

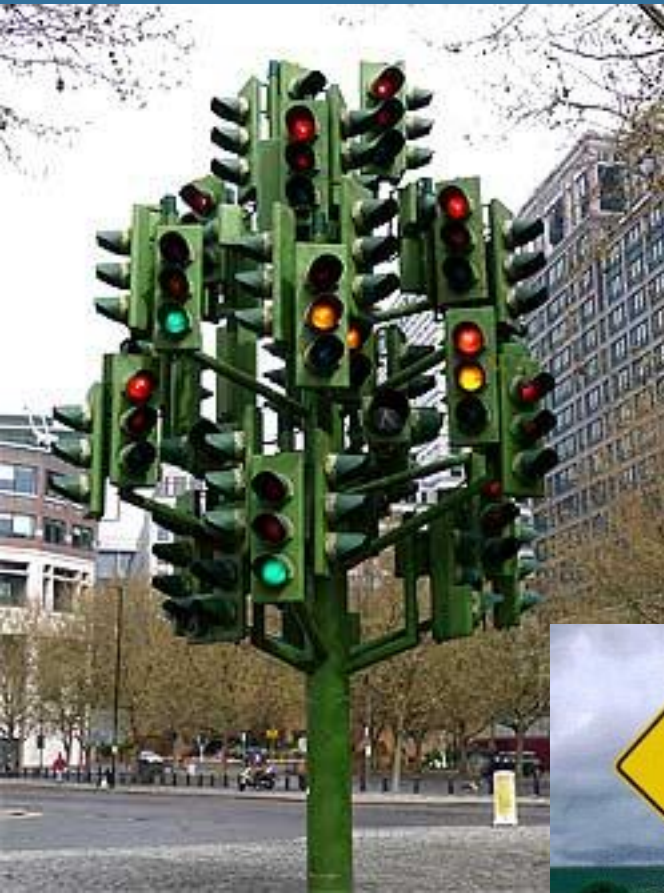
# “Networks” by Design

## 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





## VIHA's Electronic Health Record Journey

Networks by Design

The Region

Information Integration

The Community

Our Future

## Design for Intentional Outcomes

Quality Care Across the Continuum

Virtual Teams

Seamless Transitions

Care in the Community

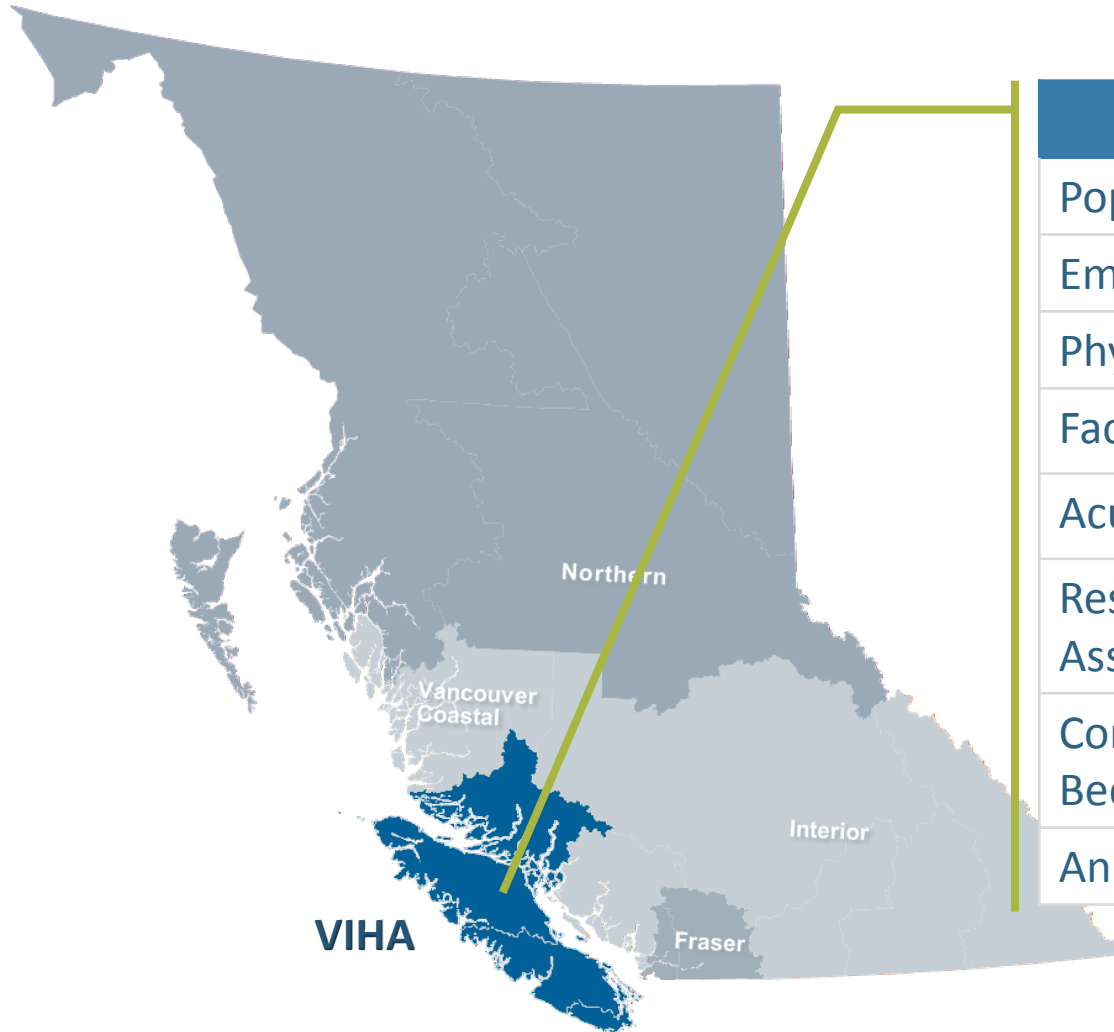
An Engaged Health System

# VIHA's Electronic Health Record

*Our EHR Journey and Current Capabilities*

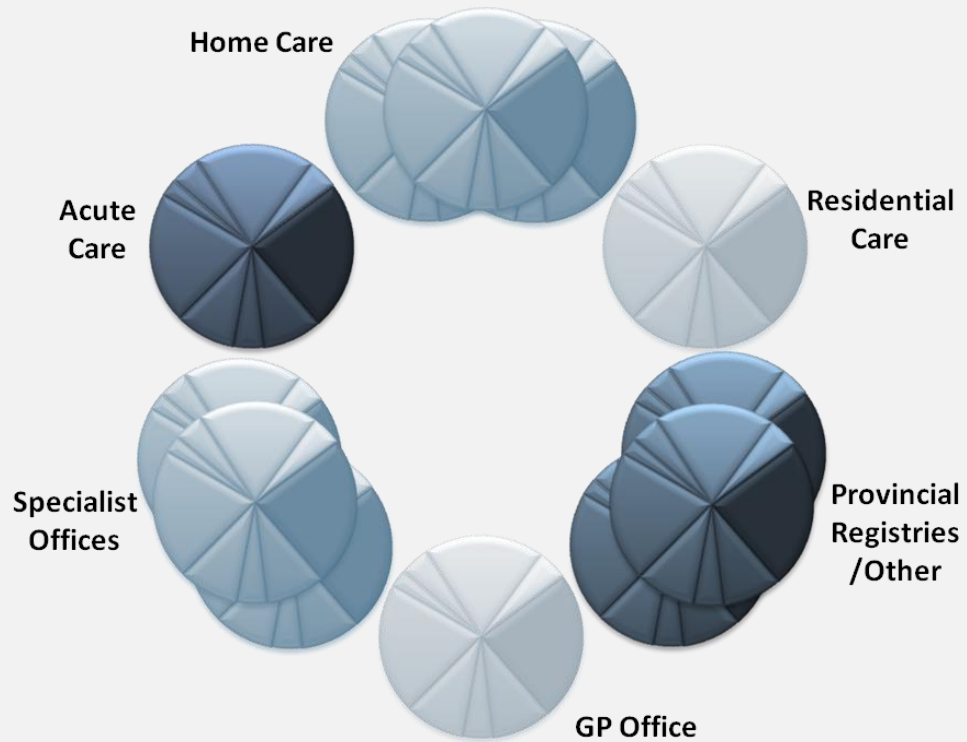


# The Vancouver Island Health Authority



Key Statistics	
Population	768,000
Employees	18,000
Physician Partners	1,700
Facilities	150+
Acute Care/Rehab Beds	1,500
Residential Care Beds/ Assisted Living Units	6,350
Community Addiction Beds/Mental Health	1,032
Annual Budget	\$1.8B

