Design & Evaluation of a **Mobile Phone-Based Heart Failure Telemonitoring System**

Emily Seto, Kevin Leonard, Joseph Cafazzo, Caterina Masino, Jan Barnsley, Heather Ross

hSITE Healthcare Support through Information Technology Enhancements
University Health Network
UNIVERSITY of TORONTO

Problem Statement

Poor outcomes from heart failure are largely the result of inadequate self-care and suboptimal clinical management. As many as **1/3 to 1/2** of heart failure hospitalizations are preventable.

Heart Failure affects:

- 500,000 Canadians
- 1 in 5 lifetime risk
- 33% 1 year mortality rate
- $400 million per year in acute in-patient costs

Project Design

Telemonitoring to improve self-care and clinical management

Development: User-Centered Design

Requirements Gathering
Interviewed 11 heart failure experts

Iterative Usability Testing
3 rounds with patients (N=8, 5 and 7)
1 round with clinicians (N=10)

Evaluation: Randomized Controlled Trial

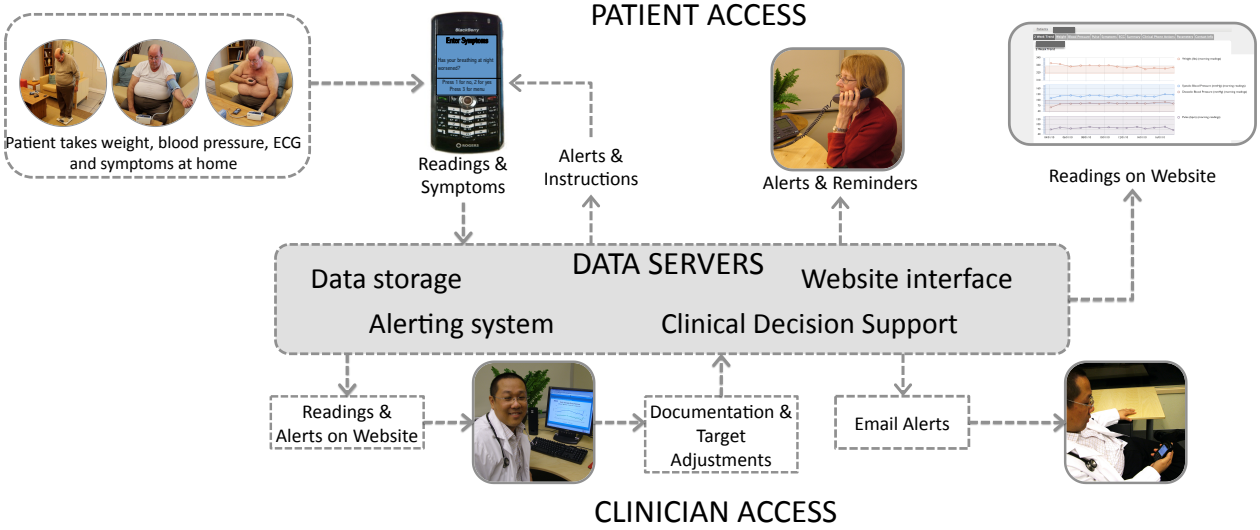
100 patients recruited and interviewed
Pre-trial questionnaire (N=94)

Intervention Group N=50
Trained on telemonitoring system → Used RPM system for 6 months → 22 interviewed (Member check N=6)

Control Group N=50
Standard care for 6 months

Post-trial questionnaire (N=84)
Clinician Interviews (N=5)

Solution



Implications

A highly automated telemonitoring system was developed with a user-centered design process. The use of the telemonitoring system significantly improved heart function (LVEF), heart failure prognosis (BNP), and quality of life through improved self-care and clinical management.

Trial Results

Telemonitoring Group

Brain Natriuretic Peptide (BNP)	↓	150 pg/mL (p=.02)
Left Ventricular Ejection Fraction (LVEF)	↑	7.4 % (p=.005)
Quality of Life (MLFHQ)	↓	9 points (p=.02)
Self-Care (SCHFI)	↑	7 points (p=.05)

No Change in Control Group