The Economical Traveller's Guide to Exploring the Future

..the Value of Partnered Research

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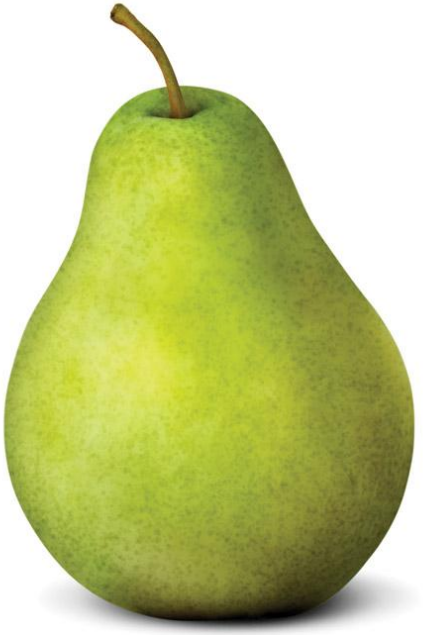
TELUS health solutions

Leading the change in Canadian healthcare

Through innovative, proven information and communication technology.

- Years of expertise in healthcare solutions
- Backed by over 1500 members
- Power hospital to home solutions
- Invested over $100 million since 2008
- #1 health IT Company in Canada for 2 years



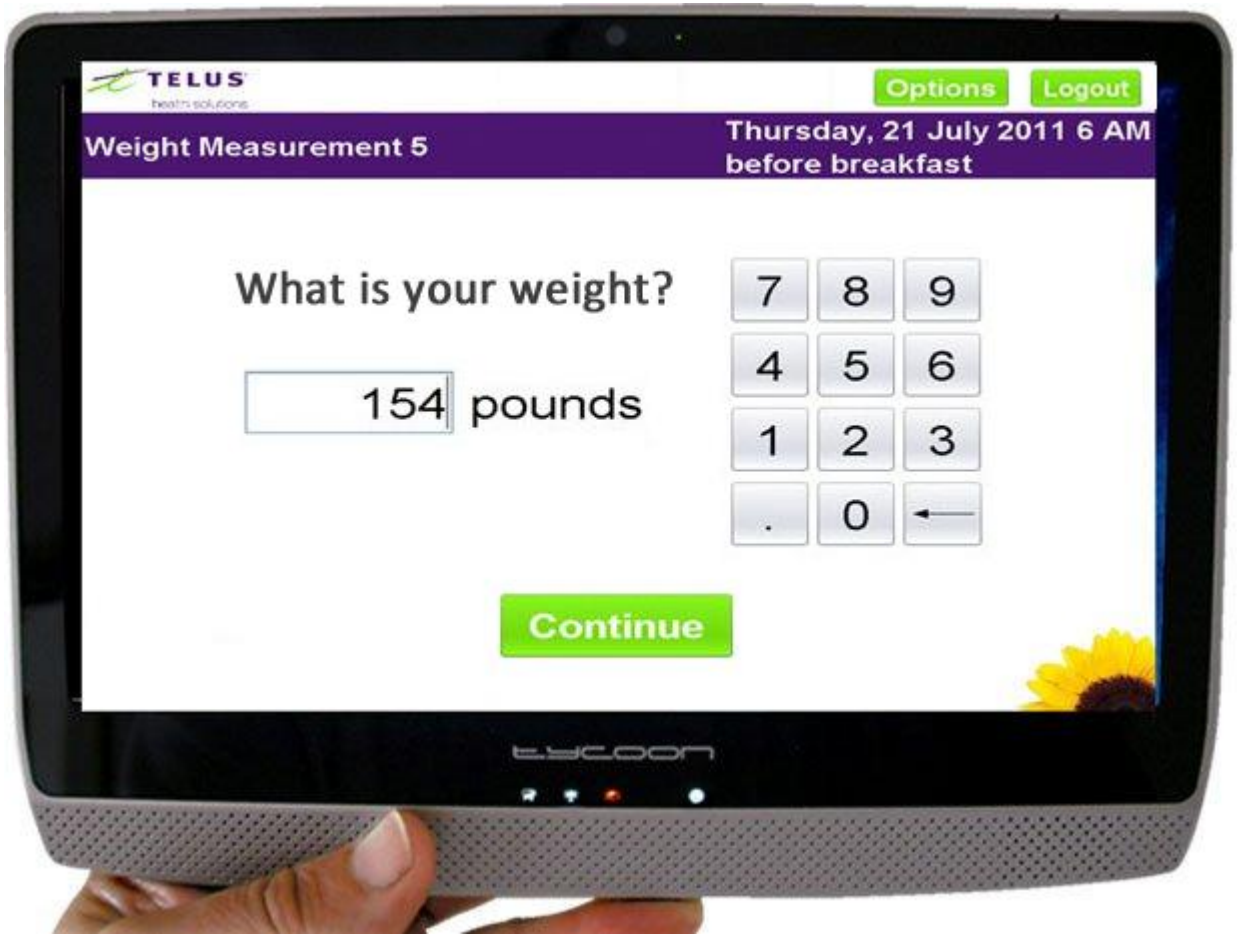
Moving health from treatment of symptoms to prevention of illness