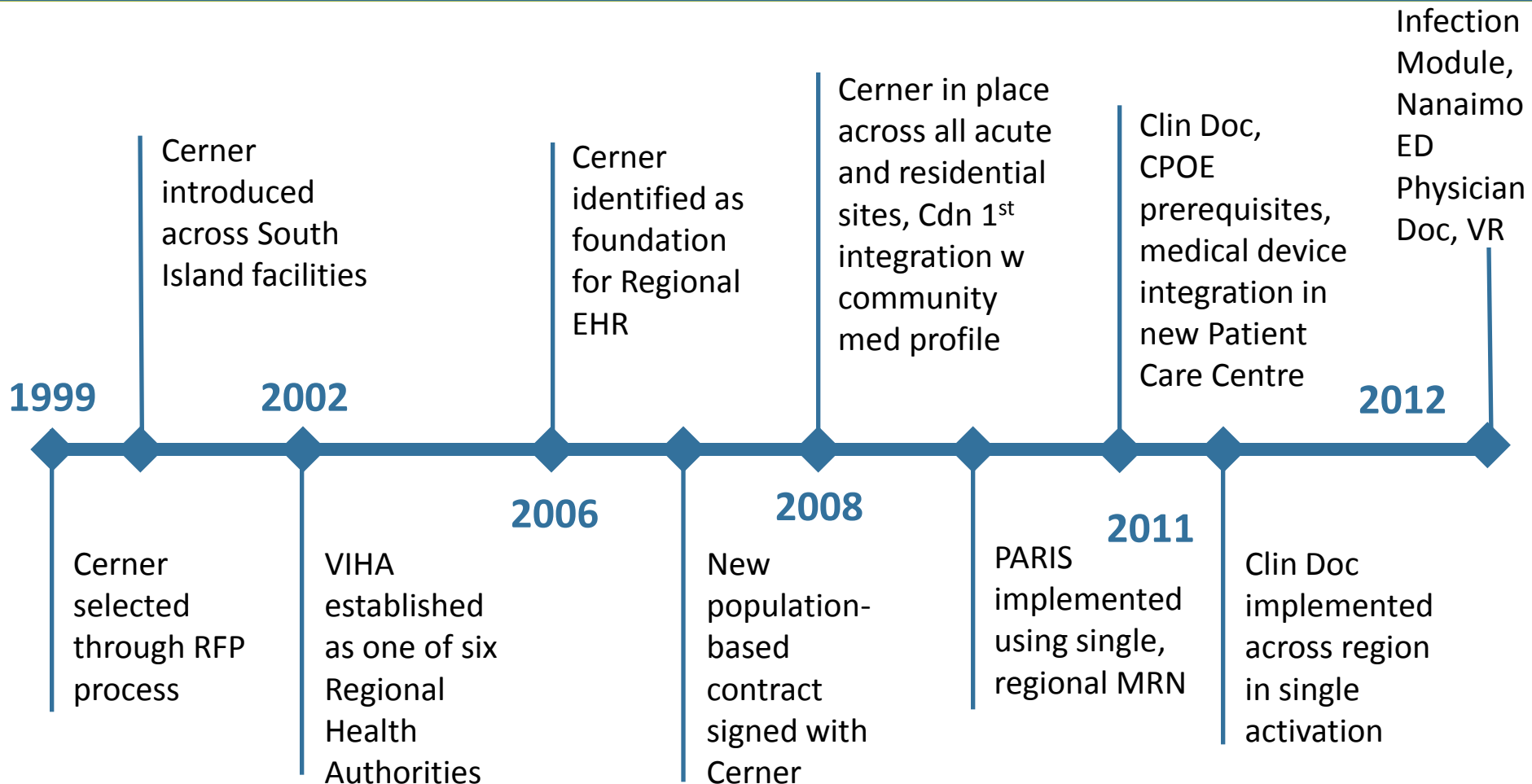
# Information Silos







# VIHA's Cerner-based EHR Implementation Journey



# 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**

The screenshot displays the 'Results Review' window in an EHR system. The window title is 'Results Review' and it includes a 'Last 48Hrs' filter. The main content area is titled 'Clinical Patient Information' and shows a list of vital signs and clinical data for a patient on 15-Feb-2011 at 21:00. A 'Navigator' pane on the left lists various assessment categories with checkboxes. The main table lists the following data:

Clinical Patient Information		15-Feb-2011 21:00
<input type="checkbox"/>	Temperature Oral	36.8
<input type="checkbox"/>	Temperature Tympanic	
<input type="checkbox"/>	Heart Rate, Apical	99
<input type="checkbox"/>	Pulse Rate, Peripheral	
	Heart Rhythm	Regular
<input type="checkbox"/>	Respiratory Rate	21
<input type="checkbox"/>	Systolic Blood Pressure Cuff	134
<input type="checkbox"/>	Diastolic Blood Pressure Cuff	78
<input type="checkbox"/>	Mean Arterial Pressure	
	Oxygen Therapy #1	
<input type="checkbox"/>	Oxygen Flow Rate #1	
	Neurological Assessment	
	Neurological Assessment Evaluation	No apparent diffi
	Level of Consciousness	Alert
	Gait	Steady
	Edema Assessment	
	Edema - Lower Leg, bilateral	1+ (2mm) Pitting
	Edema - Ankle, bilateral	3+ moderate/6mm
	Respiratory Assessment	
	Respiratory Effort	
	Cough	Normal
	Breath Sounds All	Productive Clear

# EHR Access, Use, and Volumes

- **EHR Access**

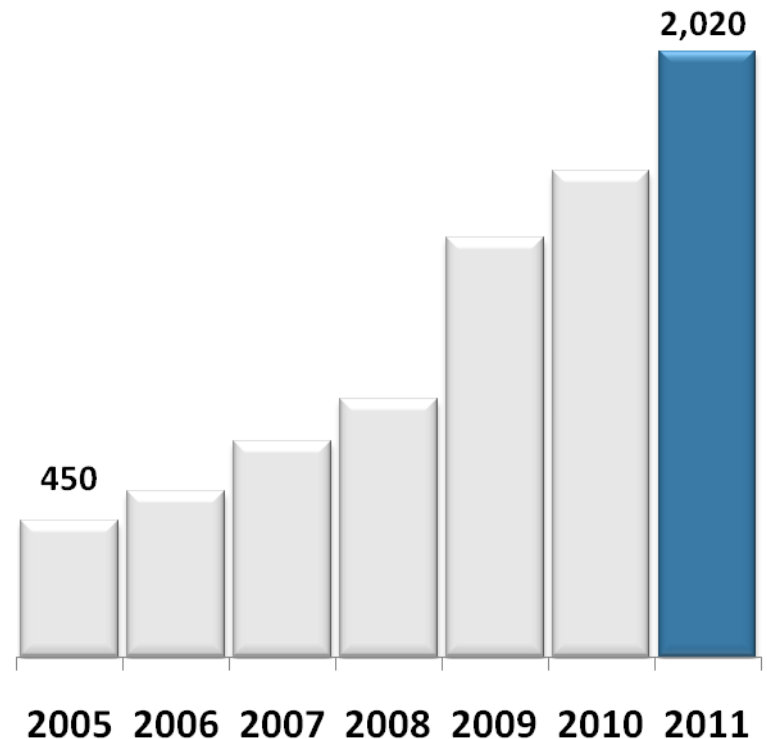
- 1,600 physicians and 13,000 clinical staff have active EHR accounts
- Wireless access is implemented across all major hospital facilities
- 9600 computer devices on VIHA's secure network, including 510 mobile carts

- **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



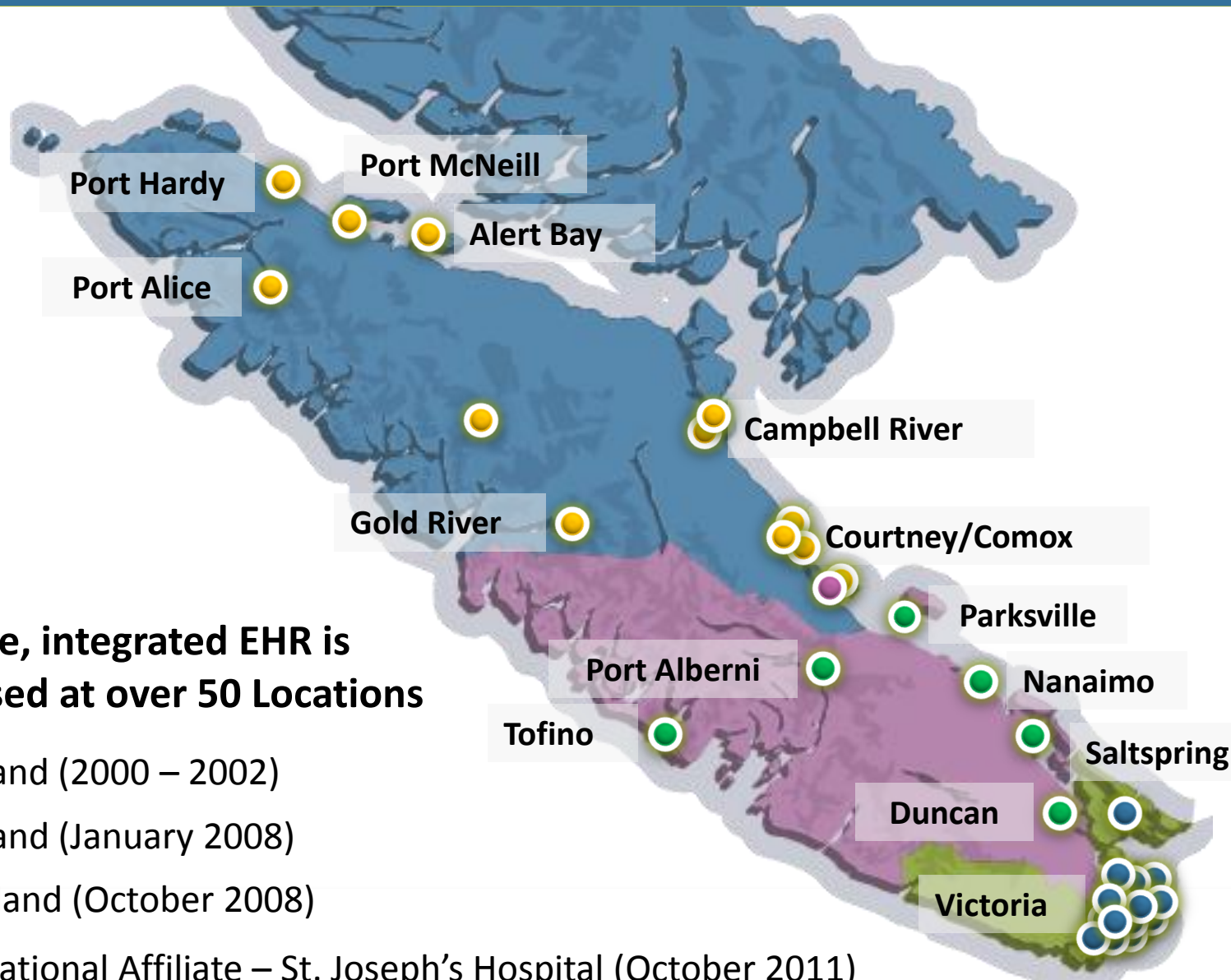
**Concurrent Use of the EHR**  
*(average daily peak)*

