



ProactiveSense

Early Illness Detection: Improving Quality of Life

Marjorie Skubic, PhD

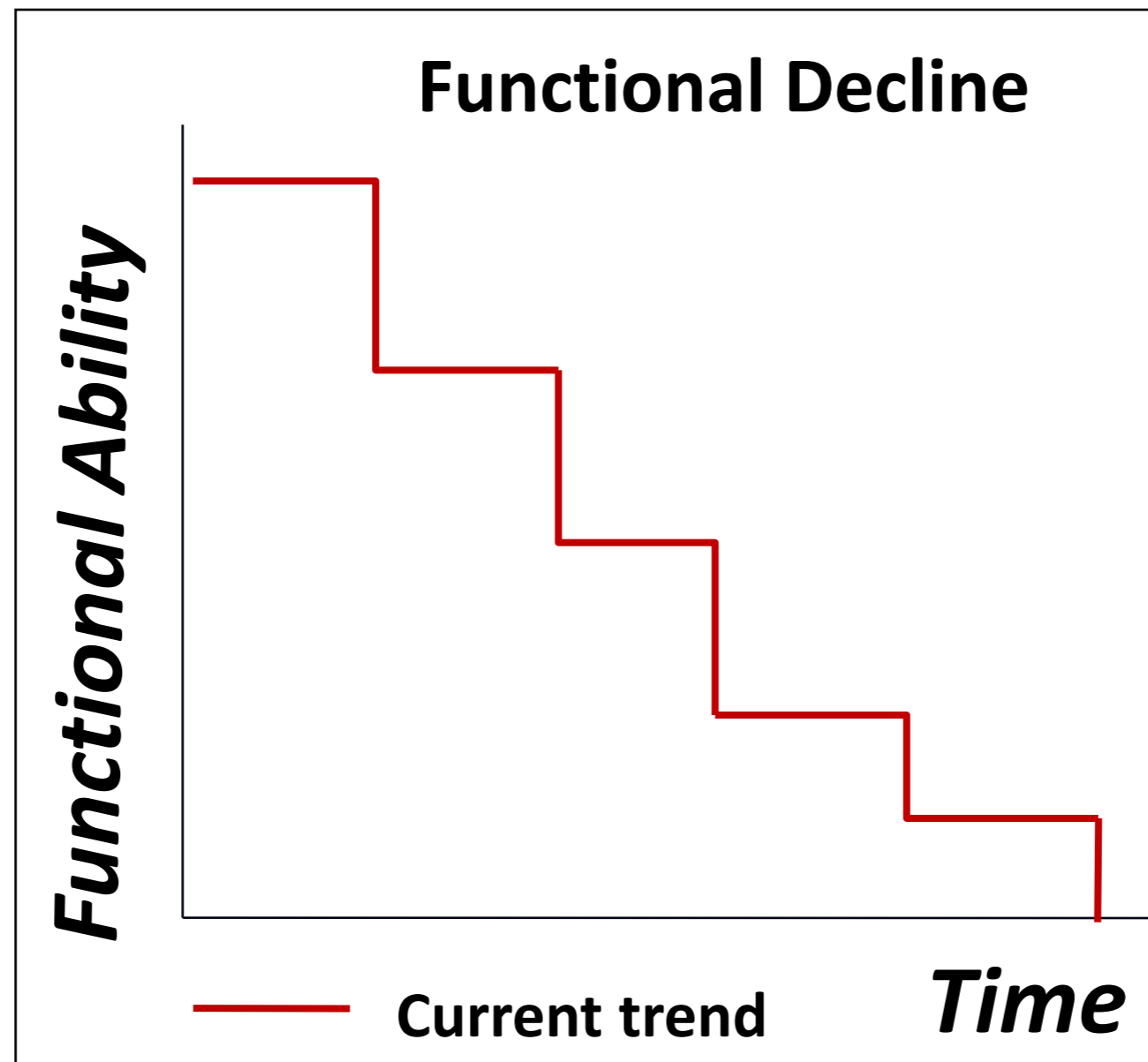
1601 S. Providence Road, Columbia, MO 65211

**Smart sensors can detect your
health change
before you sense it!**

The Problem:

When health problems go unrecognized, treatment is harder and patients cannot recover independence.

