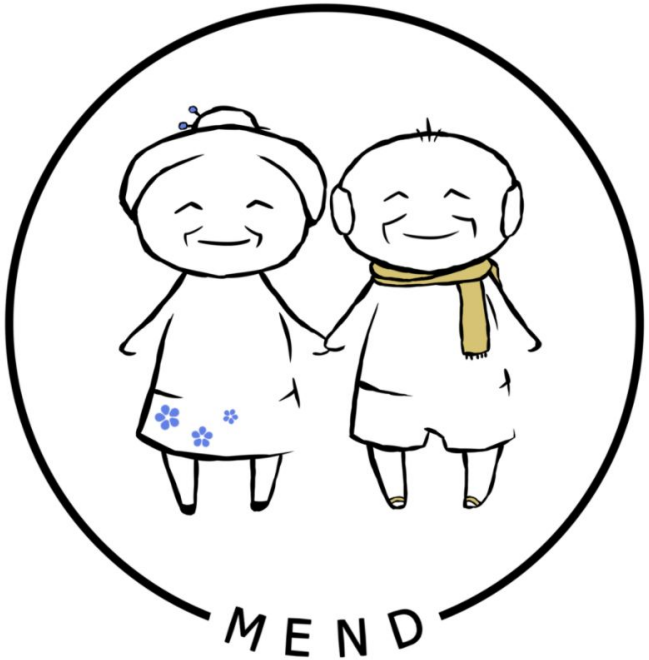


Austin Wang

01/19/19

Who are we?

M-HEAL

- Parent Organization
- Global Health / Design

MEND

- Founded in 2017
- Developing mobility & fall intervention solutions for older adults

Problem Environment

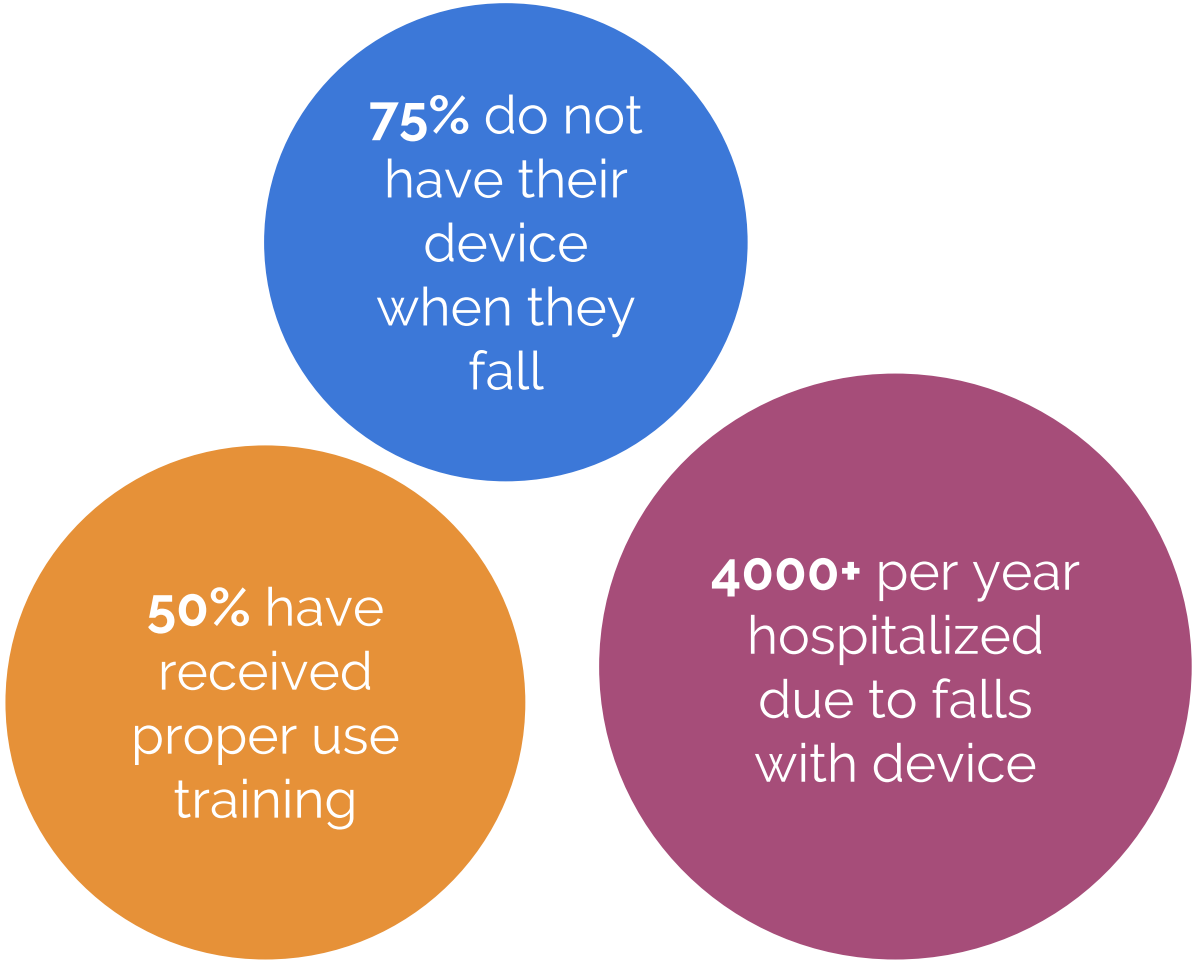
Among older adults (65+)