# “Networks” by Design

## *The Region*



# Geographic Reach of VIHA's Current Electronic Health Record

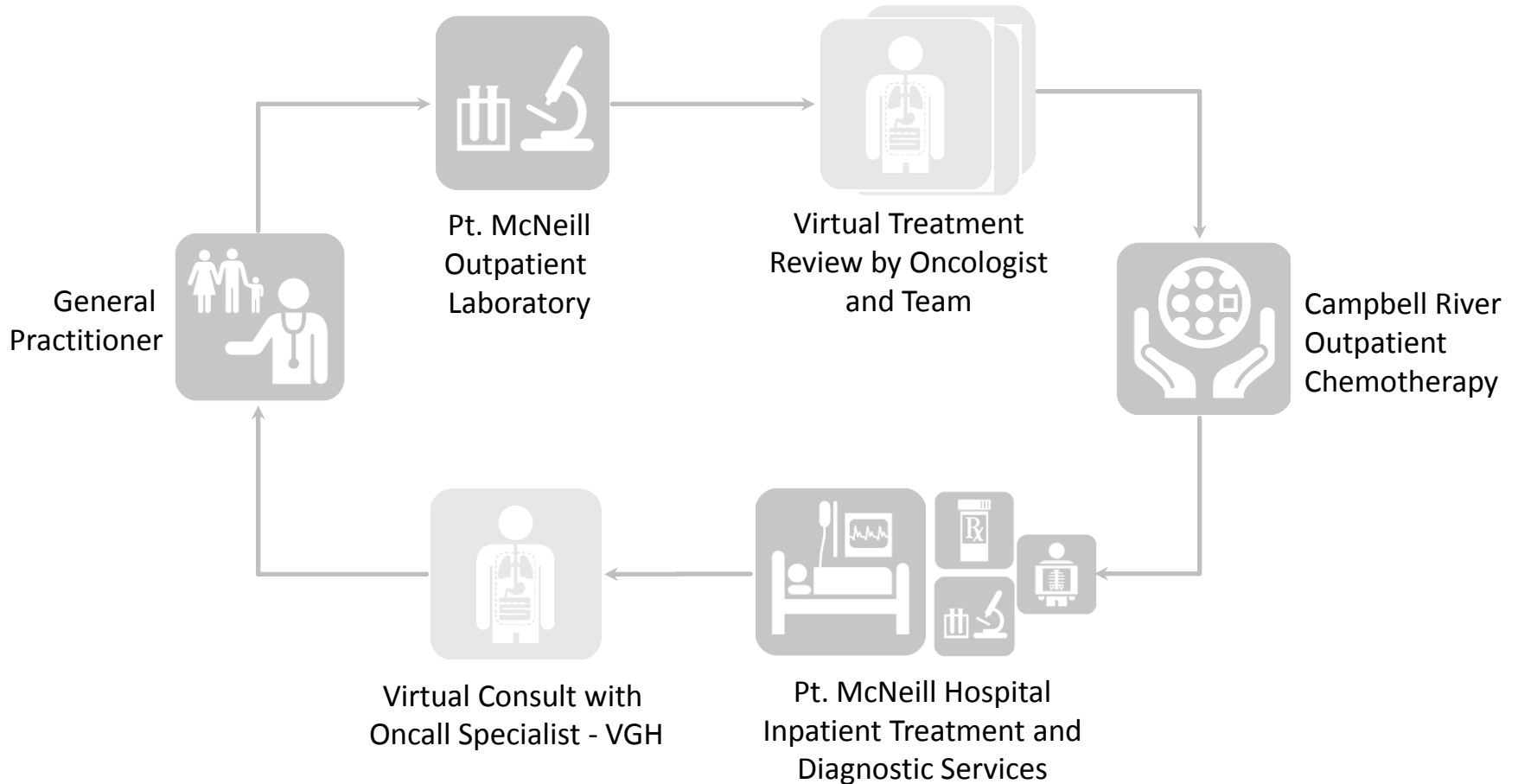


**VIHA's single, integrated EHR is currently used at over 50 Locations**

- South Island (2000 – 2002)
- North Island (January 2008)
- Centre Island (October 2008)
- Denominational Affiliate – St. Joseph's Hospital (October 2011)

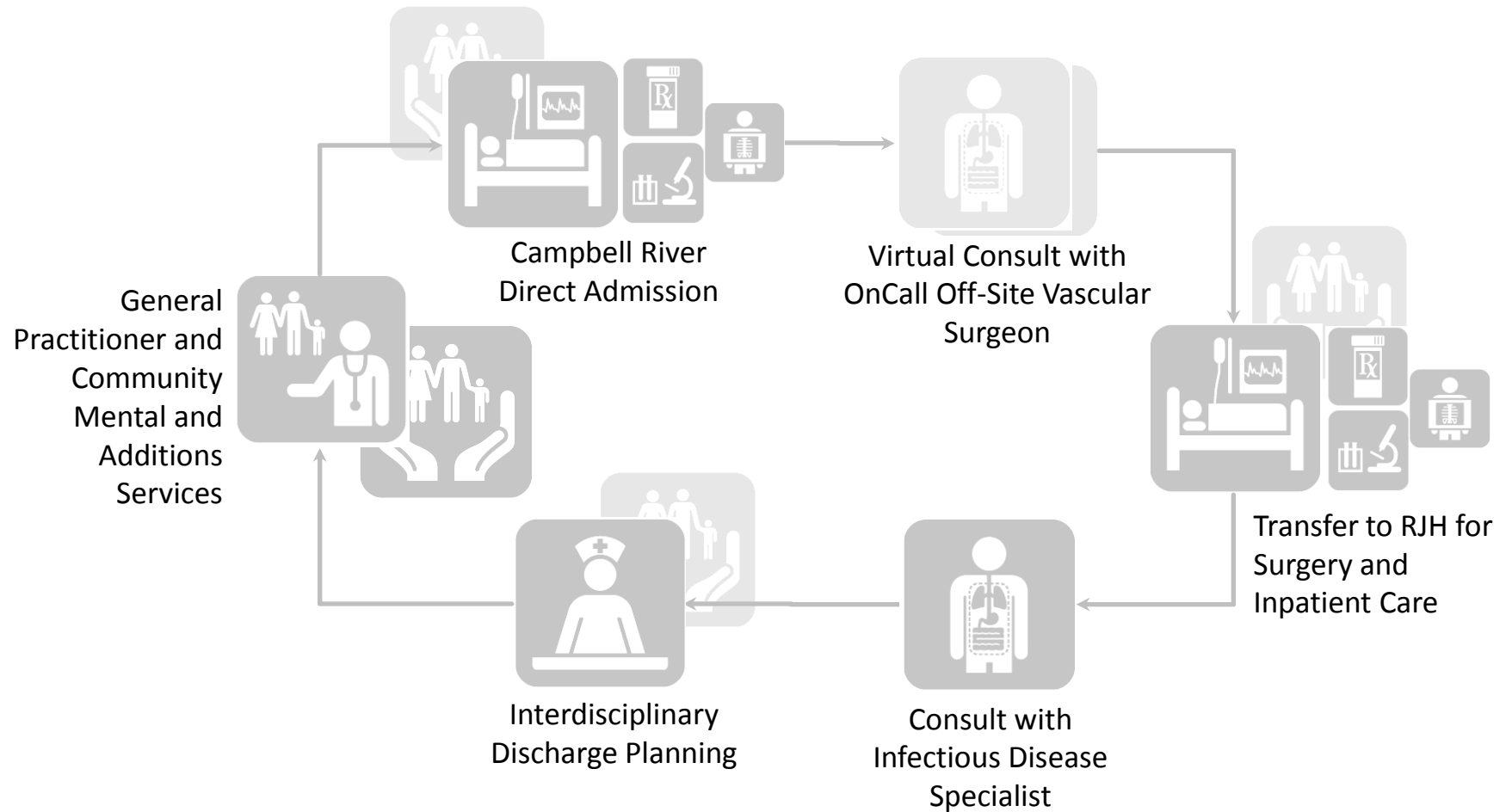
# The Value of a One Person, One Record EHR

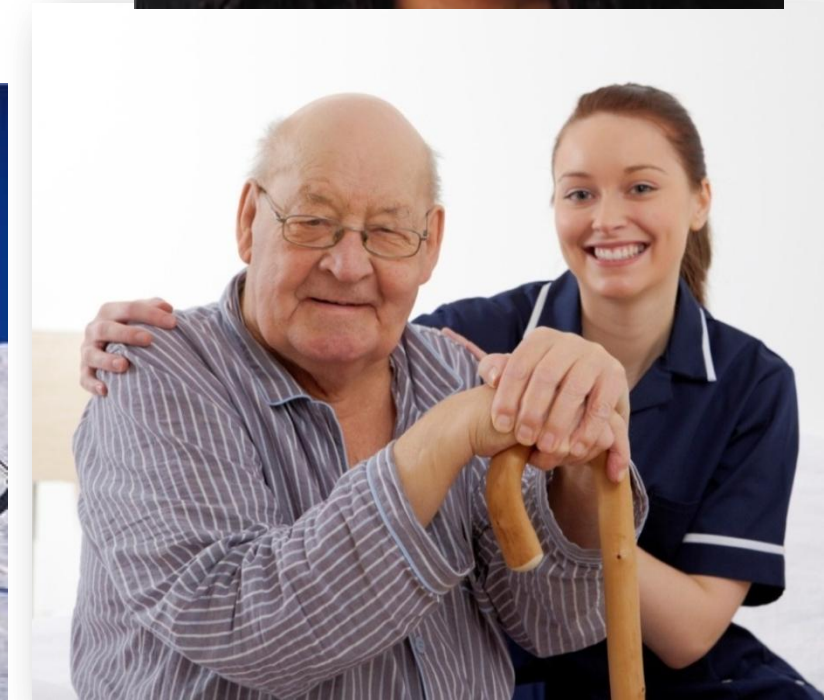
## A Patient's Journey for Cancer Care in North Island



