Project title: Reducing hospital inpatient falls through improved wheelchair and walker design

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Project description:

Patients frequently fall in hospital. Falls are associated with adverse outcomes, including injury and death. Falls leading to adverse outcomes are considered serious safety events and trigger interdisciplinary process reviews to determine how to reduce the risk of similar events in the future. Despite this, almost all falls in hospital are found to not be preventable, and hospital process reviews generate few novel solutions for reducing the risk of future falls. Therefore, any reduction to the risk of inpatient falls would represent a significant innovation. One common cause of falls is cognitively intact patients forgetting to turn on the brakes on their wheelchair or walker. In these instances, the patient loses balance when they stand as a result of the walker or wheelchair unexpectedly rolling away from them. Current walker and wheelchair design require the user to remember to apply the brakes when stationary. The goal of the current project is to develop a novel wheelchair or walker design for reducing the risk of falls related to inadvertent failure to apply brakes when stationary, either via an automatic braking mechanism, or a built-in cue to apply breaks when appropriate.

Milestone 1:

Complete literature and market review of available solutions for reducing the risk of stationary falls from brake application failures in cognitively intact patients. Propose and develop solution(s). If applicable, conduct a weighted options identification and analysis to identify appropriate solutions for further design iteration and testing. (March 2026)

Milestone 2:

Test and iteratively design solution through simulations at Hennick Bridgepoint Hospital (March – May 2026)

Milestone 3:

Analyze data and draft results (May – August 2022)

Grading distribution: Participation in project and research meetings (20%), assist with data collection and analysis (30%), and completion of academic product (50%).