>33% fall every year.

<25% are using mobility / assistive devices.

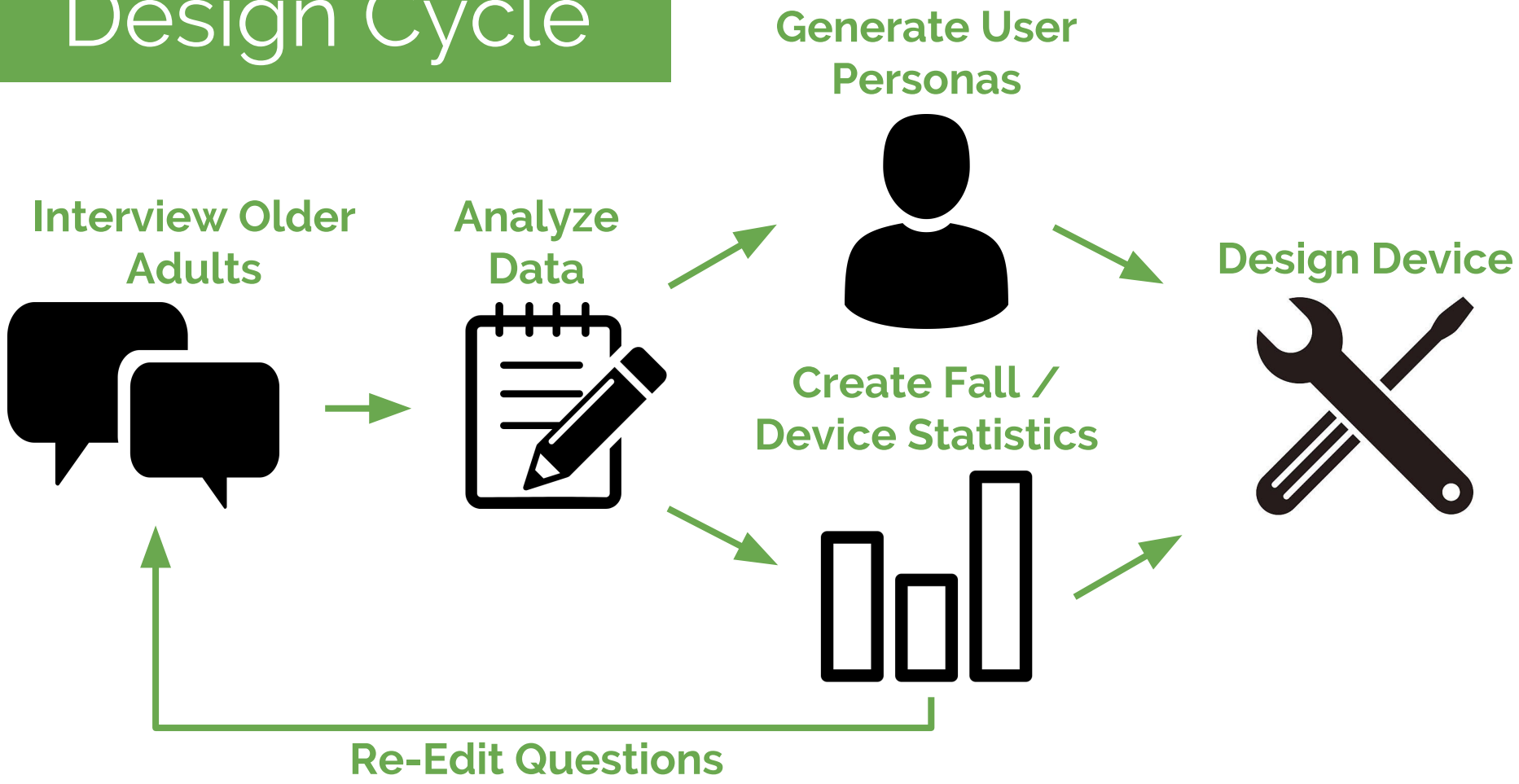
Device usage is more prevalent for **top 25%** socioeconomic bracket