# The Value of a One Person, One Record EHR

## Clinical Collaboration on Acute Vascular Graft Infection





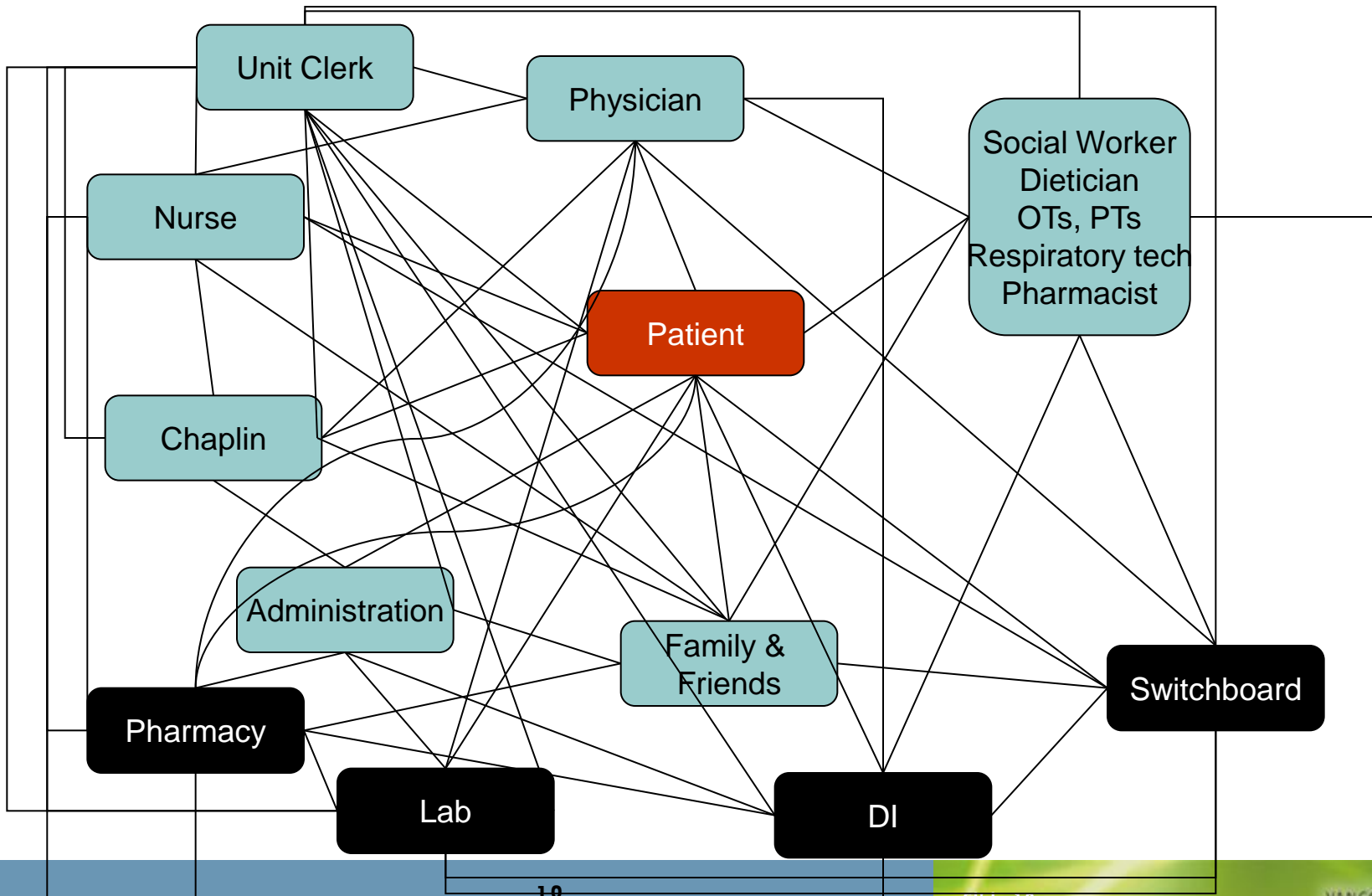


# “Networks” by Design

## Information Integration

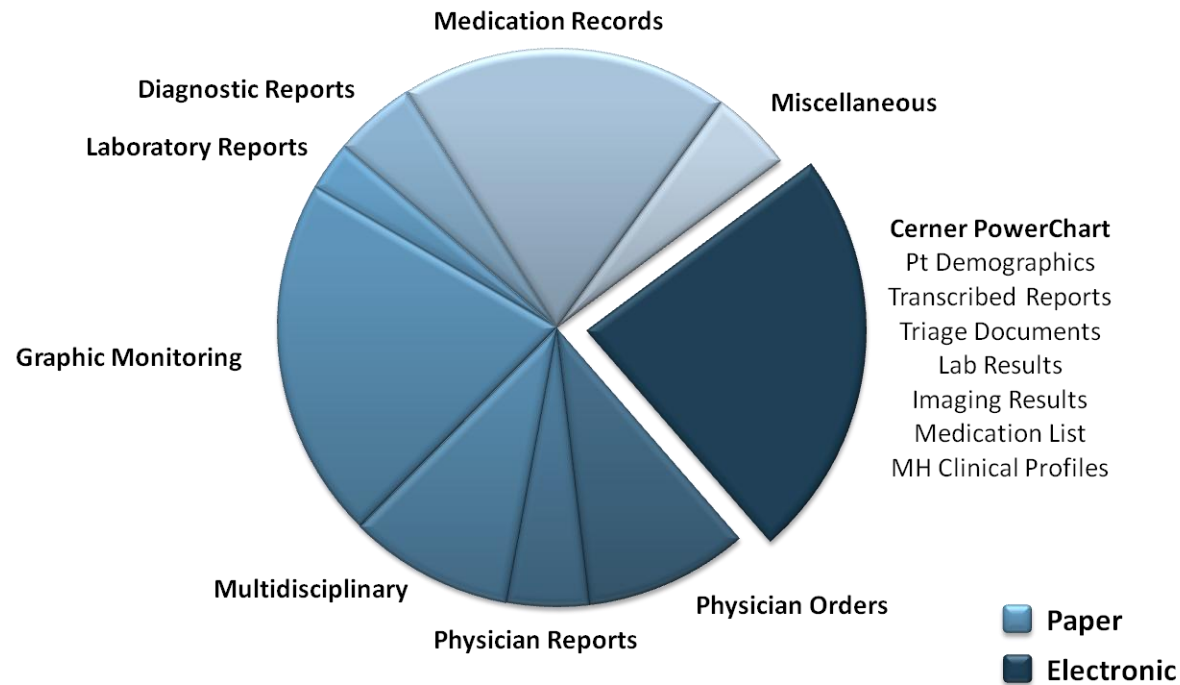


# “Networking” in an Acute Care Environment



# Incomplete Data in Electronic Format

- Only 20% of Chart Content Automated to-Date



# Challenges in a Paper- Based Environment

9/17/12  
 Got up Head up 30°  
 Head → 30°  
 New total 9 x 6 hrs then 1/8 Jallo  
 New total 9 x 6  
 New total 9 (4) the safe  
 Member 8 yr for O.P. ✓  
 • H. Leatone is with normal level in 48 hours O.P.  
 • Ken and only ten some pretzels 1000g per 500 ✓  
 Demand 4 Aug 1.1 <sup>HIS</sup> <sup>HIS</sup> <sup>HIS</sup> x 1200 ✓  
 \* ~~Value 20 yr of annual 9 per per~~  
 2000 150 yr per 50 yr 50 yr 1.0/8.  
 1/12 25 yr per O.P. ✓  
 1/13 20 yr per O.P. ✓  
 1/14 50 yr 1. M a per a 14 9/6 per  
 1/15 0 per 60 yr 7/4 per  
 1/16 Demand 750/100 yr per 2/4 per  
 1/17 100 yr 1/1  
 Don't know when drug well  
 O.P. 1/17 1/18  
 1/19 1/20 1/21  
 1/22 1/23 1/24  
 N.S.B.C. Publ.

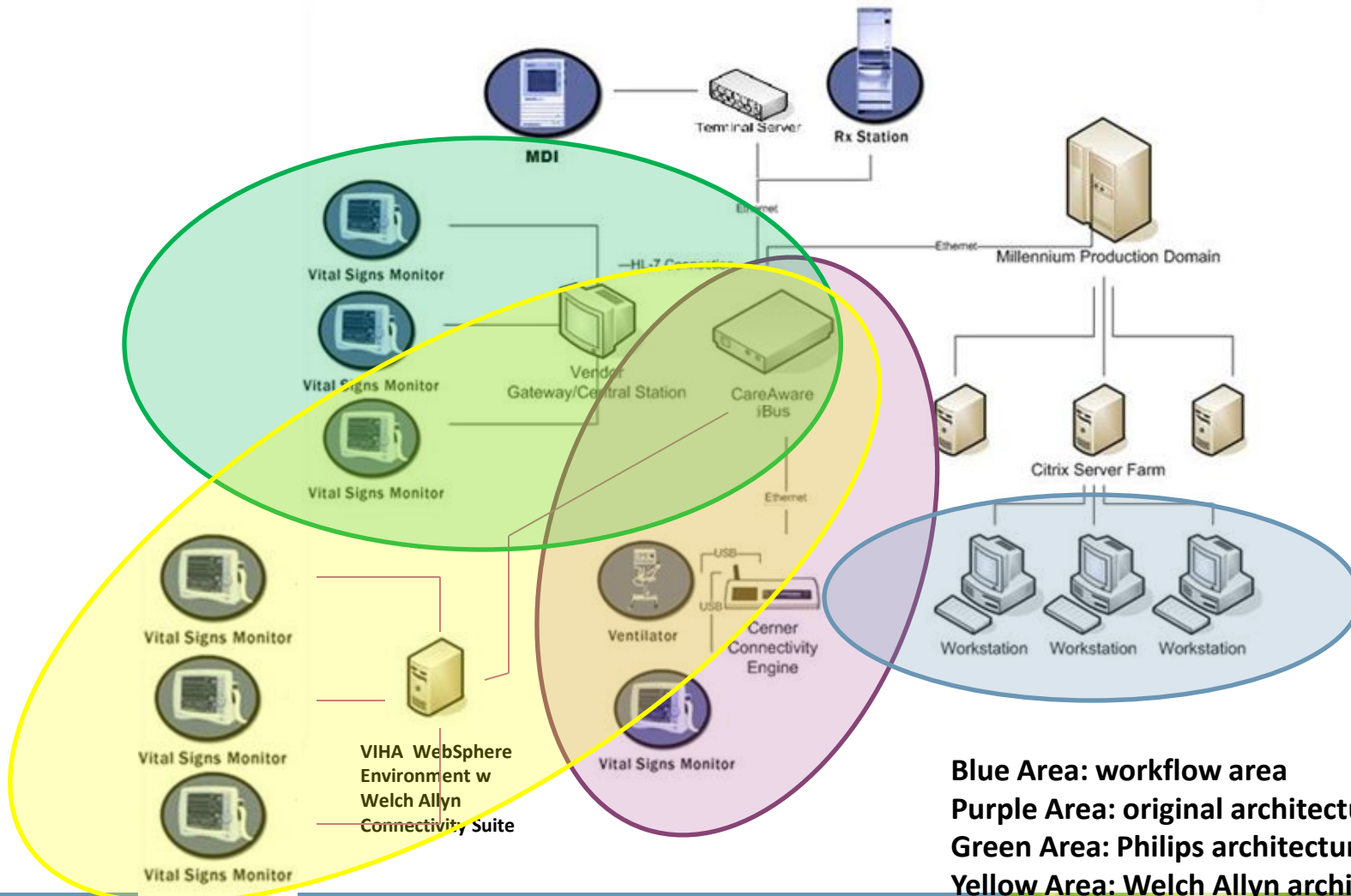
# Designing for Quality Care – Streamlining through Device Integration



# 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

YORK\_PA - CERNERRDP1  
 GHCAREDOC, FIVE - GH-701850 Opened by Futch, Jeff

Task Edit View Patient Chart Links Notifications Documentation Options Documentation Orders Help