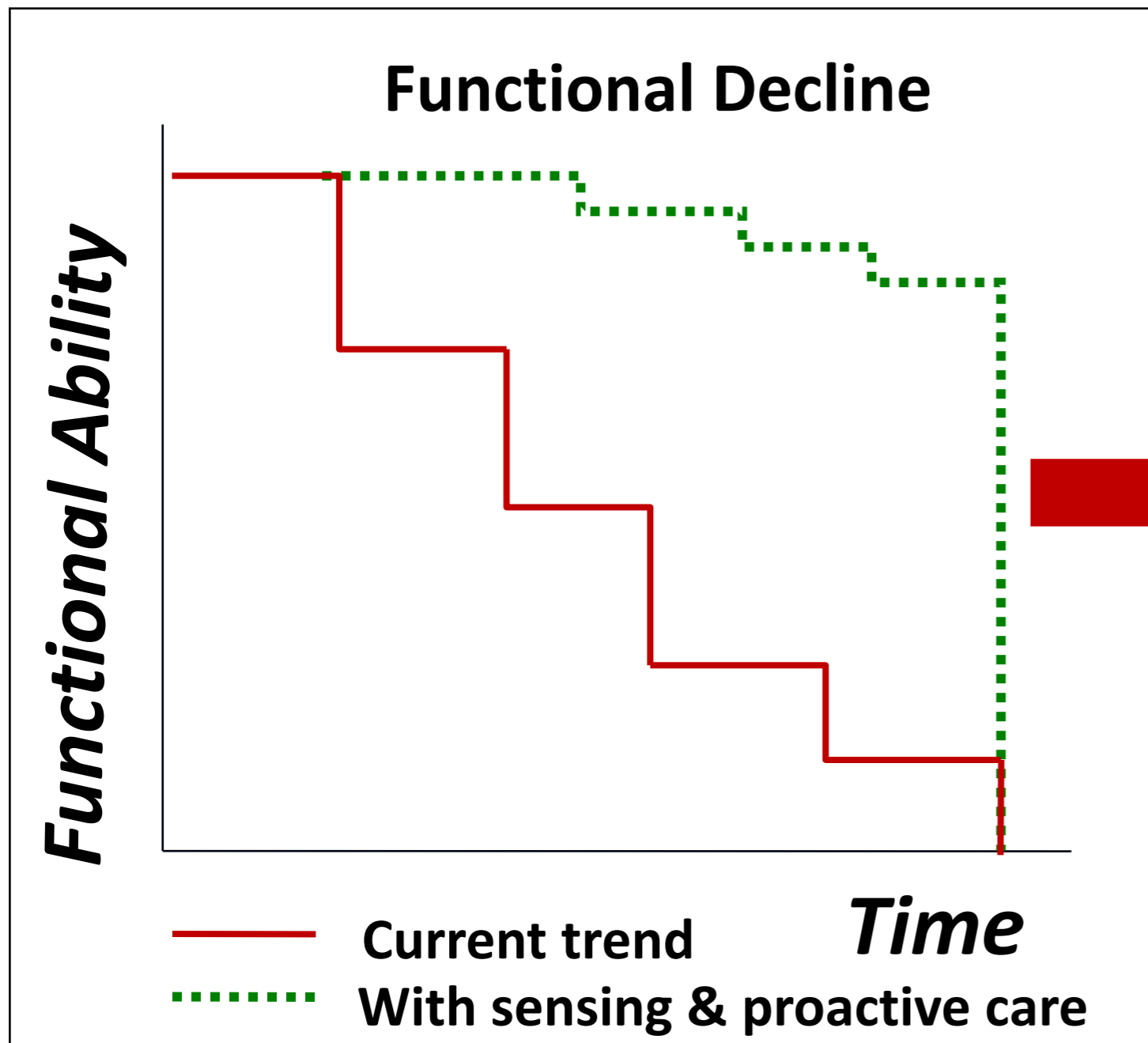
Typical Aging Trajectory of Decline



Our Solution:

Detect health changes early when intervention is possible and easier.

