

# A Virtual Ward to prevent readmissions after hospital discharge

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CHSRF Picking up the Pace

November 1, 2010



# Outline

- **Background**
- What is a Virtual Ward?
- How is our Virtual Ward being evaluated?
- Early lessons

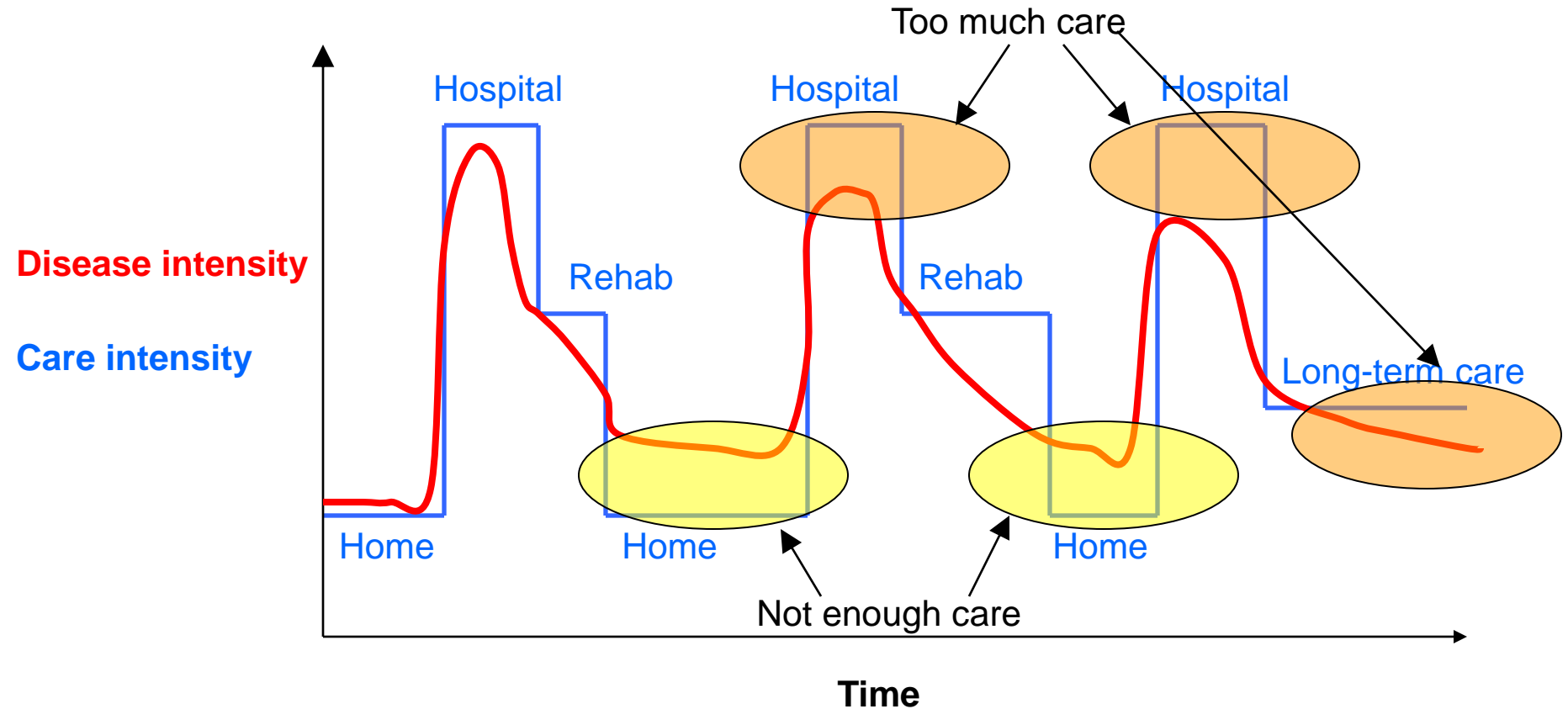


# Why focus on care after discharge?

- Most “acute illnesses” are now actually exacerbations of chronic disease, so patients do not leave hospital in a state of perfect health
- Hospital admissions have become shorter and shorter, so patients are sicker at discharge
- Large “voltage drop” in the intensity of care at the time of discharge