Patient List In-Box Multi-Patient Task List PAL ExplorerMenu New Sticky Note View Sticky Notes Tear Off Attach Charges Charge Entry Exit

Order.: 0 Paper.: 0 Doc.: 0

GHCAREDOC, FIVE - GH-701850

Age: 78 years Sex: F Location: E2: E201: A  
 DOB: 12/24/1929 MRN: GH-701850 Fin Number: 400038030  
 Allergies: ranitidine

Menu IView / I&O Print 2 minutes ago

- Patient Information
- Patient Visit Information
- Patient Kardex
- 48 Hr Flowsheet
- Lab/Rad
- Pt Care
- Documents
- Form Browser
- Cardiology View
- Task List
- Orders + Add
- Medication Profile
- Pending Orders
- Reference Text Browser
- Patient Summary
- ED Direct Chart Vitals
- IView / I&O
- MAR
- MAR Summary
- Allergies + Add
- GH Patient Kardex
- Medication List + Add

Medical/Surgical View  
 Nursing Notes  
 Nutrition  
 Pain Assessment  
 PCA/Epidural/Spinal N...  
 Pediatric Physical Ass...  
 Respiratory Therapy  
 Restraints (non BH ar...  
 Scales  
 Trends and Checks  
 Screens  
 TCC  
 Tubes and Drains  
 Tubes Lines and Drains  
**Vital Measurements**  
 Vital Signs  
 Oxygen Therapy  
 Cardiac Rhythm Analysis  
 Hemodynamics  
 Measurements  
 Blood Gas Results

Find Item Critical High Low Abnormal Flag Unauth And Or

Result	Comments	Flag	Date	Performed By
11/18/2008				
<b>Vital Signs</b>				
Temperature Temporal Artery	DegF		10:15 AM	
Temperature Oral	DegF		10:10 AM	
Peripheral Pulse Rate	bpm	37	10:05 AM	
Respiratory Rate	br/min	111	10:00 AM	
SBP/DBP Cuff	mmHg	50/60		
MAP (Cuff)		57		
B/P Location				
B/P Modality				
<b>Oxygen Therapy</b>				
Oxygen Saturation	%			
O2 Liter/Minute	L/min			
FI02 Percent	%			
O2 Delivery Device				
<b>Measurements</b>				
Height	in			
Weight lbs	lb			
Weight oz	oz			
Weight gm	gm			

BUILD JFUTCH01 November 18, 2008 10:13 AM

Start WellSpan Citrix Applicati... E:\PROGRAM FILES\CER... PowerChart Organizer fo... GHCAREDOC, FIVE - G...



# 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

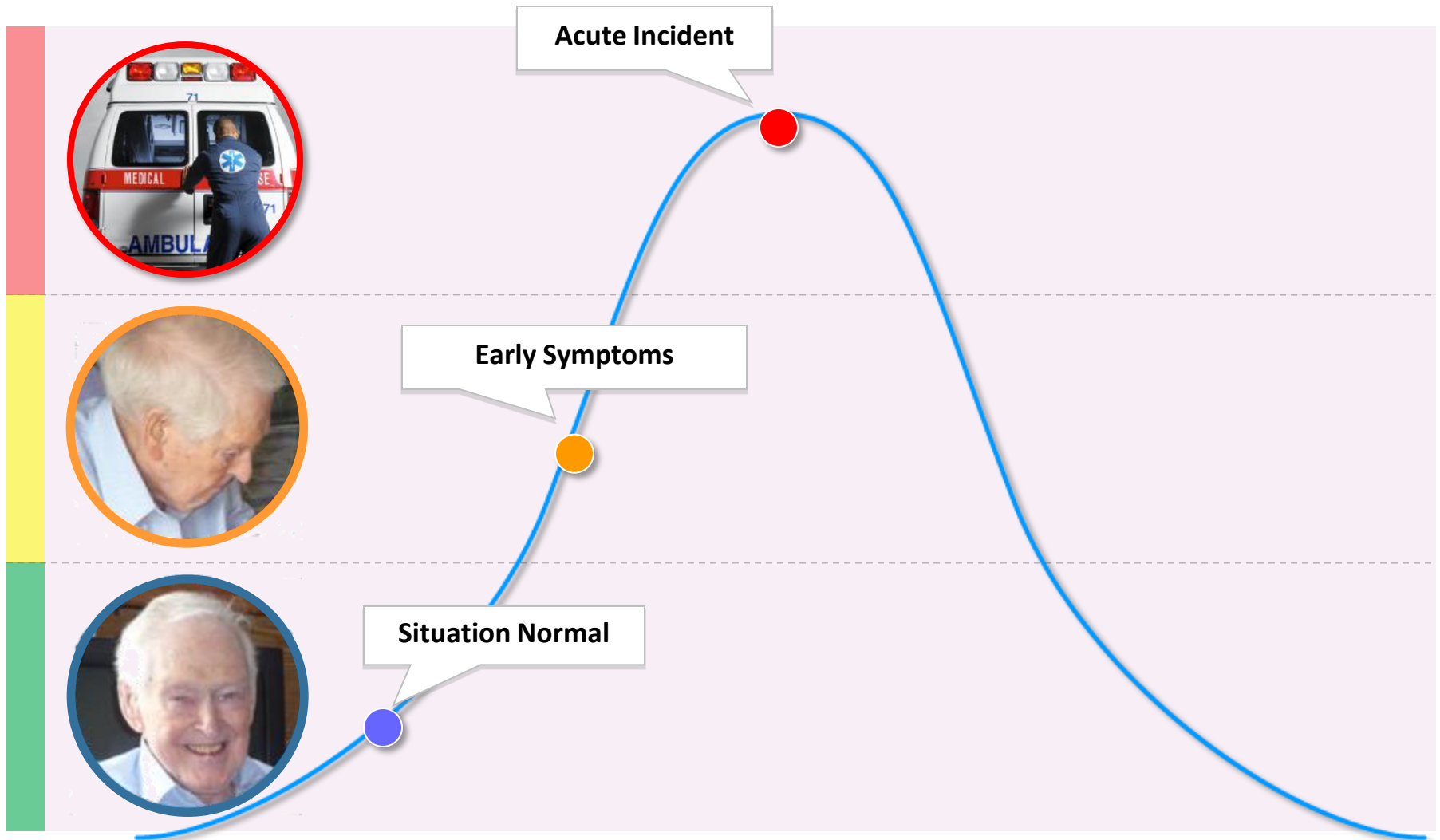
Connecting Community



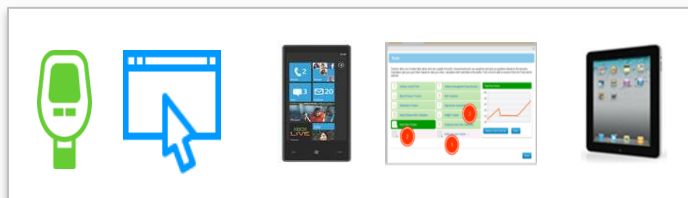
**Telehome Monitoring** is a *care delivery process* connecting clients with providers to enable ***care planning, remote monitoring, early intervention, and self-management*** within an integrated care team.



# Cycle of Chronic Conditions



# Understanding the Possibilities - Bending the Curve



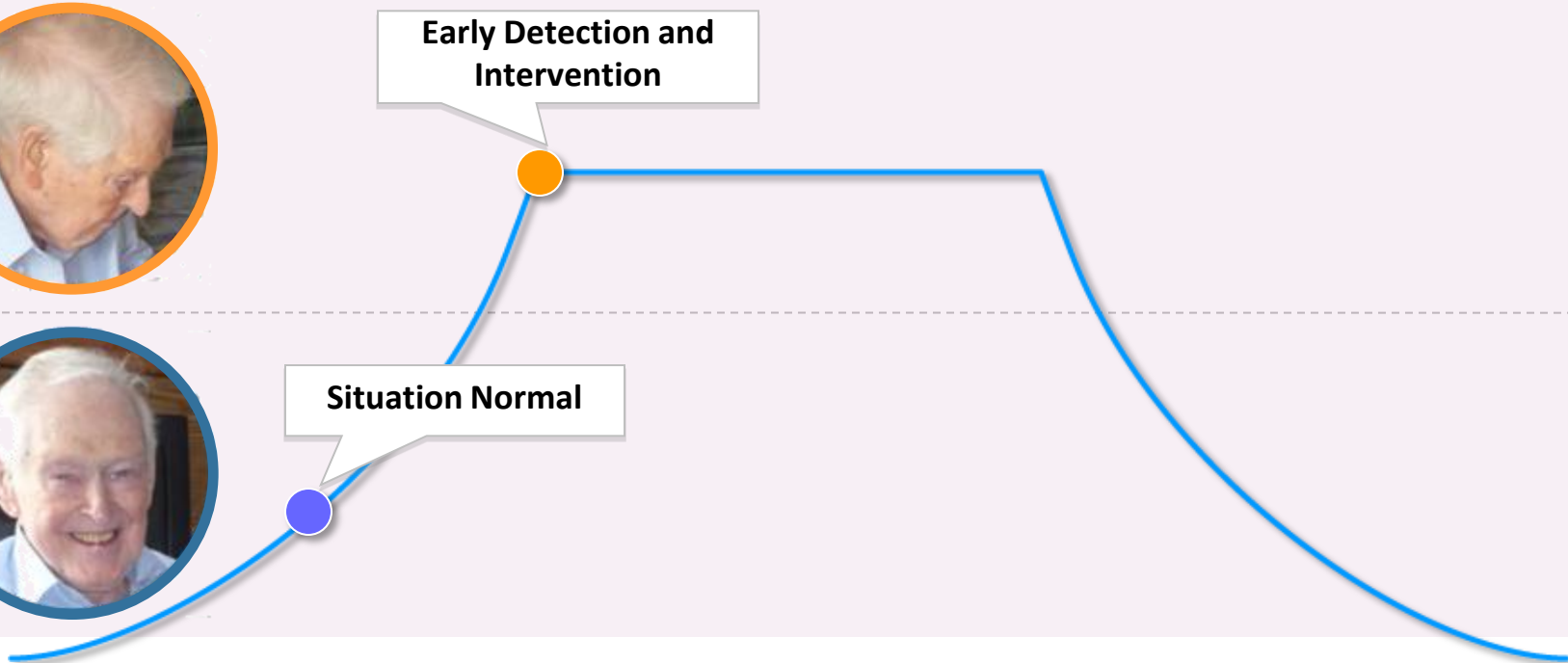
*Telehome monitoring helps avoid acute incidents*



