INTRODUCTION

- Circumstances of aging predispose many older adults to depression, loneliness, and social isolation.
- For seniors, poor socioemotional health is also associated with increased mortality, decrease in cognitive function, and poor quality of life.
- Due to the subtle onset of these changes, home sensing presents an opportunity to detect loneliness and social isolation before adverse health events occur.

SENSOR SYSTEM

- CREATE Health's 24/7 in-home ambient sensor system monitors older adults' activities of daily living (ADLs) including sleep, mobility, and hygiene.
- The system generates notifications when ADLs deviate significantly from baseline/typical routine levels.

OBJECTIVES

The goals of this analysis are to:
- Demonstrate how ambient sensor monitoring can be used to detect changes in older adults' mental health.
- Describe how older adults' activities of daily living are associated with mental health.

METHODS

Bi-Weekly Assessments (BWA)

- In addition to 24/7 ADL sensor data collection, participants spoke with a CREATE Health team member to assess health changes via the BWA twice a month.
- BWA is comprised of well validated research instruments.
- Our analysis focused on:
  - Physical health (i.e. changes in diagnoses, bodily pain)
  - Socioemotional health (i.e. levels of loneliness)
  - Measured by the UCLA Loneliness Scale
  - Measured by the Mental Health Inventory-5 (MHI-5)

Detecting Time Spent Outside of Home

- Passive sensors were installed in the homes of older adults in The Villages, Florida – a 55+ active lifestyle retirement community located in Central Florida (n=9).
- An algorithm developed by CREATE Health was applied to participants' sensor data from the 2 weeks prior to the BWA. The specific data for this analysis was collected using:
  - Contact sensors on exterior of doors monitored open/close events
  - Motion sensors arranged throughout home detected movement
  - Outside of home = no movement detected between exterior door closing event and exterior door re-opening event
  - Inside of home = movement detected without exterior door opening and closing event

RESULTS

- Time out of home is significantly different from baseline/typical routine levels.

DISCUSSION

- A positive correlation was found between the MHI-5 and time spent outside the home (p= 0.027, r= 0.625).
  - Time spent outside of the home has a positive effect on mental health (i.e. decreased anxiety, depression).
  - No correlation was found between self-reported physical health and time spent outside the home.
  - Limited variation in health changes over measured time period.
  - The Villages population has previously self-reported being healthier than older adults participating in other similar research studies.
  - Preliminary analysis found no relationship between time spent outside the home and loneliness.

FUTURE DIRECTIONS

- More research is needed to investigate applications of home sensing among community dwelling older adults.
- Future research collecting socioemotional health should include sensitive measures to detect changes when used with populations like The Villagers.

ACKNOWLEDGMENTS

This project was funded by Florida's High Tech Corridor. Additional thanks to The Villagers who participated in the study and The Villages for allowing us to conduct research in the community.