

# CHRD 2024: Abstract Submission Form

**Presenter Name**

Hayley Turner

**Presenter Status**

Undergraduate Students

**Role in the project**

Design  
Perform Experiments  
Analyze Data  
Write Abstract

**Research Category**

Clinical

**Title**

Getting to the Heart of Wearable Technology: A Proposed Validation Study of the Fitbit Inspire 3 in a Pediatric Sample

**Background**

With the use of wearable technology on the rise, the opportunity to gain a better understanding of child health has improved. Based on studies with adults, among the most popular devices are Fitbit smartwatches; however, while some report they accurately monitor heart rate, others point to discrepancies between these tools and the gold standard, electrocardiography (ECG).

**Objective**

As validation studies of Fitbit technology in the pediatric context remain scarce, we aim to clarify how the Fitbit Inspire 3 compares to ECG in measuring heart rate in younger populations.

**Methods**

Heart rate will be collected using Fitbit Inspire 3 smartwatches and ECG from preschool-aged children. Children will partake in a resting state task and computerized matching game, where they will be randomized to either a stressor or control condition. To compare the accuracy and degree of agreement between the two devices in measuring heart rate, we will use several indices, including mean absolute error, mean absolute percentage error, mixed effects modelling, and intraclass correlation coefficients.

**Results**

We expect that the Fitbit will be comparable to ECG in measuring heart rate for all children during rest. However, during the matching game, results will depend on the condition. For the control group, the Fitbit and ECG will show high agreement in heart rate measurements. For the stressor group, although we anticipate an effect of the stress manipulation, the Fitbit and ECG will show lower agreement indicated by larger discrepancies in heart rate measurements, reflected in higher error, lower intraclass correlation coefficients, and deviations in mixed effects models.

**Conclusion**

Ultimately, validating the Fitbit Inspire 3 holds importance for future data collection, beyond the laboratory. Wearable technology may enhance the accessibility of monitoring at-risk populations by providing real-time cardiac data, integrating into health interventions, and offering deeper insight into the relationship between child health and behaviour.

**Do you have a table/figure to upload?**

No

## Authors

<b>Name</b>	<b>Email</b>	<b>Role</b>	<b>Profession</b>
Hayley Turner	turnerh1@myumanitoba.ca	Presenting Author	Undergraduate Student
Mohammad Soleyman Nejad	soleymam@myumanitoba.ca	Co Author	Graduate Student
Leslie E. Roos	leslie.roos@umanitoba.ca	Co Author	Associate Professor
Ryan J. Giuliano	ryan.giuliano@umanitoba.ca	Co Author	Associate Professor