“Networks” by Design

The Intentional Opportunities with a Regional, Cross-Continuum Electronic Health Record

October 15, 2012
Dr. Mary-Lyn Fyfe, Chief Medical Information Officer
Vancouver Island Health Authority
**BIHA’s Electronic Health Record Journey**

<table>
<thead>
<tr>
<th>Topic</th>
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<tr>
<td>Networks by Design</td>
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<td>The Region</td>
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<tr>
<td>Information Integration</td>
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<tr>
<td>The Community</td>
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<tr>
<td>Our Future</td>
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### Key Themes

#### Design for Intentional Outcomes

- Quality Care Across the Continuum
- Virtual Teams
- Seamless Transitions
- Care in the Community
- An Engaged Health System
VIHA’s Electronic Health Record

*Our EHR Journey and Current Capabilities*
The Vancouver Island Health Authority

Key Statistics

<table>
<thead>
<tr>
<th>Category</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>Population</td>
<td>768,000</td>
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<tr>
<td>Employees</td>
<td>18,000</td>
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<tr>
<td>Physician Partners</td>
<td>1,700</td>
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<tr>
<td>Facilities</td>
<td>150+</td>
</tr>
<tr>
<td>Acute Care/Rehab Beds</td>
<td>1,500</td>
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<tr>
<td>Residential Care Beds/Assisted Living Units</td>
<td>6,350</td>
</tr>
<tr>
<td>Community Addiction Beds/Mental Health</td>
<td>1,032</td>
</tr>
<tr>
<td>Annual Budget</td>
<td>$1.8B</td>
</tr>
</tbody>
</table>
Information Silos

- Home Care
- Acute Care
- Specialist Offices
- Residential Care
- Provincial Registries /Other
- GP Office
VIHA’s Cerner-based EHR Implementation Journey

- 1999: Cerner selected through RFP process
- 2002: Cerner introduced across South Island facilities
- 2006: Cerner identified as foundation for Regional EHR
- 2008: Cerner in place across all acute and residential sites, Cdn 1st integration w community med profile
- 2011: PARIS implemented using single, regional MRN
- 2012: Clin Doc implemented across region in single activation
Current EHR Content and Functionality

• **Orders, Results, Documentation**
  – Lab Results
  – Diagnostic Imaging Reports
  – Transcribed Documents
  – Structured Emergency, Mental Health and Medical/Surgical Documentation

• **Medication Profiles**
  – Inpatient, Community (PharmaNet)

• **Provider Communication Tools**

• **Electronic Capture of Vital Signs - Patient Care Centre, Nanaimo ED**

• **eHealth Viewer Integration**
EHR Access, Use, and Volumes

- **EHR Access**
  - 1,600 physicians and 13,000 clinical staff have active EHR accounts
  - Wireless access is implemented across all major hospital facilities
  - 9,600 computer devices on VIHA’s secure network, including 510 mobile carts

- **EHR Use**
  - >3,000 unique daily users
  - Avg daily peak of 2,020 concurrent users

- **EHR Volumes**
  - Over 68,000 transactions/day, including:
    - 2,700 medical imaging test orders, 4,000 medication orders, and 24,000 lab orders
  - Over 4,200 new encounters/day

### Concurrent Use of the EHR
(average daily peak)

- 2005: 450
- 2006: 450
- 2007: 450
- 2008: 450
- 2009: 450
- 2010: 450
- 2011: 2,020
“Networks” by Design

The Region
VIHA’s single, integrated EHR is currently used at over 50 Locations

- North Island (January 2008)
- Centre Island (October 2008)
- Denominational Affiliate – St. Joseph’s Hospital (October 2011)
A Patient’s Journey for Cancer Care in North Island

- General Practitioner
- Pt. McNeill Outpatient Laboratory
- Virtual Consult with Oncall Specialist - VGH
- Virtual Treatment Review by Oncologist and Team
- Pt. McNeill Hospital Inpatient Treatment and Diagnostic Services
- Campbell River Outpatient Chemotherapy
Clinical Collaboration on Acute Vascular Graft Infection