Change the trajectory



- **Better & cheaper healthcare**
- **More independence**
- **Improved QoL**



ProactiveSense

Sensors

Records
(EHR)

Care
Coordination

Family

Bed

Motion

Gait

Fall
detection

Training

RN
Consultation

Home
Health
Services

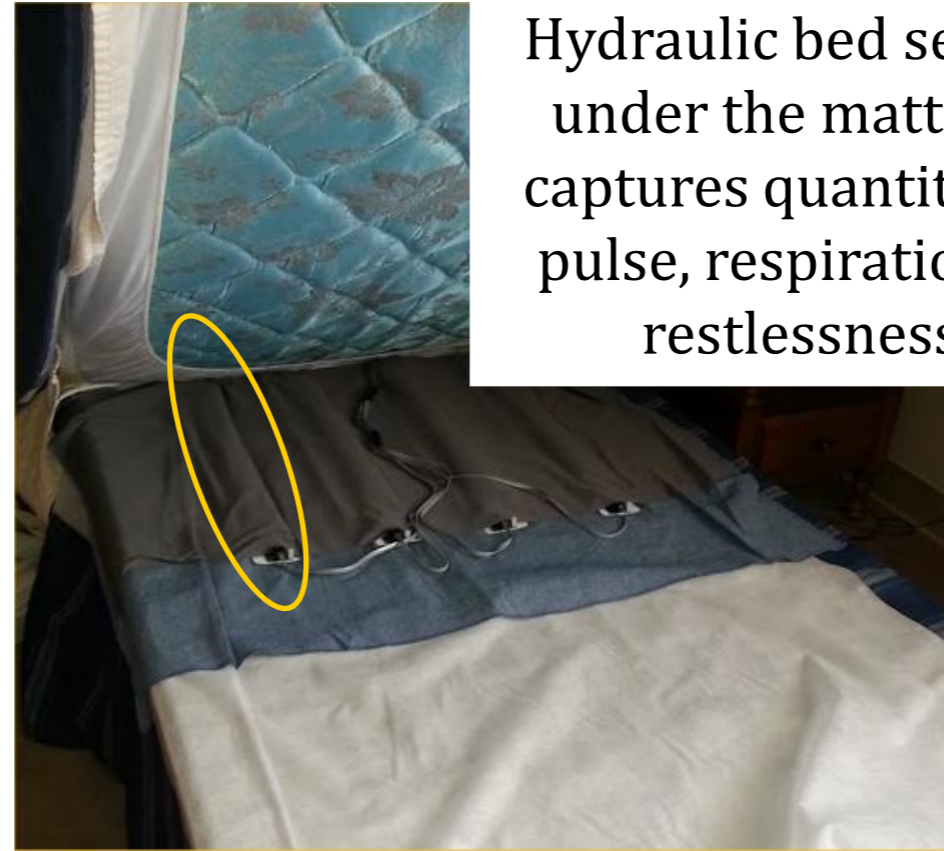
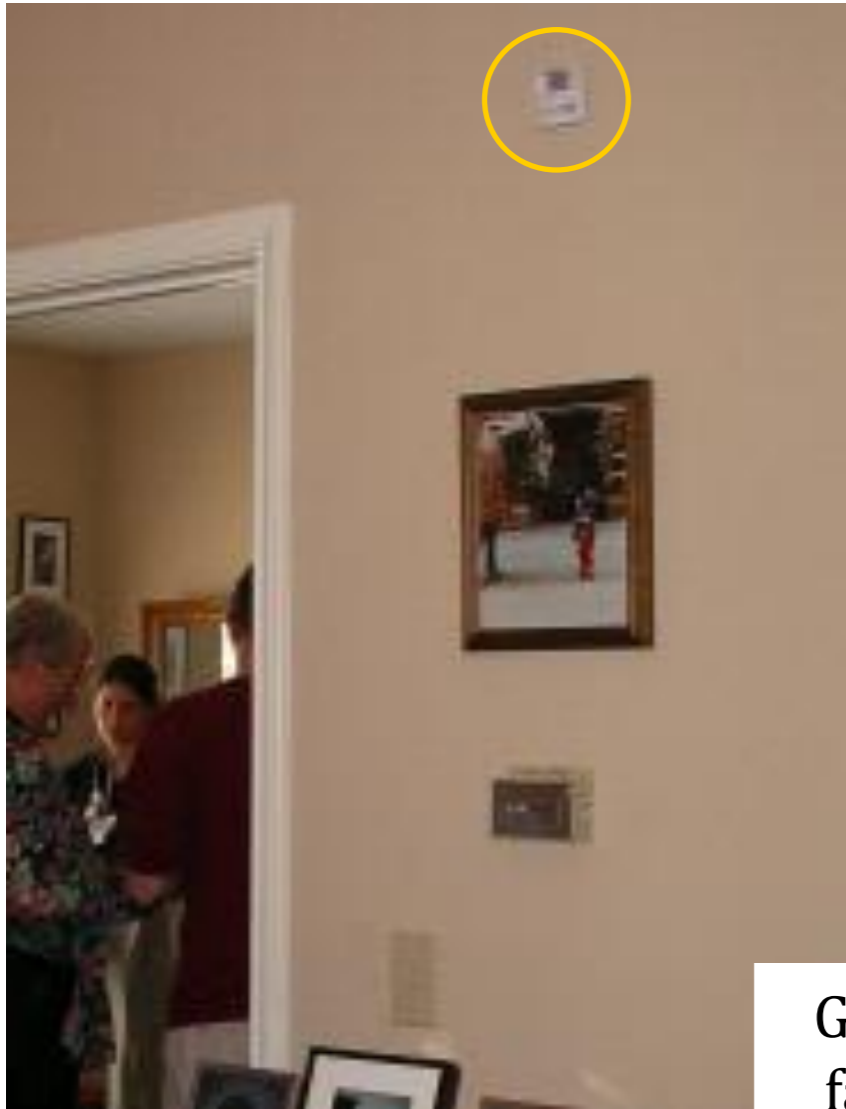
All non-wearable