Among device users



Current Work / Progress

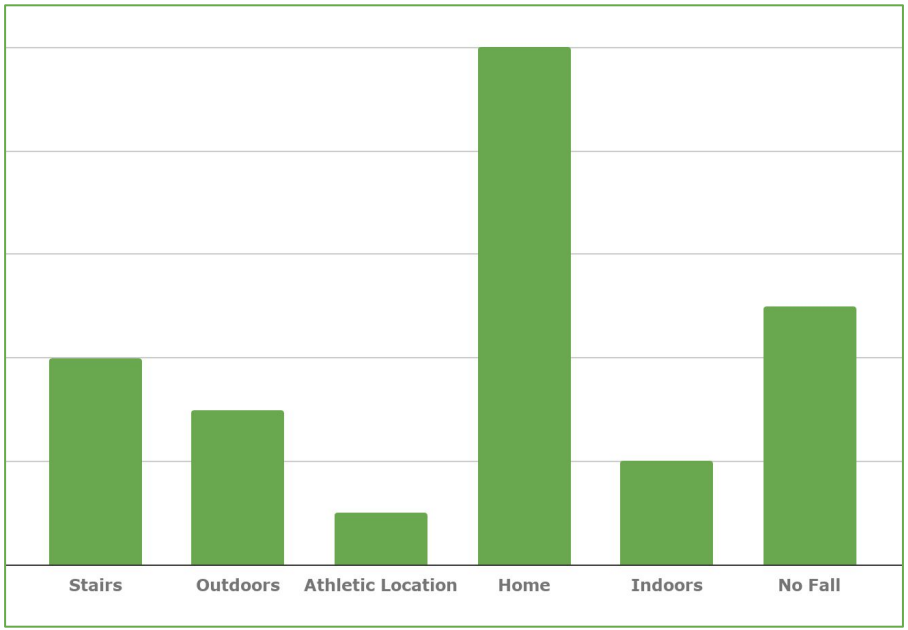
Design Cycle



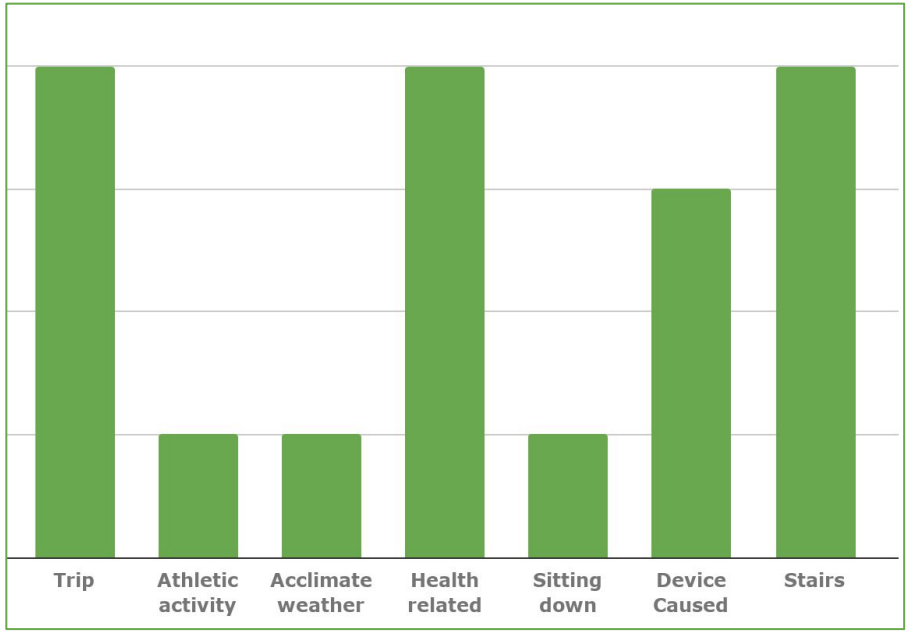
Interviews

- Turner Geriatric Clinic
- 3 Question Focuses:
  1. Where, when, and why do people fall?
  2. How can devices be made to better deal with falls?
  3. How can we promote more and proper usage?