# Why focus on care after discharge?



# Why focus on care after discharge?

- Lots of “low-hanging fruit”
  - Communication could be strengthened
  - Collaboration could be improved
  - Medications could be reconciled
  - Patients could be monitored more closely
  - Social supports could be increased
  - Patients could be educated about how to manage their health problems
  - Very few places to seek urgent (but not emergent) post-discharge care → patients end up back in ER



# Post-discharge health outcomes

The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

## Rehospitalizations among Patients in the Medicare Fee-for-Service Program

Stephen F. Jencks, M.D., M.P.H., Mark V. Williams, M.D.,  
and Eric A. Coleman, M.D., M.P.H.

N Engl J Med 2009;360:1418-28.



# Post-discharge health outcomes

- 21.1% of US Medicare patients with a medical hospitalization readmitted within 30 days of discharge
- Total cost to US Medicare of 30 day readmissions estimated to be \$17.4 billion (in 2004)

Jencks et al, NEJM 2009; 360: 1418-28



# Post-discharge health outcomes

- Three key points:
  - In 50.2% of cases with readmission within 30 days, no outpatient physician visit between discharge and readmission
  - No single disease accounts for more than 8% of readmissions
  - Even in heart failure, there are more readmissions for conditions *other than heart failure* than there are for heart failure

Jencks et al, NEJM 2009; 360: 1418-28





# Previously studied post-discharge interventions

- Fifteen high-quality systematic reviews summarized in one systematic meta-review
  - “most review authors reached no firm conclusions that the discharge interventions they studied were effective”
  - “there is little evidence that discharge interventions have an impact on health care use after discharge, or on costs, except that educational interventions may reduce readmissions in heart failure patients.”

Mistiaen et al, BMC Health Services Research 2007, 7:47



# And recently...

## Effects of Care Coordination on Hospitalization, Quality of Care, and Health Care Expenditures Among Medicare Beneficiaries

15 Randomized Trials

- Patient population: US Medicare patients with chronic disease, most of whom had a recent hospitalization
- Intervention: nurses provided patient education and monitoring (mostly via telephone)
- Outcomes: 13 of 15 programs showed no differences in hospitalizations

Peikes et al, JAMA 2009, 301: 603-618



# But...

- Some post-discharge interventions have succeeded



# Summary of transitions literature

- Post-discharge health outcomes probably can be improved
- Best interventions combine pre- and post-discharge care and include in-person contact
- May be able to reduce readmission rate well below current rates, since no interventions have been comprehensive (e.g., no additional physician involvement after discharge)
- As in other areas of medicine, impact is likely to be greatest if we focus on those at highest risk



# A tool to estimate the risk of readmission

- The LACE index
  - Clinical prediction rule derived and internally validated using data collected for the OAtH study (4812 patients at 11 hospitals)
  - 48 potential predictors considered, including functional status (Walter index) and support at home (lives alone vs. not)
  - Externally validated using data from 1 000 000 patient records from CIHI-DAD

