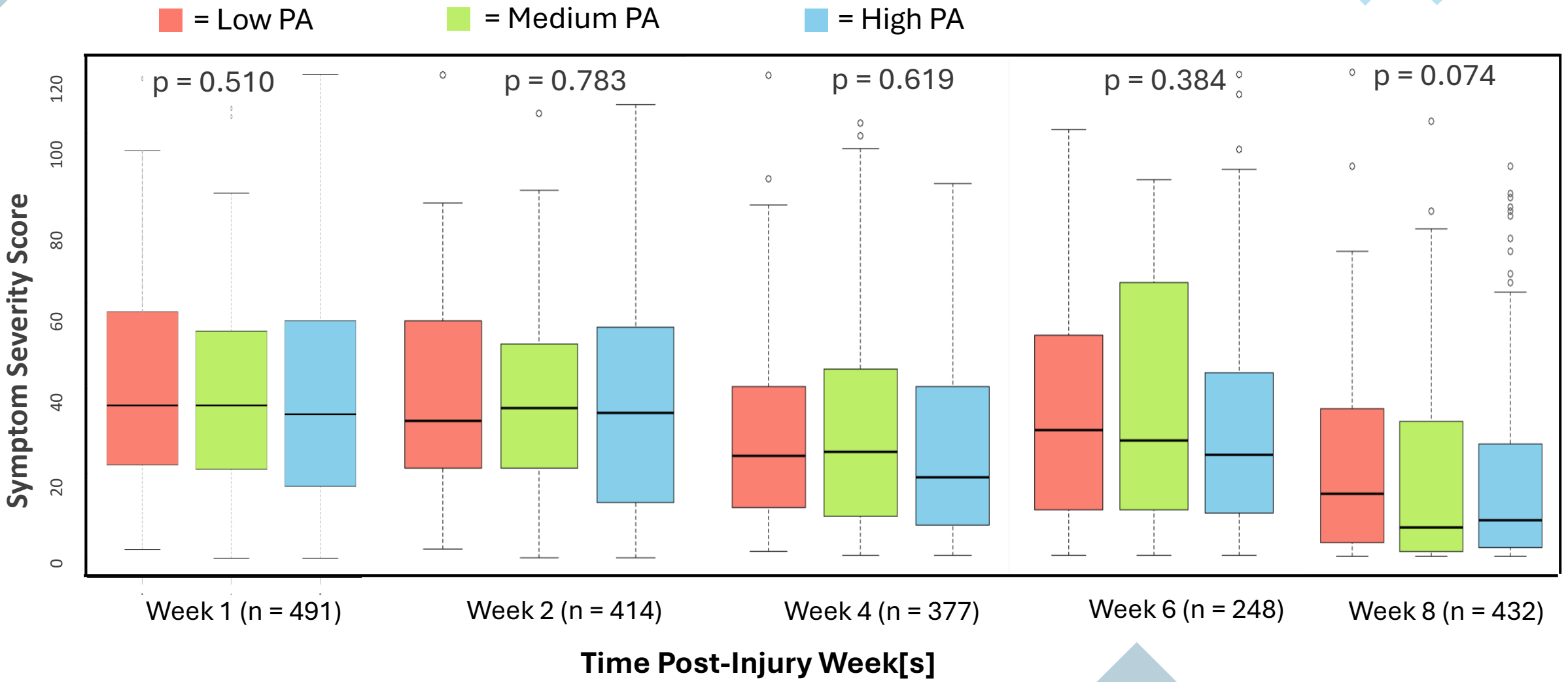
Kruskal Wallis Test – compare questionnaire results between groups

Dunn Test – Post-hoc test if the Kruskal Wallis test is significant

No Significant Difference in Recovery Between Groups



No Difference Between Symptom Severity and PA Level at Weeks 1, 2, 4, 6, and 8



Conclusion

Results suggest pre-injury exercise does not offer protective effects on concussion.

Further investigation to identify any associations between pre-injury physical activity with concussion recovery and outcomes.

With thanks to the clinical and Research Team at the Hull-Ellis concussion Clinic and collaborators including:



Pictured (Left to Right):
Dr. Elizabeth Inness, Evan Foster, Tharshini Chandra, Dr. Daniel Warshafsky, Dr. Mark Bayley, Dr. Paul Comper, Dr. Marcus Jansen, Bharvi Sharma, Dr. Lesley Ruttan, Monica Szczypinski, Dr. George Mochizuki

Not Pictured:

- Dr. Jonathan Gladstone
- Dr. Catherine Wiseman-Hakes
- Dr. Olinda Habib Perez
- Dr. Cristina Saverino
- Dr. Alan Tam
- Dr. David Lawrence
- Dr. Alice Kam
- Dr. Anita Tewari
- Sarah Abdelgalil
- Laura Langer
- UHN/ Toronto Rehab Foundation

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A head start on recovery.