- General Practitioner and Community Mental and Addictions Services
- Campbell River Direct Admission
- Virtual Consult with OnCall Off-Site Vascular Surgeon
- Interdisciplinary Discharge Planning
- Consult with Infectious Disease Specialist
- Transfer to RJH for Surgery and Inpatient Care

The Value of a One Person, One Record EHR
“Networks” by Design

Information Integration
“Networking” in an Acute Care Environment

- Physician
- Social Worker
- Dietician
- OTs, PTs
- Respiratory tech
- Pharmacist
- Family & Friends
- Patient
- Switchboard
- Unit Clerk
- Nurse
- Chaplin
- Administration
- Pharmacy
- Lab
- DI
- Administration
Incomplete Data in Electronic Format

- Only 20% of Chart Content Automated to-Date

- Cerner PowerChart
  - Pt Demographics
  - Transcribed Reports
  - Triage Documents
  - Lab Results
  - Imaging Results
  - Medication List
  - MH Clinical Profiles

- Paper
- Electronic
Designing for Quality Care – Streamlining through Device Integration
Automatic Upload of Vital Sign Data
Vital Sign Integration Solution Architecture

Blue Area: workflow area
Purple Area: original architectural option
Green Area: Philips architecture option
Yellow Area: Welch Allyn architecture option
Clinical Validation of Vitals in Patient Record
Hands Free Communication

- Vocera hands-free devices are worn on a lanyard or clipped to a uniform to enable **wireless, hands-free, voice-activated communication** between care providers.

- Integrated with **clinical alert systems**, including nurse call from patient rooms, and telemetry devices.

- Avoids unnecessary travel and supports ‘**virtual**’ team collaborations.

- Supports **quiet, healing** environment.
Wireless Medication Carts

- Secure, patient-specific drawers for daily medications
- Integrated monitor to review allergies and key clinical information prior to medication administration
- Access to Electronic Health Record to support point-of-care documentation
- Future ability to integrate bar code scanners to positively identify patients and medications
“Networks” by Design
Connecting Community
Telehome Monitoring is a care delivery process connecting clients with providers to enable care planning, remote monitoring, early intervention, and self-management within an integrated care team.
Cycle of Chronic Conditions

Acute Incident

Early Symptoms

Situation Normal
Telehome monitoring helps avoid acute incidents

Early Detection and Intervention

Situation Normal
• Highest proportion of confirmed chronic conditions per capita

• Highest proportion of elderly residents per capita

• Fastest growth in retirement living in Canada

• Challenging access for Remote and Rural clients
Our First Steps – Telehome Monitoring for Chronic Heart Failure

- Over **16,000** Vancouver Island residents have heart failure

- Heart failure is the **leading cause of hospitalization** for people over the age of 65, and the **second highest cause for bed day use**

- Six-month **readmission rate as high as 50%** and one-year mortality rates as high as **40%** after diagnosis
Our First Steps – Telehome Monitoring for Chronic Heart Failure
### Results (n=87)

<table>
<thead>
<tr>
<th>Measure</th>
<th>Pre</th>
<th>Post</th>
<th>Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Admissions (#)</td>
<td>36</td>
<td>14</td>
<td>↓ 61%</td>
</tr>
<tr>
<td>Length of Stay (days)</td>
<td>426</td>
<td>106</td>
<td>↓ 75%</td>
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<tr>
<td>Emergency Dept Visits (#)</td>
<td>57</td>
<td>20</td>
<td>↓ 65%</td>
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</table>

### Client Experience and Satisfaction

- Client Compliance with Daily Measurements 98%
- % Reported “Easy to Use” 92%
- % “Strongly Agreed” that monitoring helped to manage CHF 87%
One Client’s Story…

**With Telehome Monitoring**

<table>
<thead>
<tr>
<th>Onset</th>
<th>Day 7 and beyond</th>
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<tbody>
<tr>
<td>Early Symptoms</td>
<td>Nurse Intervention</td>
</tr>
<tr>
<td></td>
<td>Stable and Monitored</td>
</tr>
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</table>