L = length of stay

A = acuity of admission

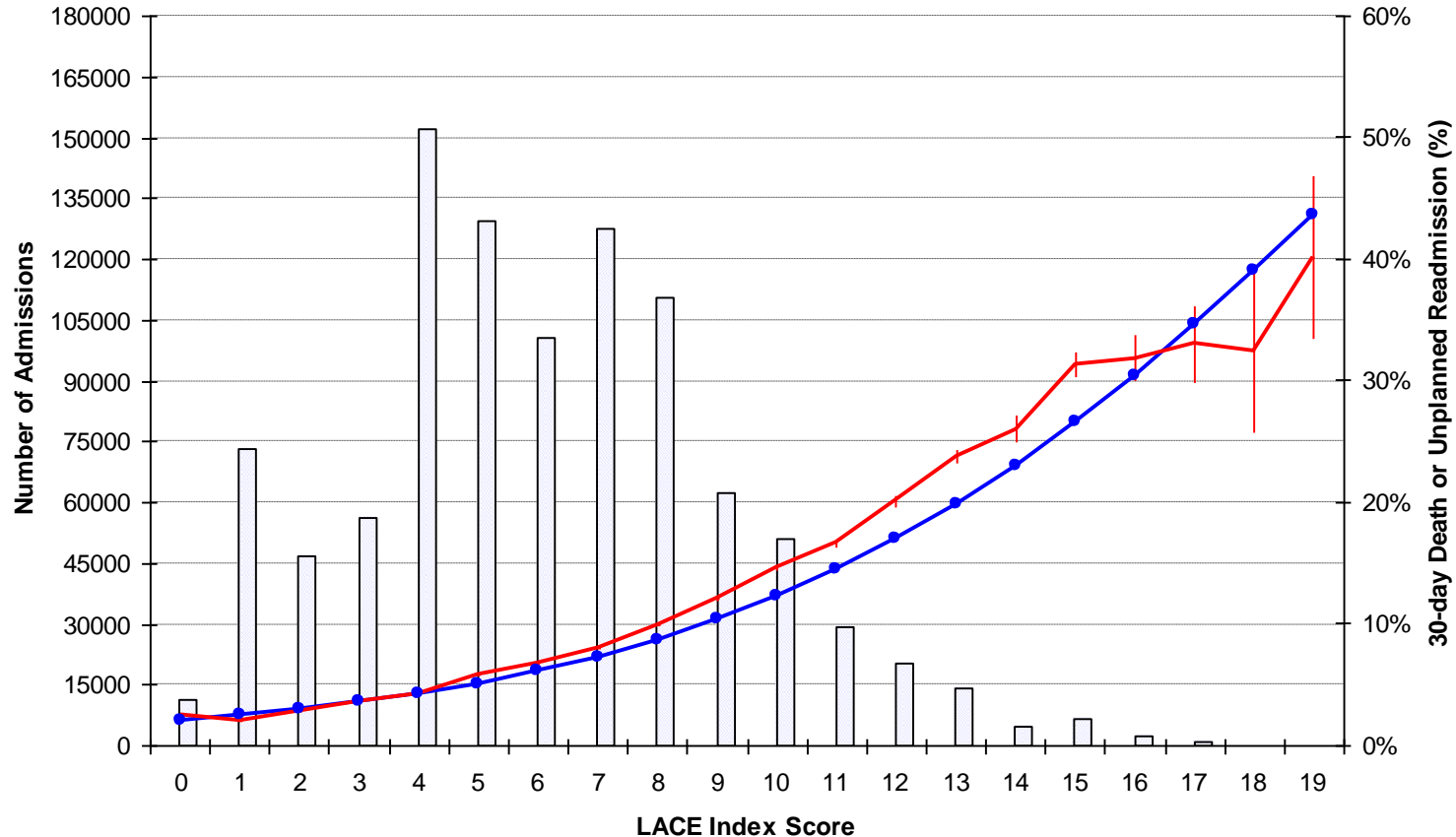
C = Charlson comorbidity index

E = number of ER visits in last 6 months

Van Walraven et al, CMAJ 2010



# Prediction of readmission using the LACE index



Van Walraven et al, CMAJ 2010



# Post-discharge health outcomes\*

	LACE < 10 (N = 17 191)	LACE ≥ 10 (N = 8 854)
Readmission or death within 30 days of discharge	1705 (9.9%)	1905 (21.5%)
Readmission or death within 90 days of discharge	2861 (16.6%)	<b>3181 (35.9%)</b>