Fall Location

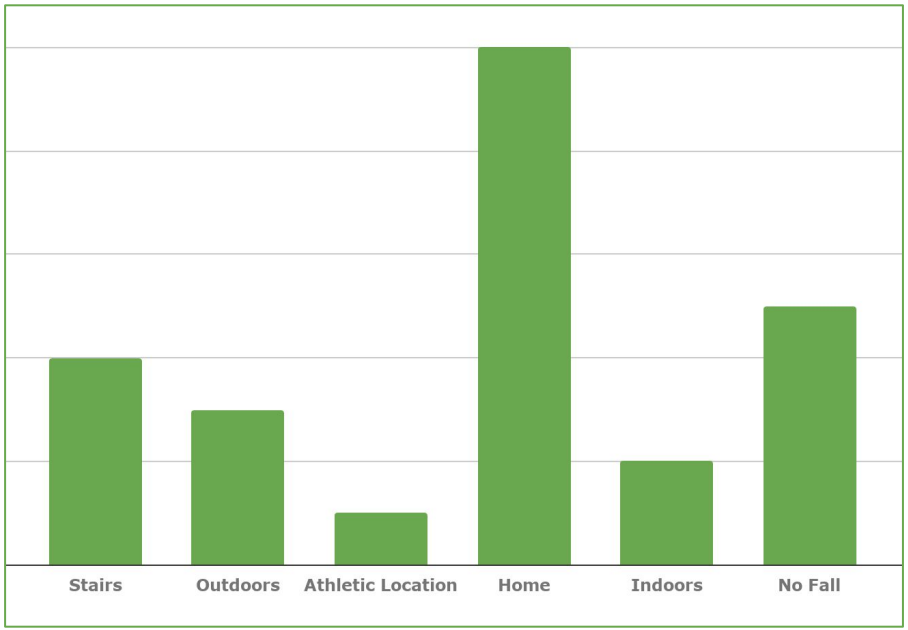


Fall Cause



*Based on n=28 interviews from the Turner Geriatric Clinic; ongoing study

Fall Location

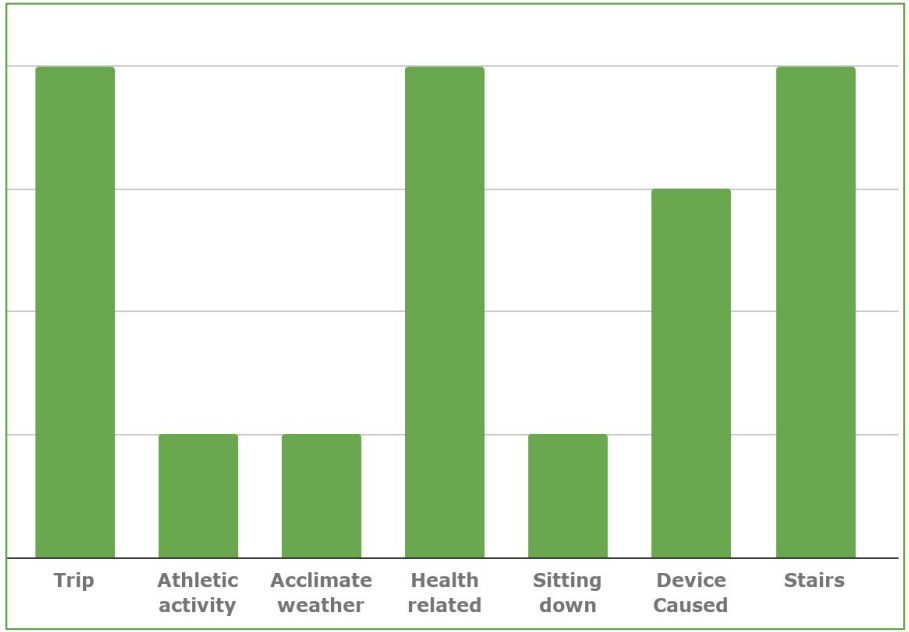


Suggests people most often fall **at home** – where they are least likely to use/have their device

*Based on n=28 interviews from the Turner Geriatric Clinic; ongoing study

The reasons for falls are extremely **multivariable**, but are most often associated with a **physical interruption**

Fall Cause



*Based on n=28 interviews from the Turner Geriatric Clinic; ongoing study

Interviews

- Turner Geriatric Clinic
- 3 Question Focuses:
    1. Where, when, and why do people fall?
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    3. How can we promote more and proper usage?