TELUS Health Solutions

Solutions for...

- Pharmacists
- Physicians
- Allied Healthcare Providers
- Health Regions and Hospitals
- Insurers & Employers
- Workers Compensation Boards
- Consumers
- Pharmaceuticals

Remote Patient Monitoring



Impact of TELUS technology

- 33% of the population has at least one chronic disease
- Patients with multiple chronic diseases are
  - The greatest users of hospitals and clinicians
  - 5% of population consuming 80% of the health care budget.
- Applications such as remote patient monitoring can
  - Reduce the cost per day to the healthcare system per patient
  - From $4,285 for acute care to
  - To between $30 and $50 for self care
  - Increase quality of life for patients

Significantly reducing health care costs

The Health Care Technology Challenge

- High tech is highly competitive
- Health care in Canada is highly cost conscious
- How does a high tech heath care company:
  - maintain its competitive edge
  - invest in applied research
  - while delivering quality products
  - that effectively support clinicians and
  - enable better patient outcomes
  - at record speed

The Value of Partnered Research

- HSITE enables:
  - Canadian companies to connect
  - Into a consortium of university and industry players
  - Focused on advancing health care systems
  - With a common goal

- HSITE partners can:
  - More effectively leverage government research funding
  - Complete cost effective applied research
  - Accomplish research with significantly less time and resources

The TELUS health journey
within HSITE
to exploring the future.

TELUS Partnered Research in HSITE

- Communications
  - Communications patterns
  - Collaboration design solutions
  - Responsive design
- Improvements to order tracking
- Wearable devices for home health monitoring

Communications: **Challenges on transferring patients**

Masters thesis:

Patient-Centered Perspectives of Communication and Handover between the Emergency Department and General Internal Medicine

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Institute of Biomaterials and Biomedical Engineering

University of Toronto

Dr Joe Cafazzo

University Health Network Human Factors

The Problem

- Communication between clinicians is a critical aspect of healthcare
  - Nurses and doctors spend up to 80% of their time communicating *(Coiera et al, 2002)*
  - The clinical environment is highly interruptive, with 10-11 interruptions per hour in emergency departments *(Coiera et al, 2002)*
  - 7.5% of hospitals admissions are associated with adverse events, of which 36.9% are preventable *(Baker et al in 2004)*
  - Communication cited as the main cause of sentinel events occurring between 1995 and 2006 *(JCAHO, 2008) (Coiera, 2000)*

The Problem

- Handovers across shifts are particularly complex and critical – especially handovers from ED to inpatient

- Impact and opportunity of increasing adoption of digital and wireless technology in hospitals

The Opportunity

- Improve communication and information access.
- Start from first principles, by mapping out patterns of communication
- Investigate communication around highest risk area of patient transfer from the ED to GIM.

The End Goal

- What information from EHRs is needed, available and missing to facilitate communication between clinicians, particularly during the critical time of handovers?
- What subset of information would be best provided on a mobile device?
- Does the mode of communication influence the type of information exchanged?

How

- Ethnography
- Three large teaching hospitals in Toronto:
  - Toronto General Hospital (TGH),
  - Mount Sinai Hospital (MSH), and
  - Sunnybrook Health Sciences Centre (SHSC)
- Observers shadowed during patient transfers from ED to GIM
- For periods from 30 minutes to 5 hours
- Brief informal interviews
- Use & effectiveness of communication aids
- How context influences communication

The Findings

- High number of specialized communication tools and software
  - a steep learning curve, and work duplication.
- General lack of awareness of patient status
  - i.e. location, pending tests and consults, etc
  - Limited success with systems designed to mitigate due reliance on manual updates & poor UIs
- Lines of communication between clinicians are often poor
  - Particularly between mobile, transient physicians and stationary nurses.
  - Finding the contact information for the right clinicians at the right time is difficult.
- Despite their many documented drawbacks and inefficiencies, numeric pagers continue to be widely used at all three sites.
- Paper chart is inefficient.
- Mixed EHR and paper ordering causes confusion.
- Current software tools have unintuitive user interfaces.
- Interruptions and distractions are frequent

Communications: **Across a Disparate Care Team**

Phase 2- Design solutions for Clinical collaboration

Phase 3 - Responsive Design

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"The biggest information repository
in health care
lies in the people working in it,
and
the biggest information system
is the web of conversations
that link the actions of these individuals."