\*Medical admissions, 2007, TC LHIN



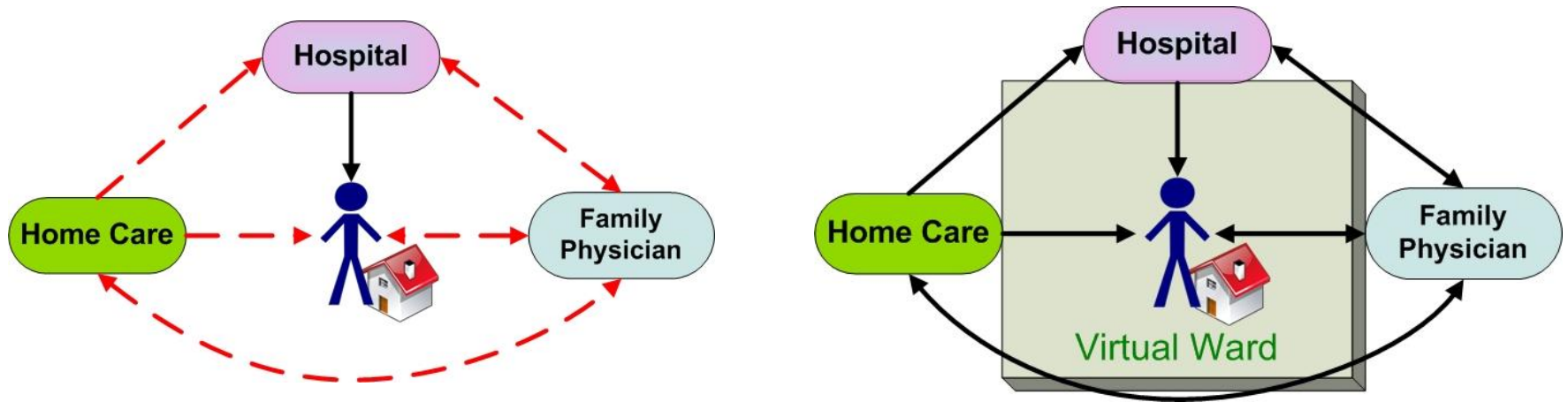
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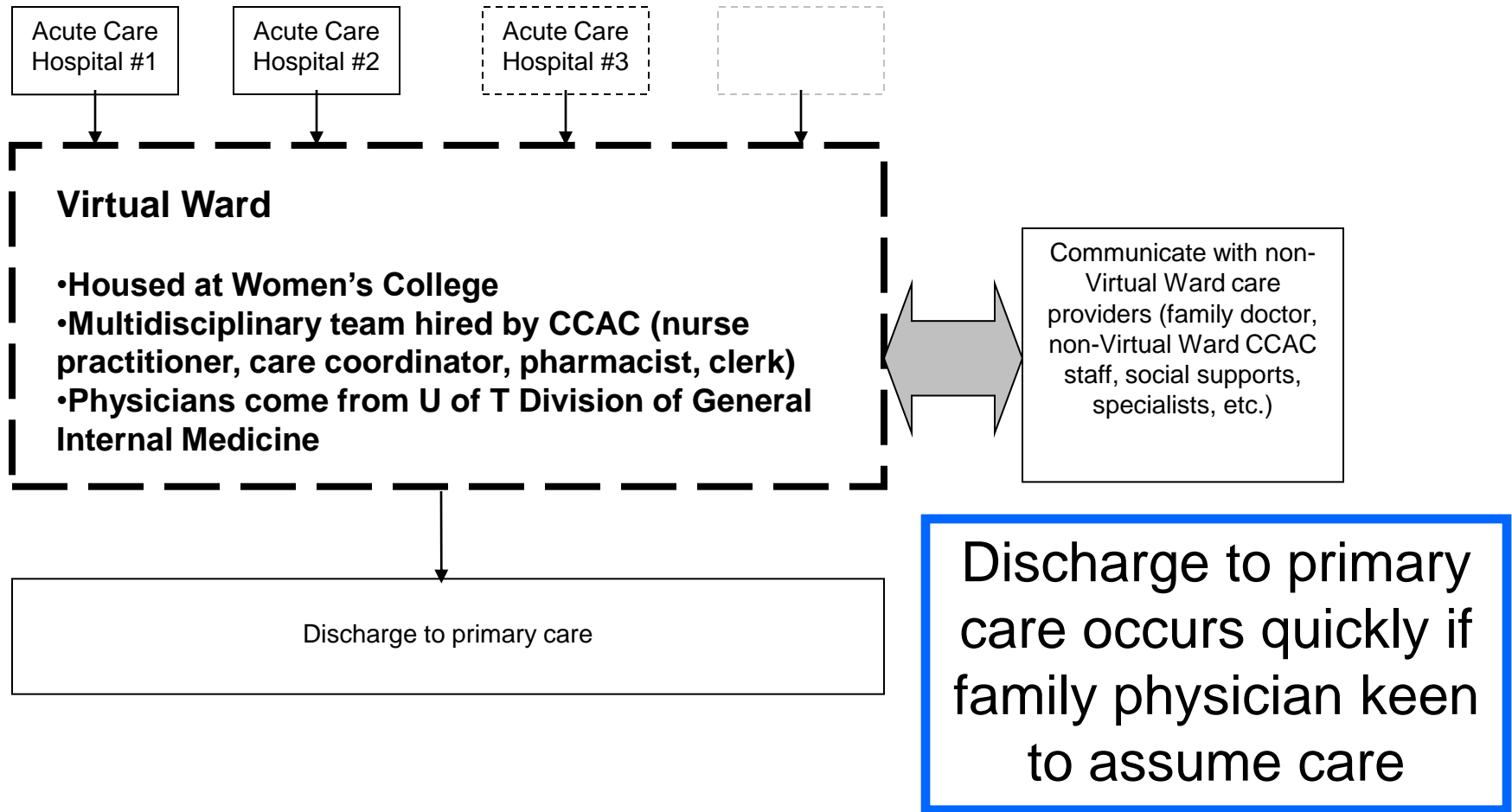
# Our Virtual Ward model



