Use of Sensor System Data for Early Detection of Health Status Changes in Older Adult Residents of a Retirement Community

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Introduction: TigerPlace is an innovative retirement community that is designed to promote aging-in-place. Because early detection of health status changes leads to early intervention, unobtrusive sensor systems were deployed in apartments of resident-volunteers to establish baseline patterns in activities and to recognize variations from baseline patterns that may reflect to health status changes.

Purpose: To assess the correspondence between data collected by the unobtrusive sensor systems in apartments and the reality of residents' activities when data is reviewed in the context of known health-related events.

Research Questions:

- Does sensor data accurately capture resident activities? YES
- Does sensor data provide indications of health status changes? YES

Method:

- Small group Interviews with each resident-volunteer, a family member, and research team members
- Retrospective review of graphically displayed activity and bed restlessness sensor data .

Resident #1

- 82 year old man
- Living alone in one-bedroom apartment
- Initially independent in all IADLs and ADLs
- Major health event during 16 months of sensor system deployment = elective knee replacement surgery
- Independent in IADLs and ADLs at this time

•What reality did the sensors capture?

- Consistent pattern of activities preoperatively
- Recovery from knee replacement surgery
- Additional family presence in apartment in first 2 days after hospital discharge
- Unbroken sleep on first night back from hospital related to fatigue according to resident
- Broken sleep on subsequent night related to restlessness attributed to discomfort and/or fatigue from physical therapy
- Physical therapy bed exercises
- Restored pattern of personal care i.e., morning routine, shower, bedtime routine
- Time on bed in evening described as time spent removing compression stockings

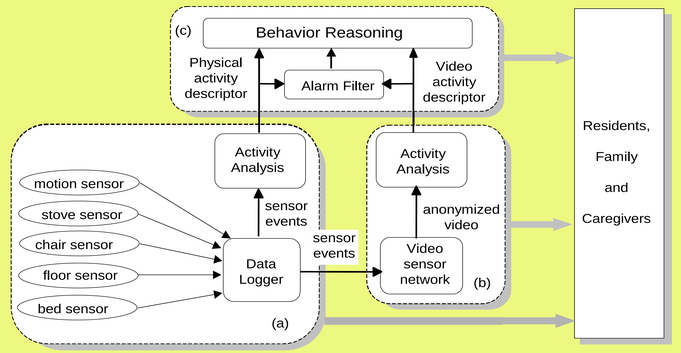
Resident #2

- 80 year old man
- Living alone in one-bedroom apartment
- Initially independent in IADLs and ADLs
- Deterioration of health status during 14 months of sensor system deployment = several hospitalizations for cardiovascular events and one hospitalization for CVA

•What reality did the sensors capture?

- Pattern of frequent trips to bathroom during the night
- Change of pattern = reduction in the frequency of trips to bathroom at night with use of Flomax
- Three nights of increased restlessness immediately prior to CVA
- After discharge from hospital post CVA stayed in bed longer in the morning
- Spending more time in bed during the day
- Activity in shower reflecting installation of shower chair by two workers
- Activities by personal care aides

Flow chart of sensor system with proposed video component and proposed analysis leading to notification of residents, family, and caregivers.



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