# How does hSITE Impact Older Adults?

#### McGill University 2011 06 17

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# OUTLINE

- Background
- Clinical Applications of Sensors
  - Bed Sensor: Nocturia
  - Bed Sensor: Mobility
  - Bed Sensor: Breathing
- Next steps







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# BACKGROUND

- Overall Goal
  - Establish close link between clinicians and their needs, and engineers and their solutions
- Context 2:
  - Homecare for Seniors and People with Disabilities
- Theme 2:
  - Context Aware Sensor Systems, Software and Applications







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# THE TEAM

- Dr. Rafik Goubran, Theme Lead
- Dr. Amaya Arcelus, now PhD graduate
- Robert Levesque, undergrad
- Megan Holtzman, PhD Candidate

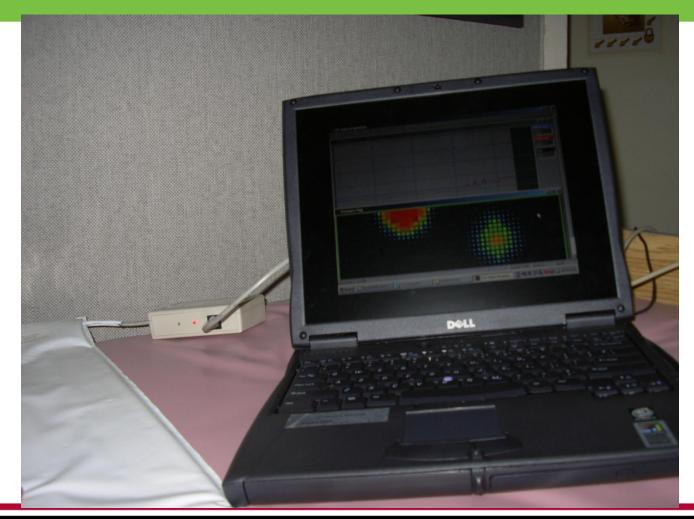






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#### **BACKGROUND: HARDWARE**



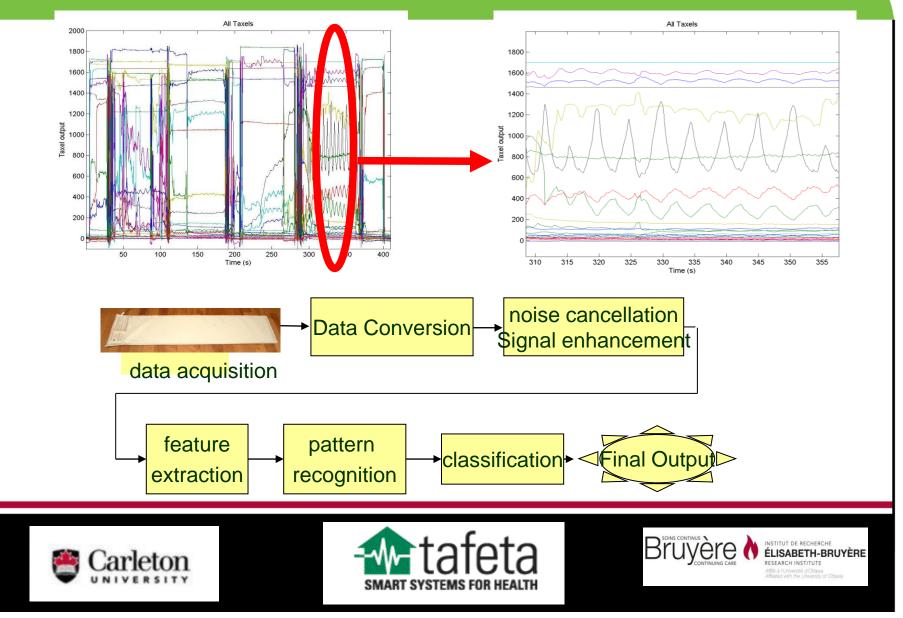






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### **BACKGROUND: SOFTWARE**



### WHAT IS IMPACT FOR HER?









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# NOCTURIA

- Question: Can a mat sensor under a mattress help monitor nocturia treatment in the community?
- Methods: 10 frail older day hospital patients with nocturia monitored over 8 weeks in their homes







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## **NOCTURIA: CHALLENGES**

- Definitions:
  - When is night when is sleep?
  - How long in bed = "gone to bed"
  - How long out of bed = "bathroom"

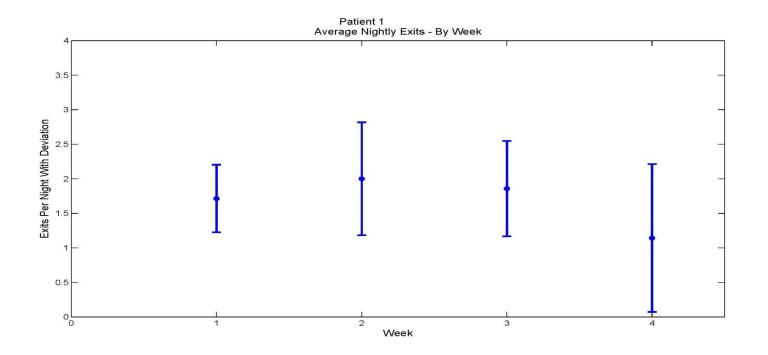






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### **NOCTURIA: RESULTS**









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## **NOCTURIA: ISSUES**

- What percentage of "get out of bed" represent bathroom break?
- What percentage of bathroom breaks are bladder related?