- Method of providing care to people in the community who are most vulnerable to repeated unplanned hospital admissions
- “Ward” - Case management approach to their care from a multidisciplinary team
- “Virtual” - Patients remain at home
  - Nothing high-tech about it



# Our Virtual Ward model







# The situation

- **63 year old woman, living alone at home, discharged from hospital after being treated for a pulmonary embolism as well as COPD and CHF exacerbations**
- **Seen at home on day after discharge**
  - **Very short of breath**
  - **Poor understanding of medications**
  - **Not using community support services**
  - **Insecure plan for medical follow up**





# What the Virtual Ward team did

- **Stabilized the patient**
  - Brought patient to Women's College Hospital (for 3-4 hours) to assess need for home oxygen
  - Patient met criteria → home oxygen arranged
- **Refined the diagnosis**
  - Arranged pulmonary function tests which ruled out COPD. This allowed intensive focus on CHF and discontinuation of puffers



# What the Virtual Ward team did

- **Provided in-home support**
  - Medication counseling (warfarin, puffers, adherence aid)
  - Arranged in-home dietary counseling for CHF
  - Increased in-home nursing until patient more stable
- **Established plan for post-Virtual Ward care**
  - Spoke with family doctor several times to ensure good handover, especially regarding INR monitoring
  - Expedited cardiac assessment at St. Michael's Hospital to refine treatment plan for CHF



# Outcome

- **No readmission**
- **Satisfied patient**
  - “I don’t know what would have happened [without the Virtual Ward] ...would have gone back to hospital”
  - “I used to be a volunteer gardener [2003-2007]. This month, I’ll go back to my plot.”