**Without Telehome Monitoring**

<table>
<thead>
<tr>
<th>Onset</th>
<th>Day 7</th>
<th>Day 14</th>
<th>Day 21</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Symptoms</td>
<td>Emergent Intervention</td>
<td>Critical Care</td>
<td>Stabilization</td>
</tr>
<tr>
<td></td>
<td>Discharge</td>
<td>Recidivism</td>
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</table>

- Community-based Services
- Acute/Intensive-based Services
Key Learnings

- Elderly clients **very receptive** to technology
- More value could be derived with **data integrated into EHR**
- Improved care team **relationships**
- Improved **self management** continued post monitoring
VIHA’s Electronic Health Record

Our Future – One Patient, One Record
Our Population Trends Since 1995

Health care today looks very different from what it did only 15 years ago.
Our Population - Prevalence of Chronic Disease in BC

- **1 in 3** British Columbians have one or more chronic diseases
- **80%** over age 65 have two or more comorbidities
- **>70%** of health care costs are consumed by this population
A Case for Change

Maintain 92
Per 1,000 Population 75+

Add ~163 Beds per Year

Add ~1 Bed per Day
Our Plan for Supporting Health and Care in the “Smart Home”

- Personal Health Record
- Mobility Sensors
- Video for Virtual Visits
- Medication Mgmt Tools
- Vital Sign Monitors
- Internet/ Social Media

Point of Care Devices

Home Aggregation Services

Integrated Electronic Health Record

Community Providers
Acute Care Clinicians
Authorized Caregivers
Three Year Telehome Monitoring Roadmap – New Conditions, New Care Models

2012/13 (200+ clients)
- Expand CHF monitoring
- Broaden referral process
- Optimize care pathway

2013/14 (600+ clients)
- One new condition region-wide
- Oceanside
  - Multiple conditions (2+)
  - Data integrated into Cerner EHR
  - Pilot new models of care
    - Integrated primary care team
    - Peer to Peer support network

2014/15 (1,000+ clients)
- Expansion of integrated care teams
- Extend multi-condition monitoring
- Introduce Personal Health Records
Enhancing the Capabilities of the EHR – The Next Generation EHR

- **Major Change Components (Cross-Continuum):**
  - Clinical Documentation
  - Order Management
  - Closed-loop Medication Management

- **Deep Sector/Program-specific automation:**
  - Home and Community Care
  - Critical Care, Surgery, Anesthesia, Maternal Health, etc.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Cumulative Capabilities</th>
<th>VIHA</th>
<th>Canada</th>
<th>United States</th>
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</thead>
<tbody>
<tr>
<td>7</td>
<td>Data/information flows across continuum as byproduct of EHR</td>
<td>0.0%</td>
<td>1.7%</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Structured Physician Documentation</td>
<td>0.5%</td>
<td>6.5%</td>
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</tr>
<tr>
<td>5</td>
<td>Closed Loop Medication Administration</td>
<td>0.3%</td>
<td>11.5%</td>
<td></td>
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<tr>
<td>4</td>
<td>CPOE</td>
<td>2.5%</td>
<td>13.3%</td>
<td></td>
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<tr>
<td>3</td>
<td>Basic clinical documentation and decision support for errors</td>
<td>34.1%</td>
<td>42.4%</td>
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<tr>
<td>2</td>
<td>Clinical viewer for ancillary results</td>
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<td>11.7%</td>
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<tr>
<td>1</td>
<td>Ancillary (laboratory, pharmacy, and radiology systems) – all installed</td>
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<tr>
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<td>All three ancillaries not installed</td>
<td>n/a</td>
<td>23.0%</td>
<td>7.9%</td>
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* Based on HIMSS Analytics EMR Adoption Model 2012 Q2
Integrating Care Across the Continuum:

- Single, integrated patient-centric solution across all services provided by VIHA
- New solutions/options to connect Primary Care
  1. New, interoperability solutions to connect with EMRs (HIE)
  2. Cerner-based private office solution for existing practices
  3. New primary care models with Cerner-based solution (Oceanside)
- New solutions for Home & Community and Residential Care
Our Vision - One Patient, One Record
Questions, Comments
Enhancing the Capabilities of the EHR - The Next Generation EHR

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<td>1.2%</td>
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