**Early Detection and Intervention**

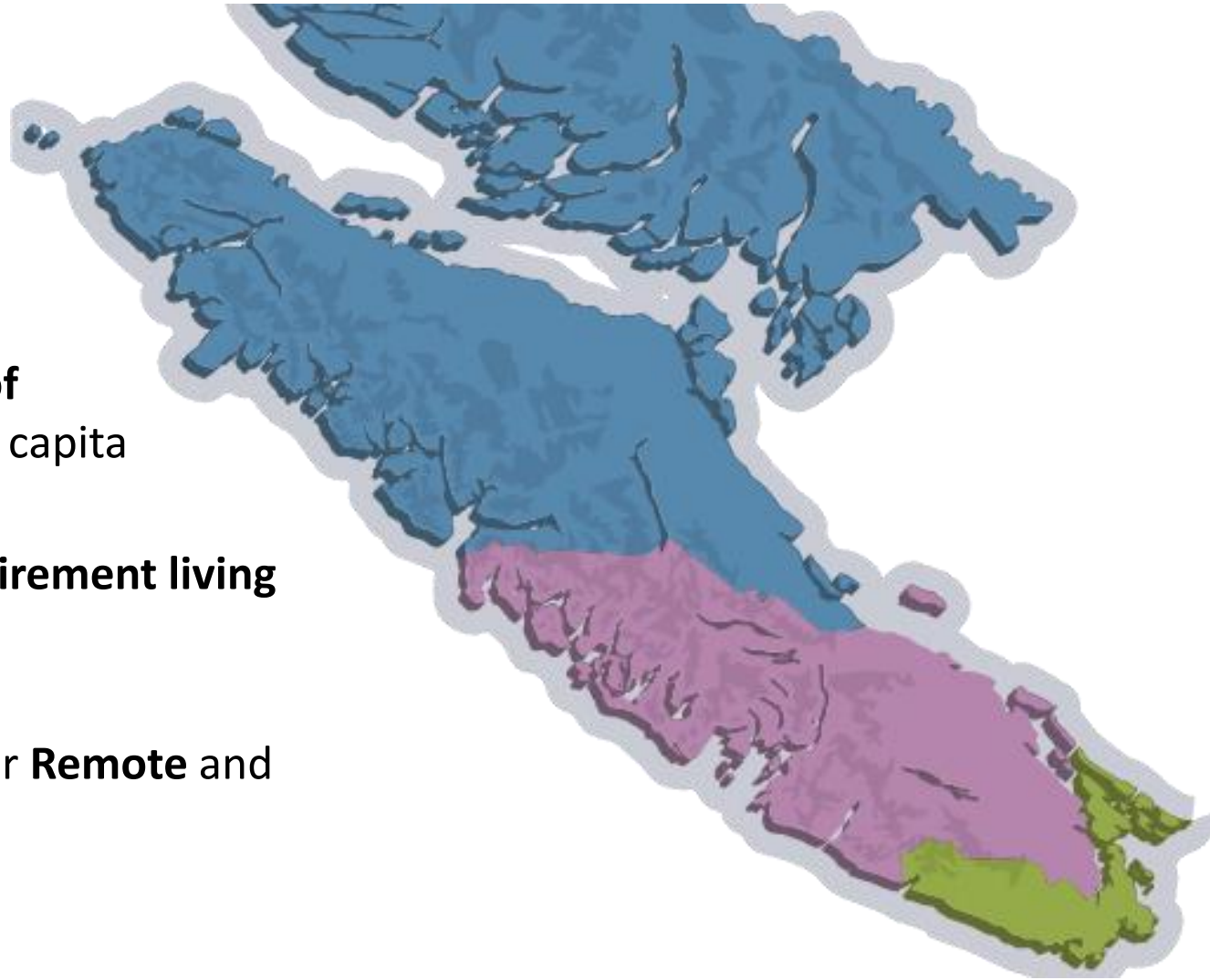


**Situation Normal**



# Telehome Monitoring Drivers - VIHA's Population and Geography

- **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



# Our Initial Results – Telehome Monitoring for Chronic Heart Failure

<b>Results</b> ( <i>n=87</i> )	<b>Pre</b>	<b>Post</b>	<b>Change</b>
Hospital Admissions (#)	36	14	↓ 61%
Length of Stay (days)	426	106	↓ 75%
Emergency Dept Visits (#)	57	20	↓ 65%

## **Client Experience and Satisfaction**

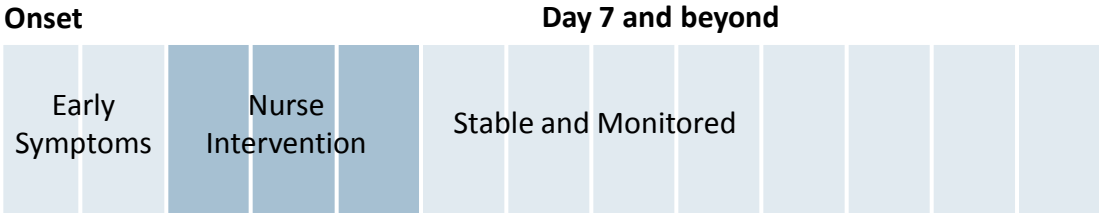
Client Compliance with Daily Measurements **98%**