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# RCT - population

- **Inclusion criteria**
  - High-risk patients ( $LACE \geq 10$ ) discharged from St. Michael's and Toronto General Hospital general internal medicine wards
- **Exclusion criteria**
  - Age < 18
  - Lives outside TC LHIN catchment area
  - Discharged to rehab hospital or complex continuing care
  - Neither patient nor any available surrogate able to speak English



# RCT - intervention

- **Virtual Ward**
  - **Patient admitted to Virtual Ward on day of hospital discharge**
  - **Multidisciplinary team providing care**
    - **Physician coverage 24/7, MD home visits**
    - **Active case management**
    - **Focus on**
      - **Keeping patient out of hospital**
      - **Developing a post Virtual Ward care plan**
    - **Collaboration with family doctor and other care providers**



# RCT - control

- **Usual care**
  - **Discharge planning +/- home care**
  - **Communication with family doctor?**
  - **Medication reconciliation?**
  - **Arguably a passive approach to responding to urgent medical/social problems**



# RCT design - outcome

- **Primary outcome**
  - Readmission or death within 30 days
- **Secondary outcomes**
  - Each of the following at 30 days, 90 days, 6 months and 1 year
    - Readmission or death
    - Readmission
    - Death
    - Long-term care admission
    - Emergency department utilization



# RCT design – sample size

- **Baseline readmission risk conservatively estimated to be 15%**
- **We hypothesize that Virtual Ward will reduce readmission by 33% (i.e., to 10%)**
- **Assume 10% lost to follow up**
- **Requires 1510 patients (755 in each arm)**
  - **Note that this is 2x as large the Coleman Care Transitions Intervention trial and the Jack trial and 4x as large as the Naylor trial**



# RCT design – practicalities

- **Data management provided by Applied Health Research Centre in the Li Ka Shing Knowledge Institute of St. Michael's Hospital**
- **Funding through U of T Department of Medicine, MOHLTC, AFP innovation fund, CIHR**
  - total cost of RCT ~ \$500K
- **Rate-limiting step is Virtual Ward capacity**
  - 2 patients per day into Virtual Ward means we will meet target in approximately 18 months
- **Data Safety Monitoring Board**
  - Chaired by David Sackett



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# Early lessons from the Virtual Ward

- **Major problems in the current system include**
  - **Lack of access to family physicians after discharge, particularly for home-bound patients (very few doctors do home visits)**
  - **Lack of integration between primary care, acute care, home care, pharmacy and long-term care**
  - **Difficulty transferring information in a timely manner between all sectors**
  - **Lack of urgent specialty support for family physicians**
- **Studying these issues is not easy, but if you have ideas please let me know!**



# Acknowledgements

## Founding partners:

**St. Michael's**

Inspired Care.  
Inspiring Science.



University Health Network

Toronto General Hospital Toronto Western Hospital Princess Margaret Hospital

## Funding provided by:



Canadian Institutes  
of Health Research

Instituts de recherche  
en santé du Canada



Medicine  
UNIVERSITY OF TORONTO

11-04-2010

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- **Some thoughts about evaluations of complex health services interventions**



# Evaluating health service interventions



## **Developing and evaluating complex interventions:** new guidance



# Evaluating health service interventions

- **RCTs are the gold standard**
  - “Randomization ... is the most robust method of preventing the selection bias that occurs whenever those who receive the intervention differ systematically from those who do not, in ways likely to affect outcomes.”



# Evaluating health service interventions

- **However...**
  - **RCTs cost money (although not as much as one might think) and require expertise and effort**
  - **RCTs introduce their own potential problems**
    - Hawthorne effect
    - Research ethics / informed consent
    - External validity is reduced (at least for individual-level RCTs)
  - **RCTs are not a substitute for a process evaluation**
    - Why did the intervention succeed or fail?
  - **Adequately powered RCTs require lots of patients and take a long time and energy**
  - **Policy makers want quick results and interim reports**



# Two concluding remarks

- **Achievement of high quality, cost-effective health care will require relentless focus on (and acceptance of) high-quality evaluations from funders, researchers, physicians, policymakers, patients and the public**
- **RCTs are expensive, but the cost of not doing RCTs is even greater**