Coiera E. When Conversation Is Better Than Computation. Journal of the American Medical Informatics Association. 2000;7(3):277-286.

The Opportunity

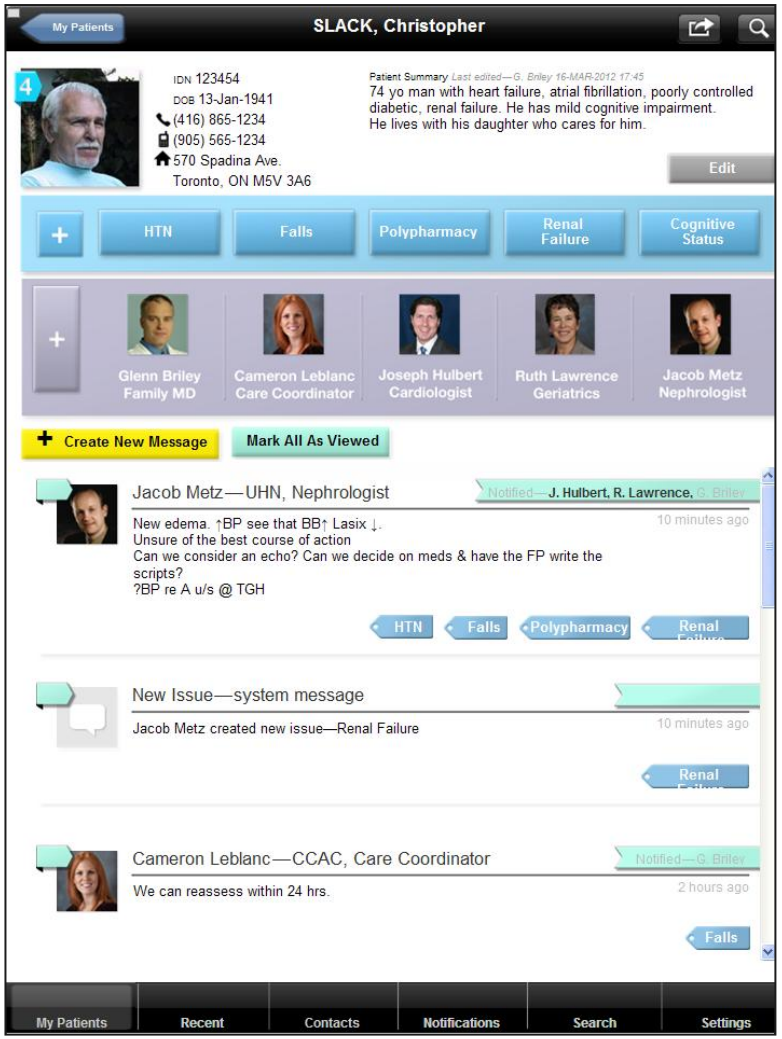
Design a solution to support:

- Effective lines of communication
- Between busy, transient clinicians
- Who are frequently interrupted and distracted
- With an intuitive user interface
- That improves awareness of patient status

The Solution Concept

Patient page:

- Consolidates all communications
- Across all care team members
- Everyone sees all communications
- Explicit notification of a team member
- Notification read confirmation
- Tagging of comments



The Solution Concept

Notification page:

- Specific to each care team member
- Shows only comments explicitly notified of

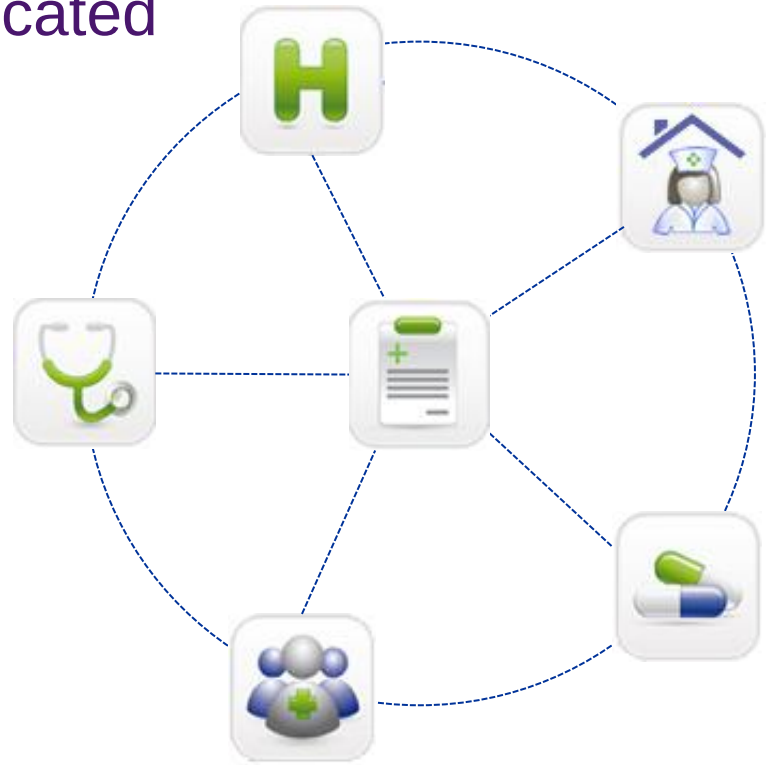
My patients page:

- Lists patients
- Access to all communications on that patient

The Expanded Opportunity

- Even more relevant to recently discharged patients with complex conditions
- Where care team is not co-located
  - Discharging physician
  - Patient GP
  - One or more specialists
  - Community care nurse
  - Pharmacist
  - Allied health

    (physiotherapist, dietician etc)
- Virtual Ward - Toronto



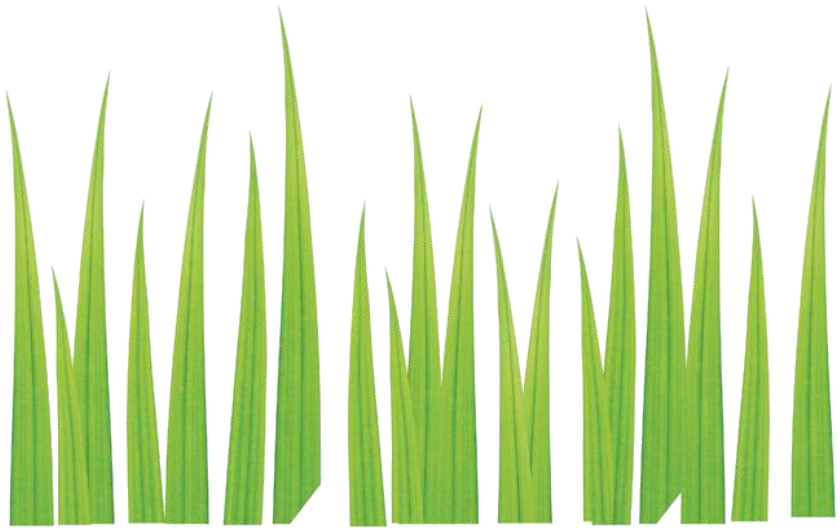
Phase 3: The Need for Responsive Design

- Access to clinical communication and patient status
- Anytime, anywhere
- On any device

- Without having to maintain multiple versions of software

Value to TELUS Health

- Strategic value
- Ties together strengths in health and communications
- Fits into next generation focus on collaboration solutions for healthcare



Improvements to Order Tracking

Masters Thesis:

Improvements to information flow in the physician order tracking process

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Dr Mike Carter

Centre for Research in Healthcare Engineering

Mechanical and Industrial Engineering

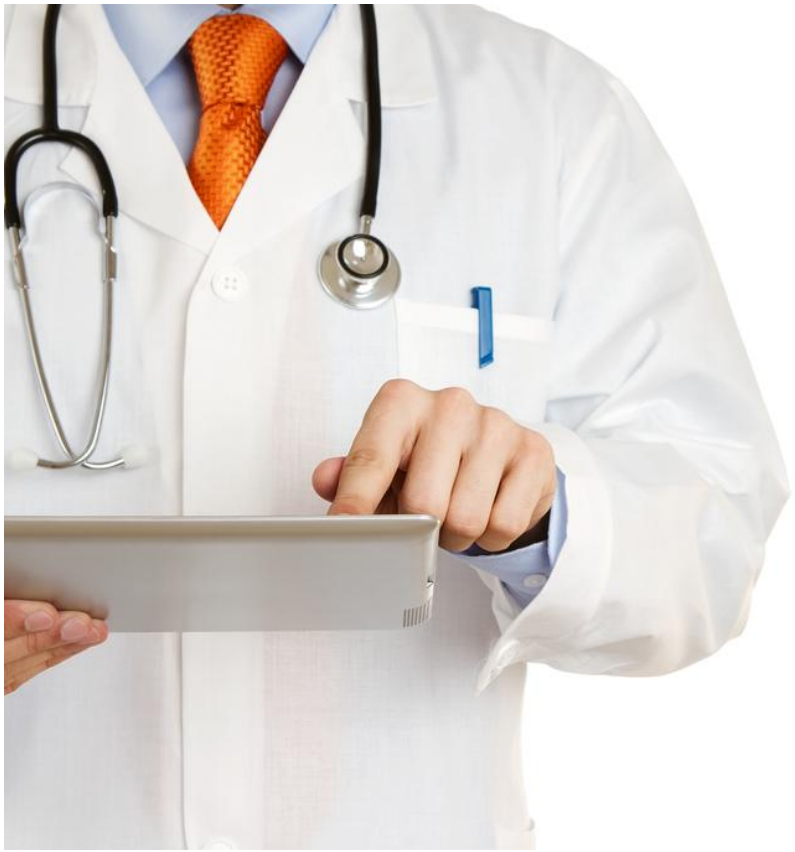
University of Toronto

The Problem

- General lack of awareness of patient status
- Limited or no feedback on order status
  - From time of entry – to - result availability
- Wasted time re-checking order status
- Wasted money placing and filling redundant orders
- Slower decision-making
- Potentially serious patient health outcomes if an order is lost, not noticed and the results would have been important
  ….this has actually happened !

A missing test result is worse than a bad test result!

The Opportunity



- Study the flow of information and critical points in the hospital order life cycle
- ED of the Sunnybrook Health Sciences Centre (SHSC)
- Ideal clinical environment:
  - high patient volumes
  - wide spectrum of clinical activities
  - opportunity to observe communication and information flow between multiple specialties of clinicians

The Goal

- To identify, quantify, and propose a methodology for targeting the problems in the existing order life cycle
- By simulating the order life cycle flow
- To improve the feedback on order status
- Without resulting in alert fatigue for clinicians

How

- Interview and shadow the ED clinicians to identify the range and the type of issues
- Quantitatively compare the identified problems and rank their severity
- Analyze electronic order entry data to estimate the frequency and potential cost of each type of tracking issue
- Select order type(s) of greatest concern
- Use simulation modeling to identify the critical points in the process where feedback is required

What

- Lab orders modelled:
  - highest volume by order type
  - greatest amount of critical feedback and
  - highest volume of feedback discrepancies

- Lab order actions:
  1. Order lab tests
  2. Take the sample from a patient.
  3. Send the sample to the laboratory
  4. …..wait …..
  5. Check for order completion
  6. Read the order results

The Findings

Possible feedback status:

- Arrival delayed
- Arrived
- Processing delayed
- Began processing
- Processing delayed due to re-order
- Completed

Best results:

	Feedback	Time reduction	% improvement
1	Arrival delayed	2.72 → 2.11	22.99%
2	Arrival delayed + Processing delayed due to re-order	2.72 → 2.23	18.63%

The Value

- Timing of feedback:
  - Best results @ 90th and 95th percentiles of mean time processing time
  - Providing feedback too late or too early yield unfavourable results

Value to TELUS Health:

- Recent significant investment in CPOE systems
- Materially improve CPOE with most effective feedback at the right time
- Without creating alert fatigue
- Ensure missing results are alerted

What's Next

- Home health monitoring
- Wearable devices to monitor activity
- Cardiac patients - avoid re-admission
  - > 20% readmitted 30 days post discharge
  - as many as 50% readmitted at 6 months
  - Mayo inpatient study - correlated steps to length of stay
- Diabetic patients – behavior modification
  - difficulty understanding the impact of lifestyle modification

Making it Easier for Patients

Information for life

References

- Baker GR, Norton PG, Flintoft V, et al. The Canadian Adverse Events Study: the incidence of adverse events among hospital patients in Canada. *CMAJ*. 2004;170(11):1678-1686.

- Coiera E. When Conversation Is Better Than Computation. Journal of the American Medical Informatics Association. 2000;7(3):277-286.

- Coiera EW, Jayasuriya RA, Hardy J, Bannan A, Thorpe ME. Communication loads on clinical staff in the emergency department. *MJA*. 2002;176:415-418.

- Joint Commission on Accreditation of Healthcare Organizations (JCAHO). Root causes of sentinel events. http://www.jointcommission.org/