% Reported “Easy to Use” **92%**

% “Strongly Agreed” that monitoring helped to manage CHF **87%**

# One Client's Story...

## With Telehome Monitoring



## Without Telehome Monitoring



- 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

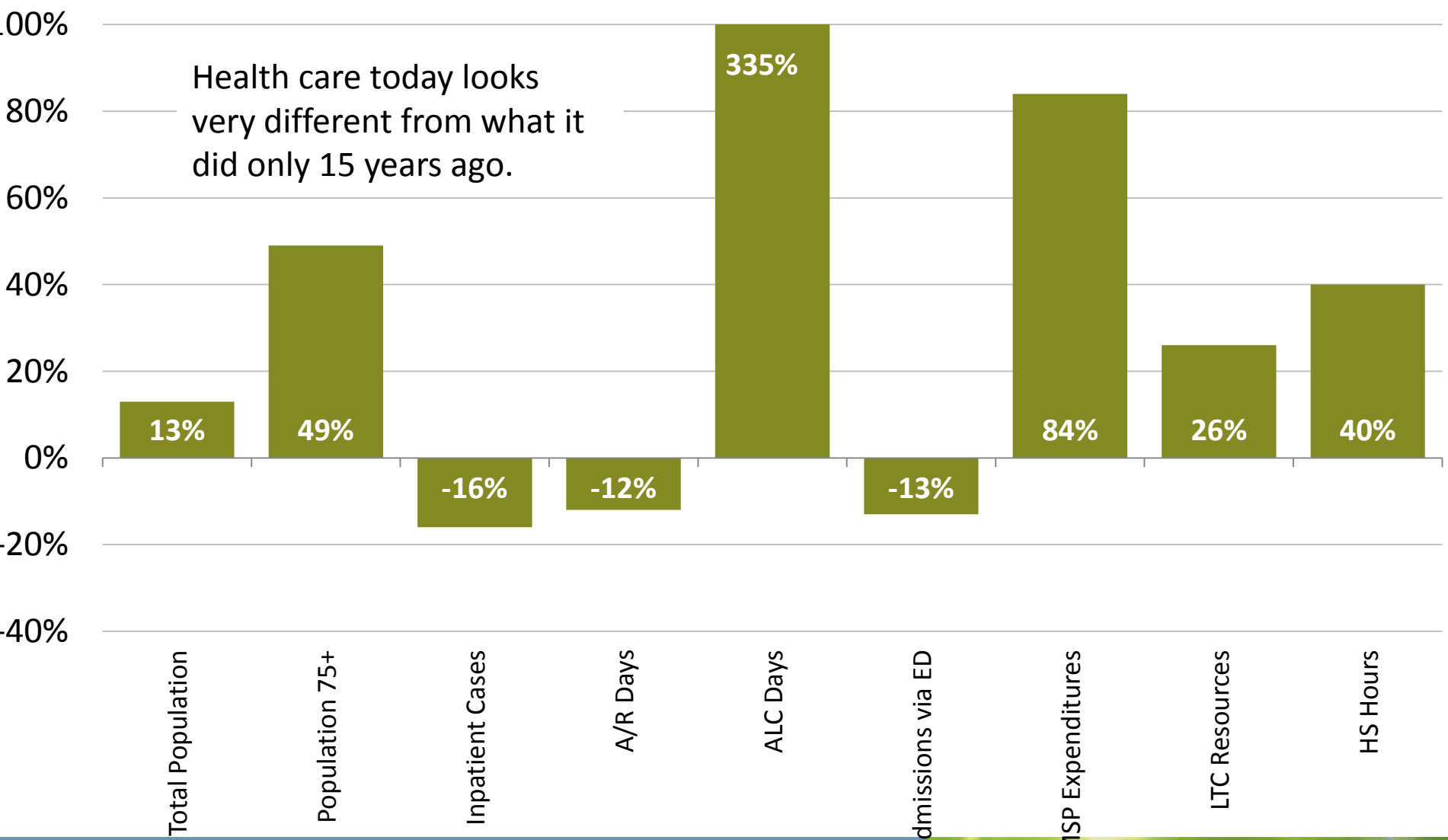


# VIHA's Electronic Health Record

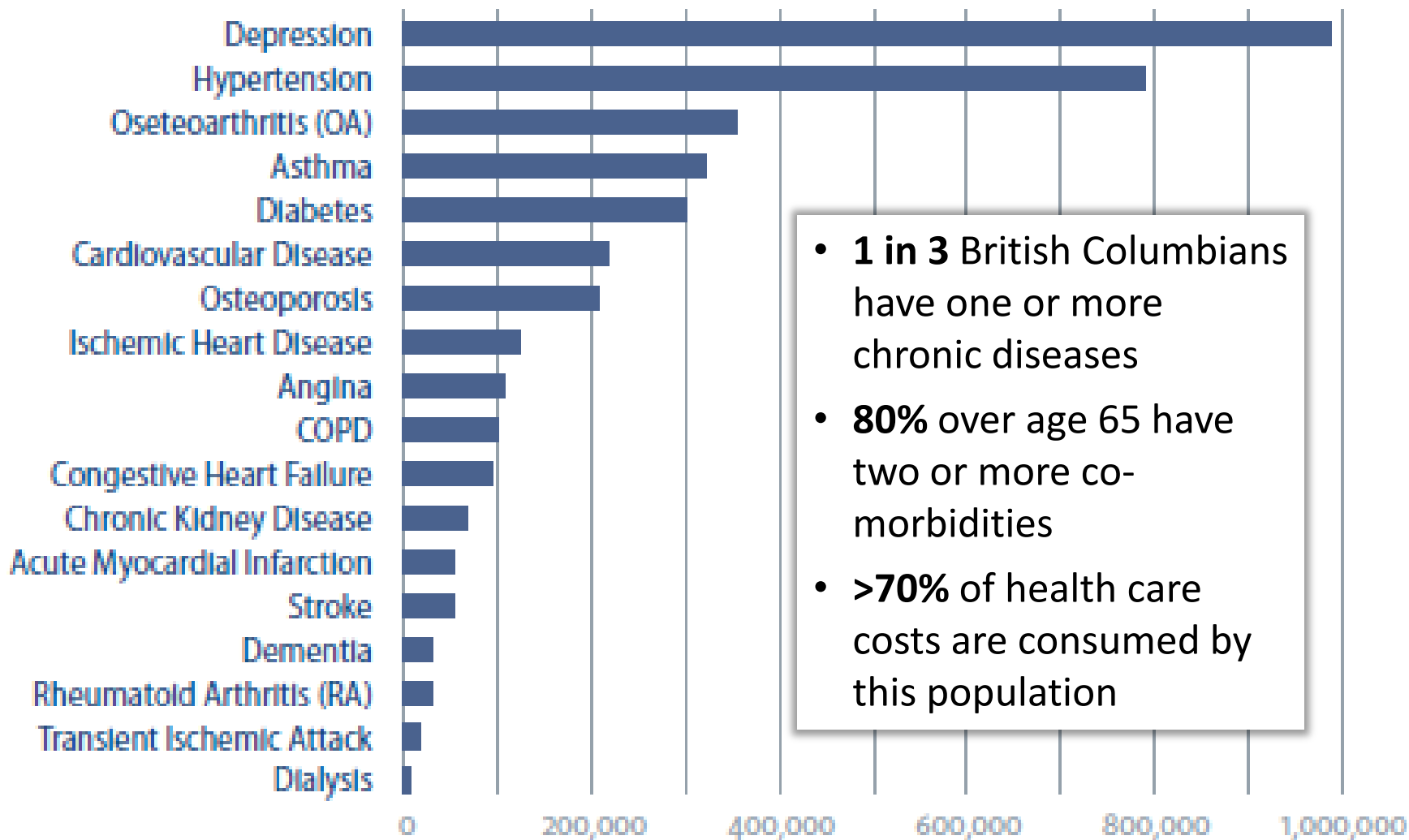
*Our Future – One Patient, One Record*



# Our Population Trends Since 1995



# Our Population- Prevalence of Chronic Disease in BC



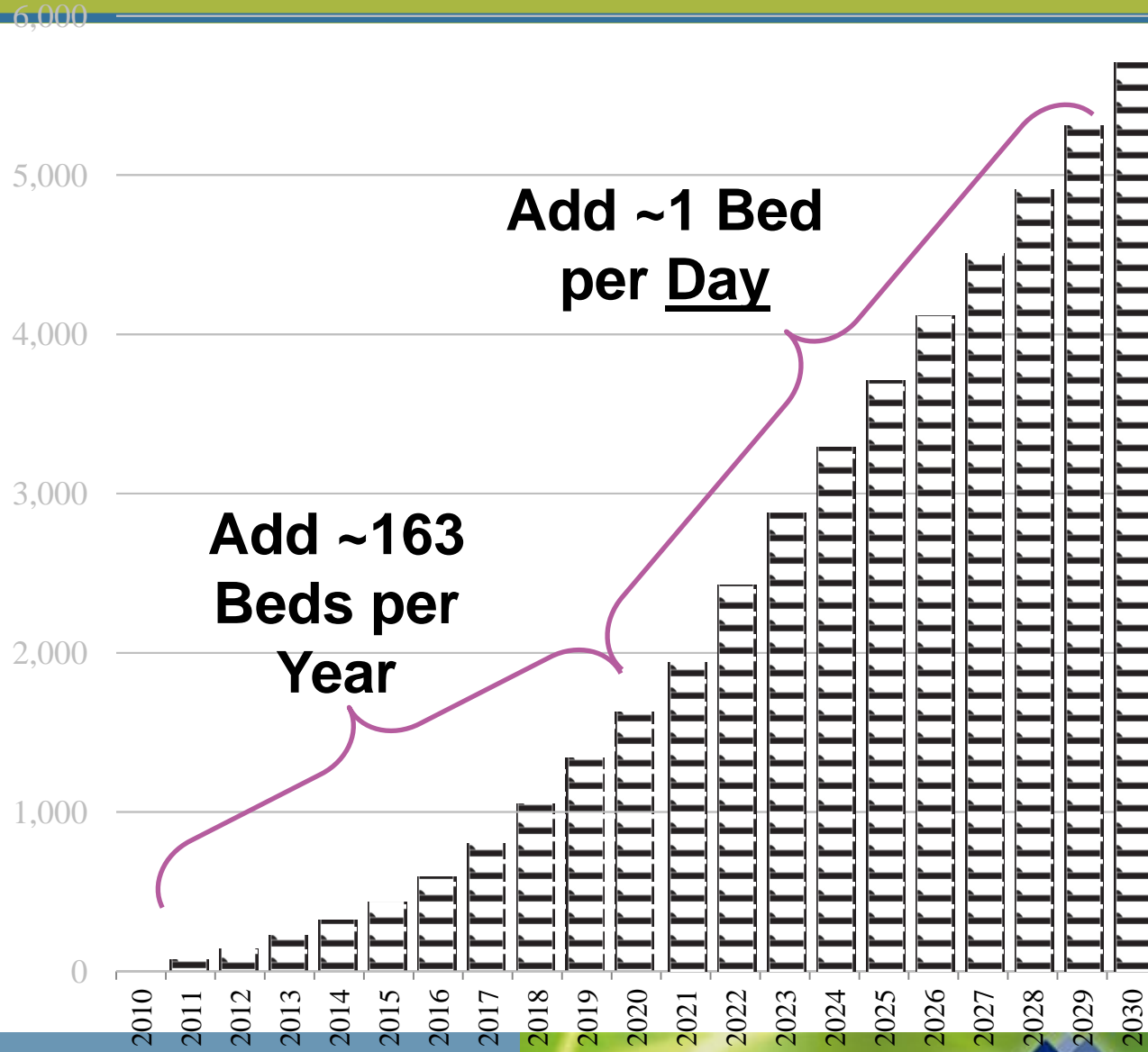
- **1 in 3** British Columbians have one or more chronic diseases
- **80%** over age 65 have two or more co-morbidities
- **>70%** of health care costs are consumed by this population