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# MOBILITY

- Question: Can mat data be used to identify changes in mobility – and if addressed, could this prevent falls?
- Step 1: compare transfers of clinical groups
- Step 2: compare transfers of single client over time







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## **MOBILITY: CHALLENGES**

- When does transfer start?
- Mat misses "stabilisation" phase

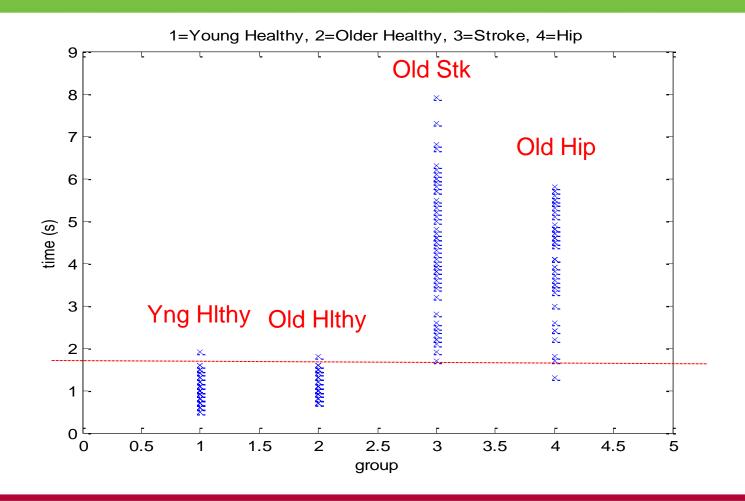






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### **MOBILITY: RESULTS I**



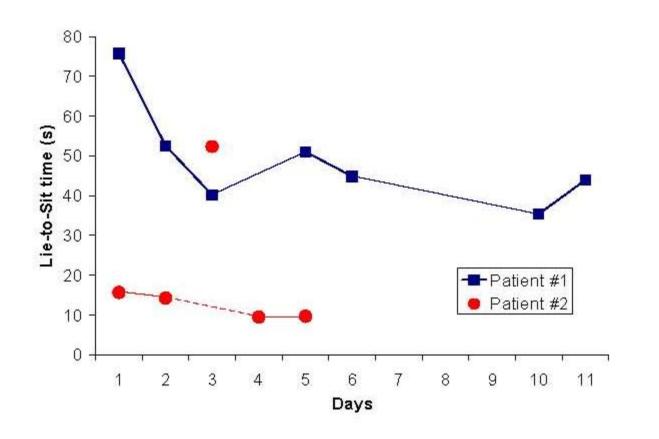






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#### **MOBILITY: RESULTS II**











## **MOBILITY: ISSUES**

- Transfer times in hospital: what is the role of nurse or therapist?
- Transfer times at home: what factors impact transfers from bed day to day, and when are the variations significant?







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## **BREATHING PATTERNS**

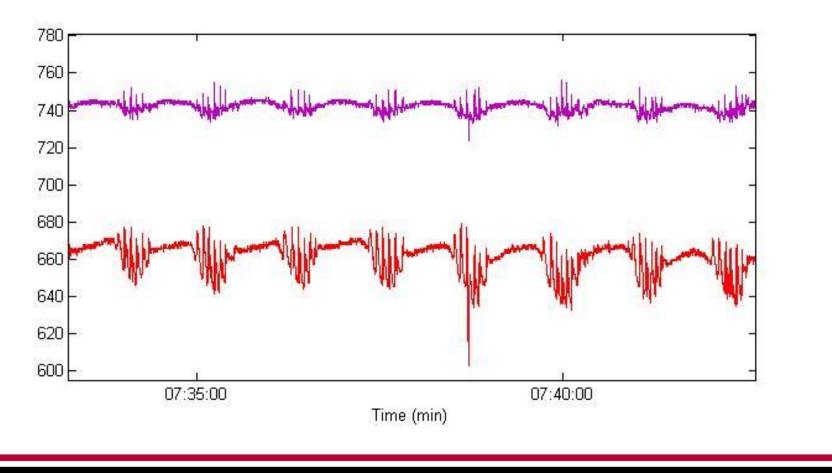
- Question: Can the mat algorithms create clinically identifiable breathing patterns - are there breathing or movement patterns that can predict the end of life?
- Methods: Monitor 15 patients on an inpatient palliative care unit for the duration of their stay







## **BREATHING: RESULTS I**

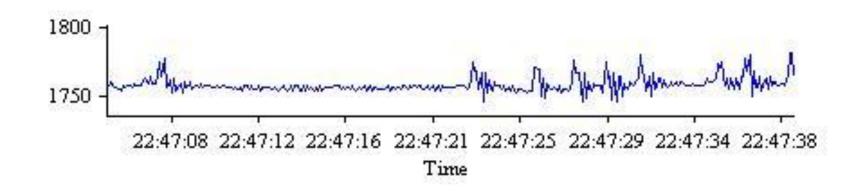








#### **BREATHING: RESULTS II**









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## **BREATHING: ISSUES**

- Apnea vs. change in position
- Impact of coughing vs. breathing
- End of life: sleeping vs. resting







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# **NEXT STEPS**

- Nocturia: additional sensors: Bathroom? Fridge? TV?
- Mobility: additional sensors to determine if getting help?
- Breathing: additional sensors to determine cough? Presence of care provider?

















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