Team

- George Chronis, PhD *CS & Eng.*
- Katy Musterman, RN, MBA, BSN *Nursing*
- Marilyn Rantz, PhD, RN, FAAN *Prof, Nursing*
- Marjorie Skubic, PhD *Prof, ECE*

- *Business advisors*
- *Advertising & sales*

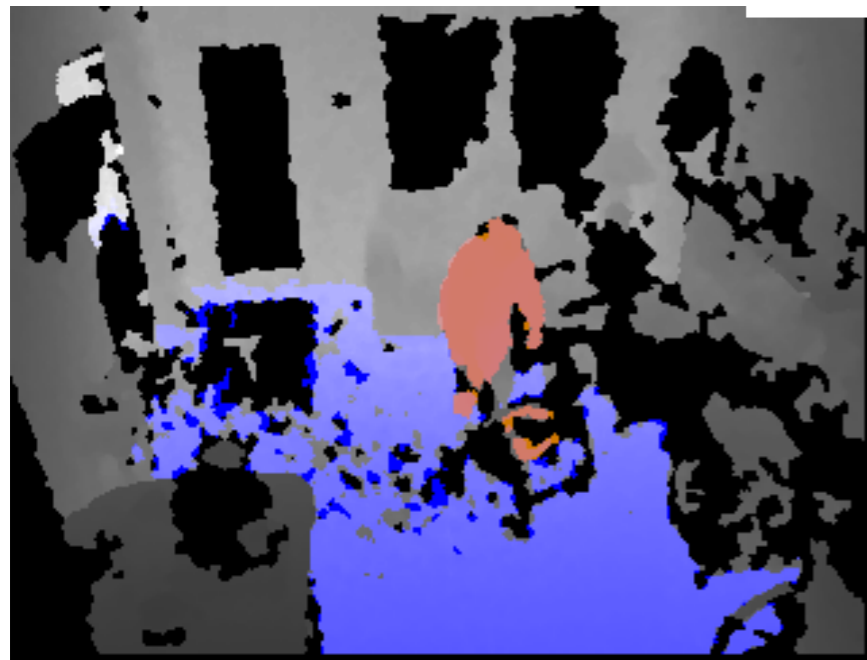
Sensors



Hydraulic bed sensor under the mattress captures quantitative pulse, respiration & restlessness