# A Case for Change

Maintain 92  
Per 1,000  
Population 75+

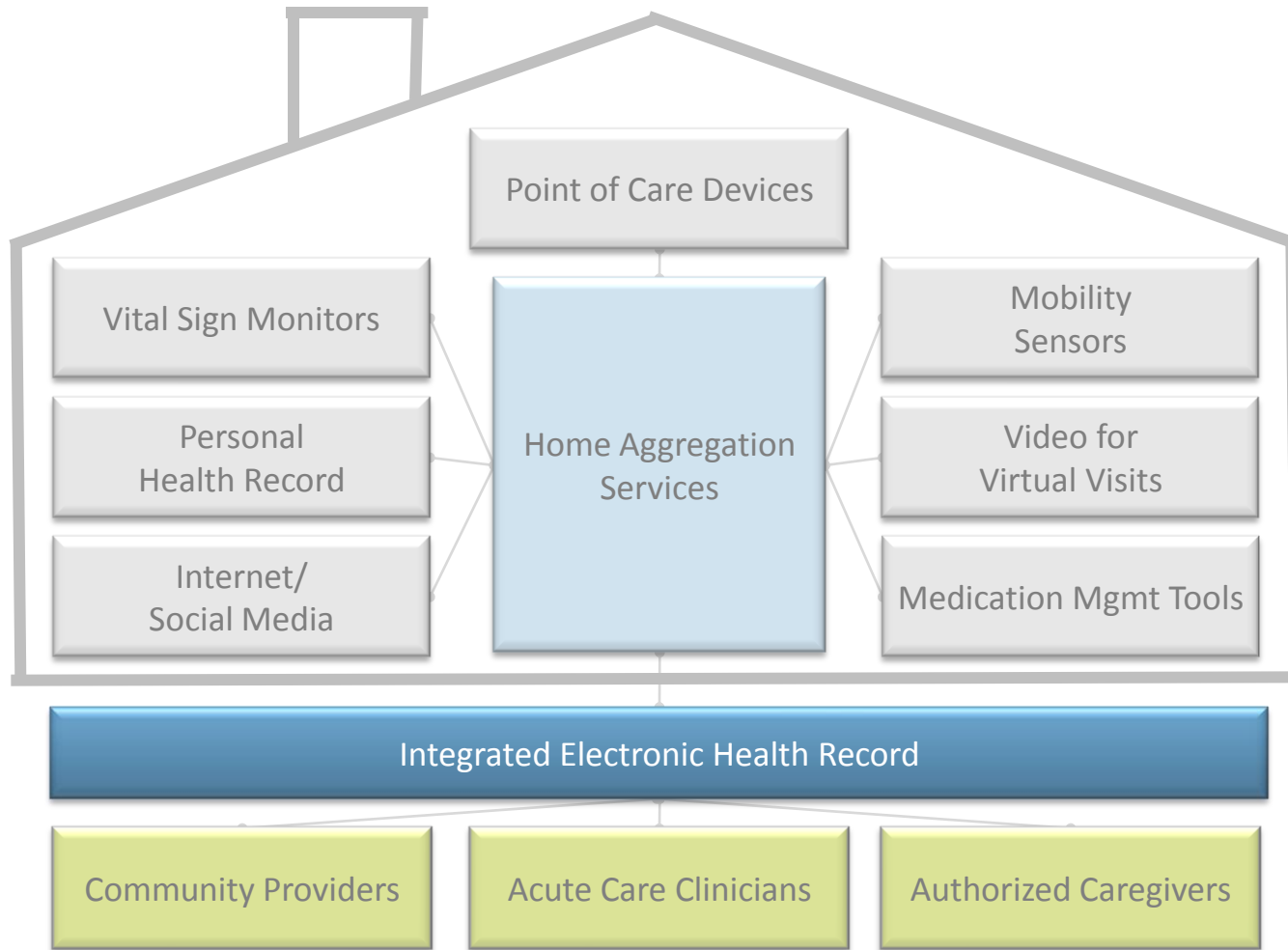


Additional Beds and Units

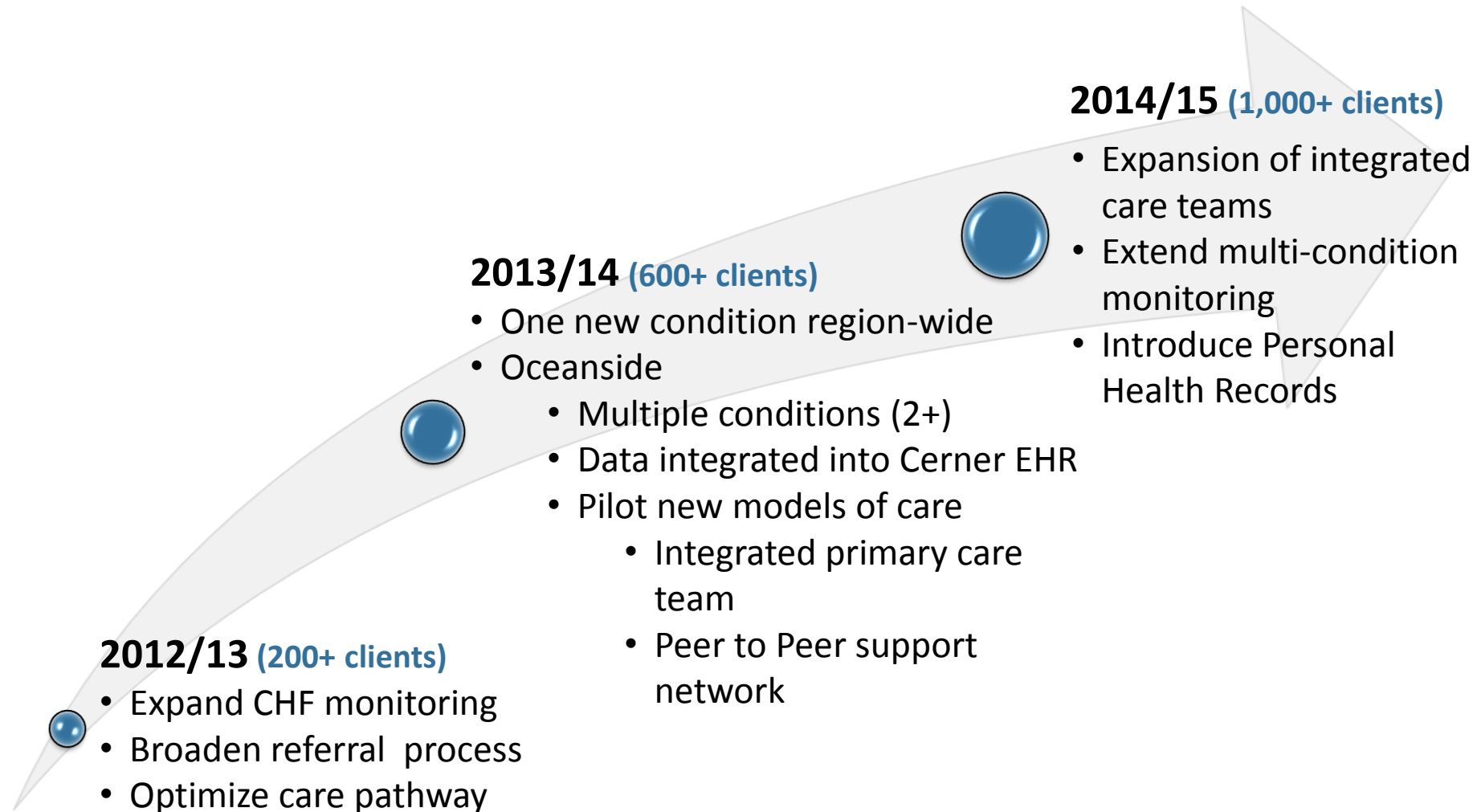




# Our Plan for Supporting Health and Care in the “Smart Home”









# Three Year Telehome Monitoring Roadmap – New Conditions, New Care Models



# 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.

Stage	Cumulative Capabilities	VIHA	Canada	United States
7	Data/information flows across continuum as byproduct of EHR		0.0%	1.7%
6	Structured Physician Documentation		0.5%	6.5%
5	Closed Loop Medication Administration		0.3%	11.5%
4	CPOE		2.5%	13.3%
3	Basic clinical documentation and decision support for errors		34.1%	42.4%
2	Clinical viewer for ancillary results		24.6%	11.7%
1	Ancillary (laboratory, pharmacy, and radiology systems) – all installed		15.0%	5.1%
0	All three ancillaries not installed	n/a	23.0%	7.9%

n = 639

n = 5303

\* Based on HIMSS Analytics EMR Adoption Model 2012 Q2

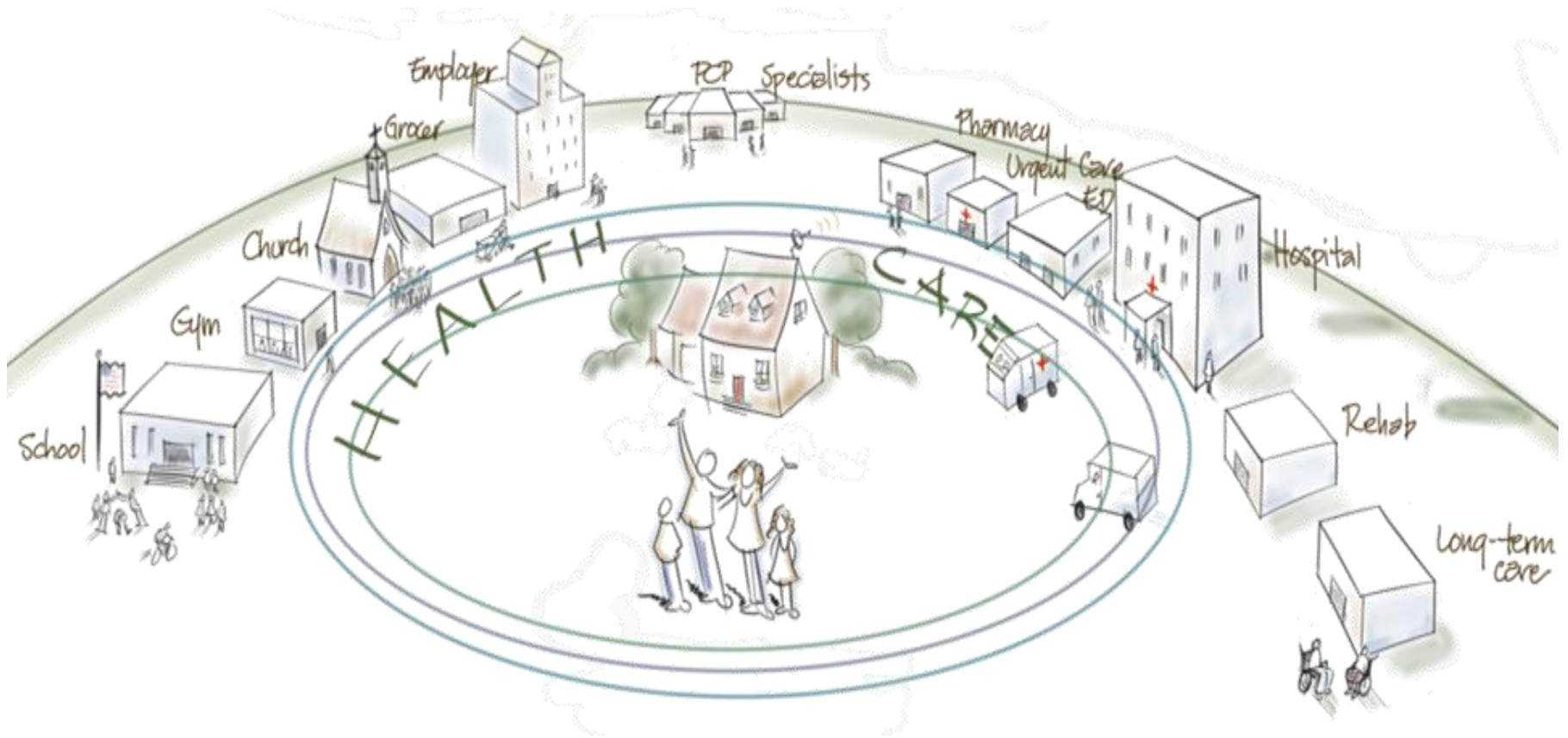
# Breaking Down the Silos - Next Generation EHR 2012-2015

- **Integrating Care Across the Continuum:**

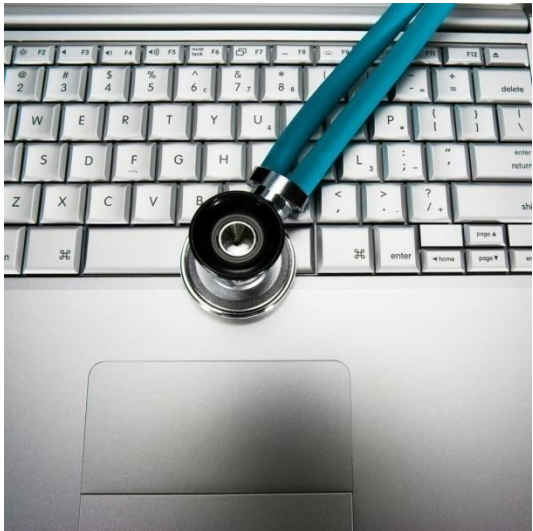
- Single, integrated patient-centric solution across all services provided by VIHA
- New solutions/options to connect Primary Care
  1. New, interoperability solutions to connect with EMRs (HIE)
  2. Cerner-based private office solution for existing practices
  3. New primary care models with Cerner-based 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

- **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.

Stage	Cumulative Capabilities	VIHA	Canada	United States
7	Data/information flows across continuum as byproduct of EHR		0.0%	1.2%
6	Structured physician documentation		0.5%	5.2%
5	Closed loop medication administration		0.2%	8.4%
4	CPOE		2.3%	13.2%
3	Basic clinical documentation and decision support for errors		36.5%	44.9%
2	Clinical viewer for ancillary results		20.4%	12.4%
1	Ancillary (laboratory, pharmacy and radiology) systems - all installed		14.5%	5.7%
0	All three ancillaries not installed	n/a	25.6%	9.0%

\* Based on HIMSS Analytics EMR Adoption Model 2011

n=641 5,337