Design Approaches

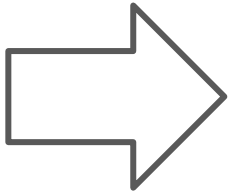
Designs

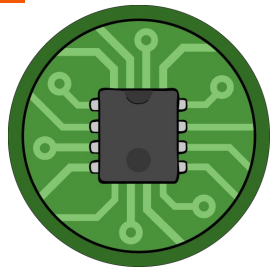
- Defined User Needs:

	Weight:
1. Promote usage	**5**
2. Improve safety	**4**
3. Improve mobility	**3**
4. Improve situational awareness	**3**
5. Optimize truncal position	**2**

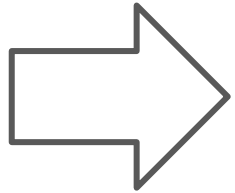
Timeline

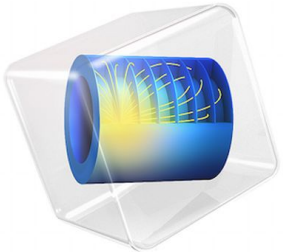
Research





Electrical





Mechanical

Build

Next semester

Solution Approach

1. Analysis of different base designs

2. Sensor based warning system

3. Modifiable design to optimize truncal position

Questions?

Image sources

https://www.clipartmax.com/download/m2i8i8b1Z5i8K9K9_research-clip-art-free-transparent-research-clipart/ - magnifying glass

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https://academic.oup.com/gerontologist/article/57/2/211/2631943

Pocket Slides

External Contacts

External Advisors:

1. Dr. Neil Alexander (UM Geriatrics)
2. Dr. James Richardson (UM Physical Medicine)
3. Dr. Mary Janevic (School of Public Health)
4. Mitch Baldwin (MDP Stryker)
5. Leena Lalwani (UM Library Grant Mentor)

Community Partners

1. Assisted Living Communities: University Living, Lurie Terrace, Gilbert Residences
2. Potential New Communities
   a. Turner Clinic
   b. VA Ann Arbor

Goals

February 2019: Finish literature review

↓

March 2019: Finish collecting needs assessment data

↓

April 2019: Utilize data from research and interviews to motivate design ideation and prototyping

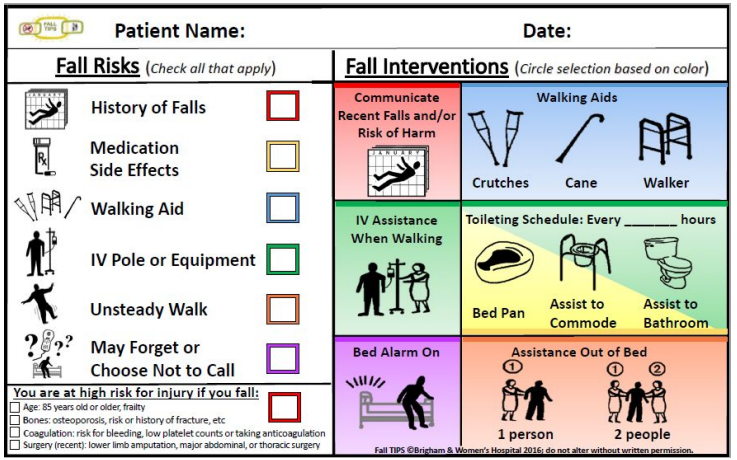
Literature Review

1. Walker user sizes
2. Gait info - kinesiology
3. Posture recommendations
4. How older adults best respond to different stimuli
5. Fall mechanics research
6. Collision sensor technology
7. Types of mobility users are limited to when using a device

Benchmarking

- Space has few-to-no innovations, completely unsaturated
- Innovations involve intricate and complicated systems
- Standard in-house procedures are still response-focused

U-Step Walker



Brigham and Women's Fall Prevention Protocol

User Requirements and Design Specifications

https://docs.google.com/document/d/19ONXivCHOoZDjU0eDJqDagLOhWJtzktv3JfUTwYGuiE/edit?usp=sharing