Gait parameters & falls are captured using depth images



Automated Health Alert System Tested in NIH Study

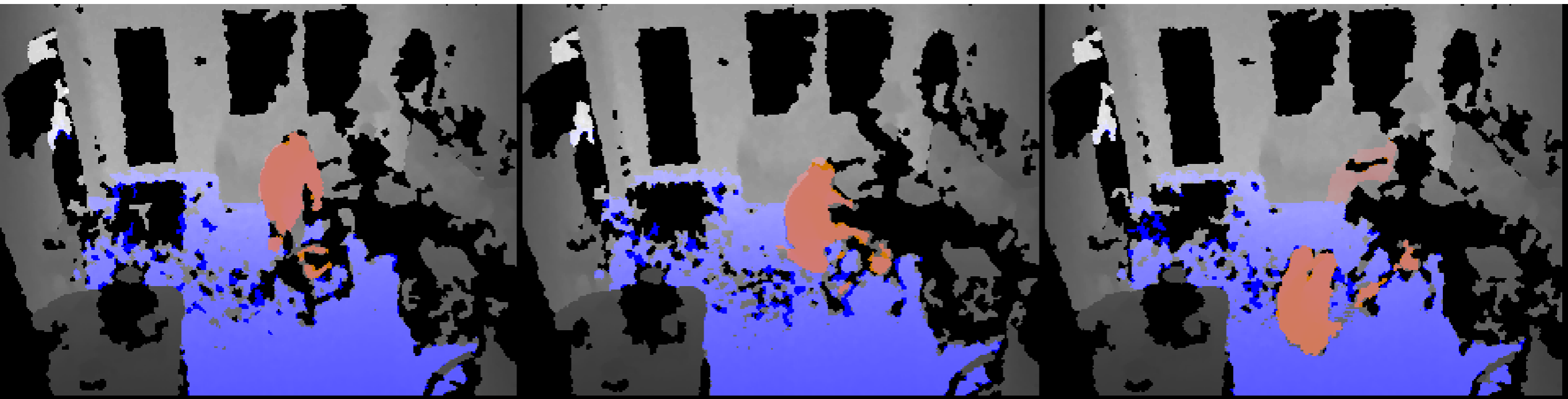
Statistically significant differences in health outcomes

Illnesses detected early include:

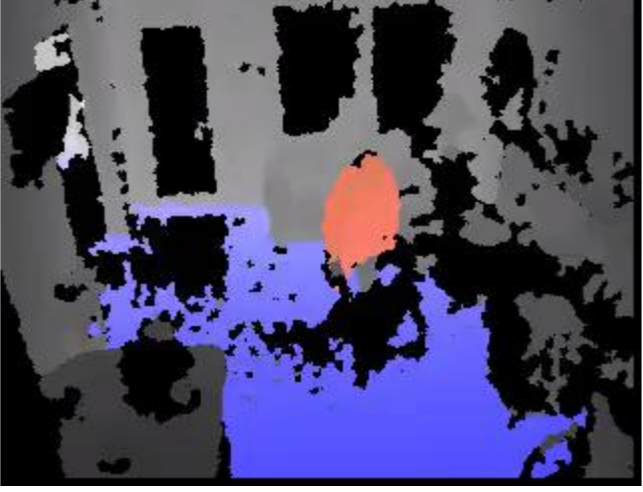
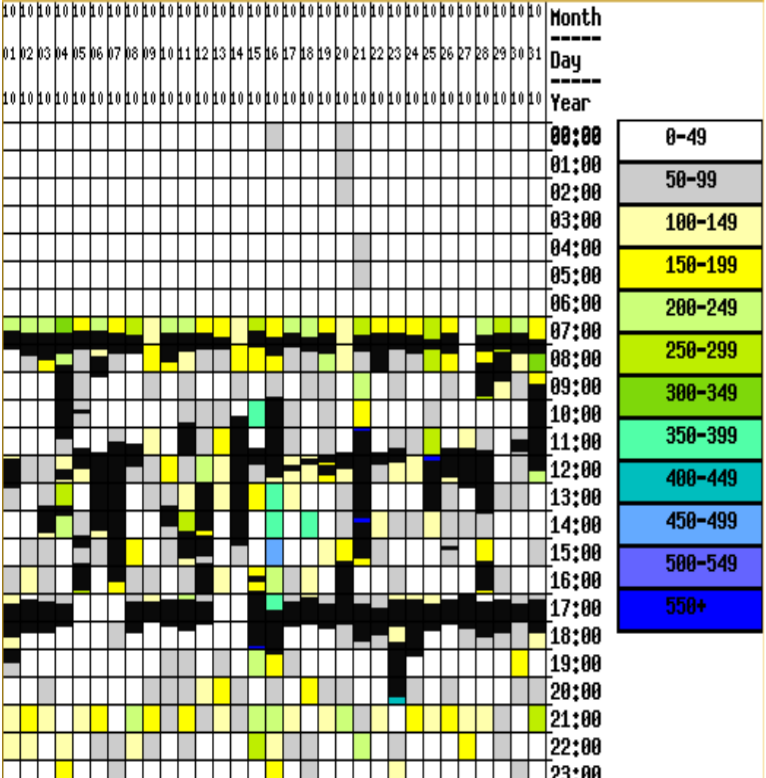
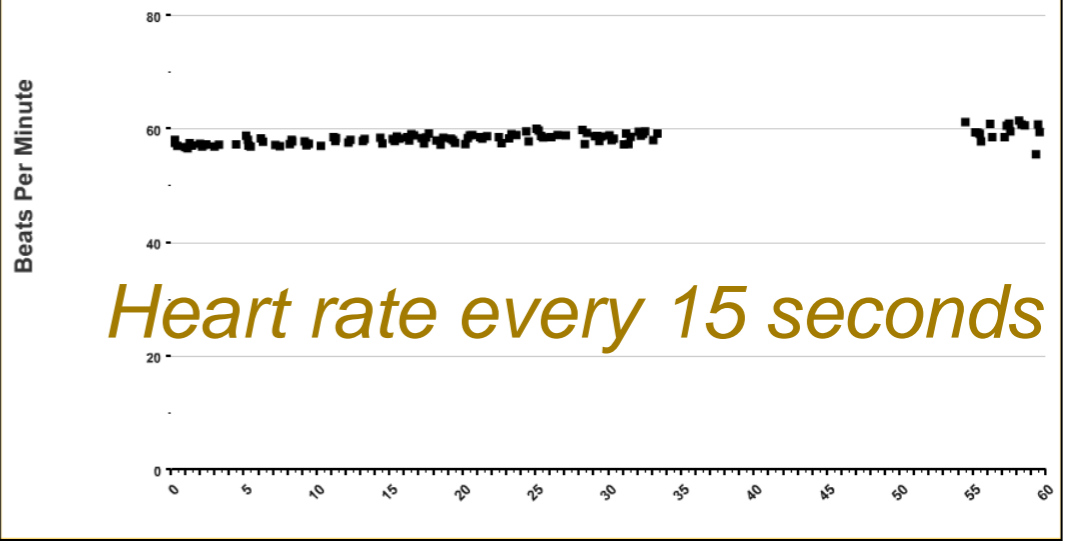
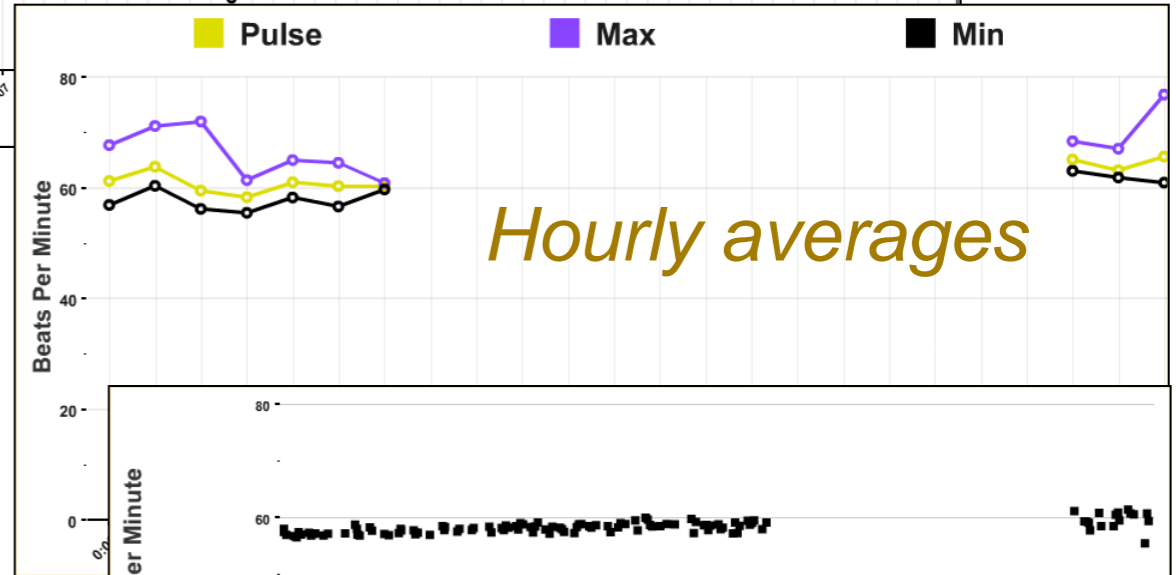
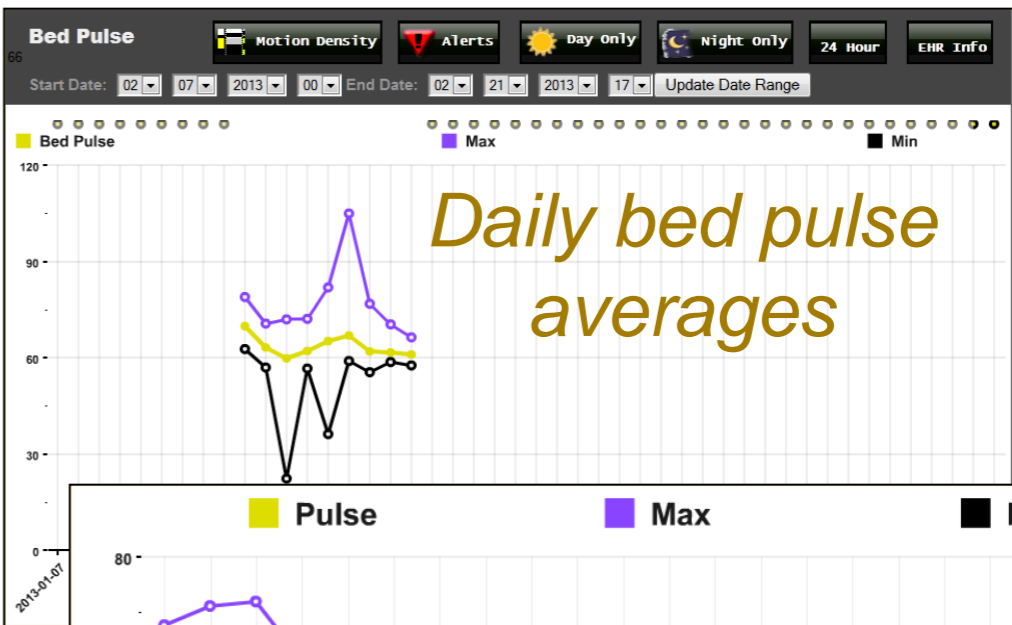
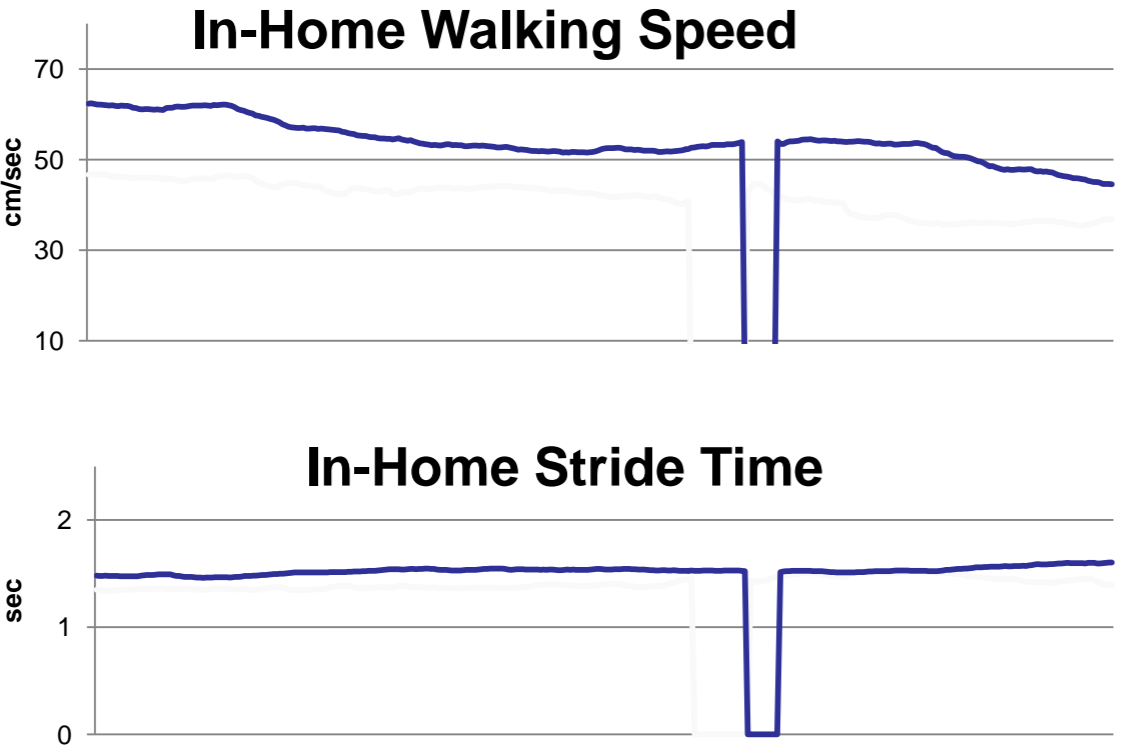
- urinary tract infections
- pneumonia & other upper respiratory infections
- congestive heart failure exacerbation
- pain post hospitalization
- delirium
- low blood sugar

Fall Detection Alerts

**Actual elderly resident fall captured
with non-wearable sensing**



Web interfaces for EHR & data visualizations streamline the clinical workflow



Institutional Market

- 2000 continuing care retirement communities
- 36,000 assisted living facilities, 2 million residents
- Elder housing: 2-3 million residents
- 4+ million customers in elder care communities

Home Market

- 40 million seniors in 2009 (12.8%)
- 72.5 million in 2030 (19%)
- 80% of those have one chronic condition
- 50% have two or more chronic conditions
- market for health related services for seniors is growing at 9.1% CAGR

How we will make money

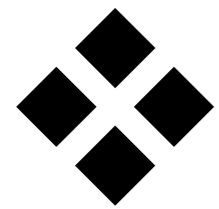
- installation fee
- equipment rental
- Sensors (software license and updates)
- Care Coordination (monitoring service)
- family member reporting option
- Onsite training or consultation
- Records (EHR): Annual fee



Low
monthly
fee



ProactiveSense



*Backed by over \$12M in
interdisciplinary research*