Delivering Cardiac Device Care in the Community

CM Seifer

Faculty/Presenter Disclosure

- None

Mitigating Potential Bias

- None

Cardiac Sciences Program
Programme des sciences cardiaques

Objectives

- List common cardiac implantable electronic devices (CIED's)
- Describe existing remote technology
- Aware of emerging technology

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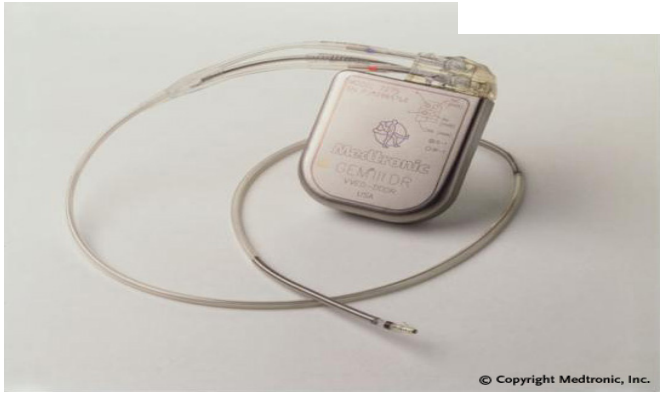
Cardiac Implantable Electronic Devices



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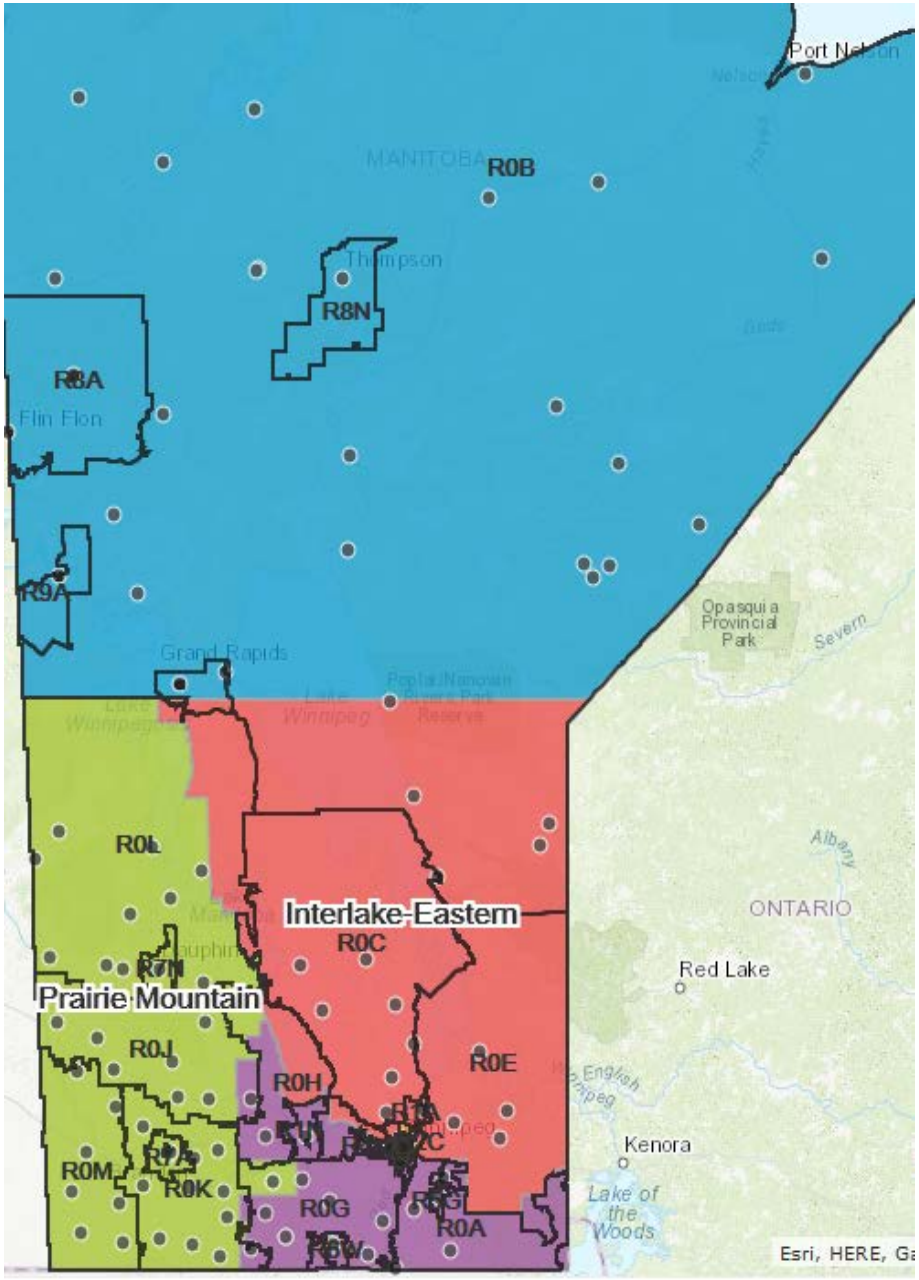

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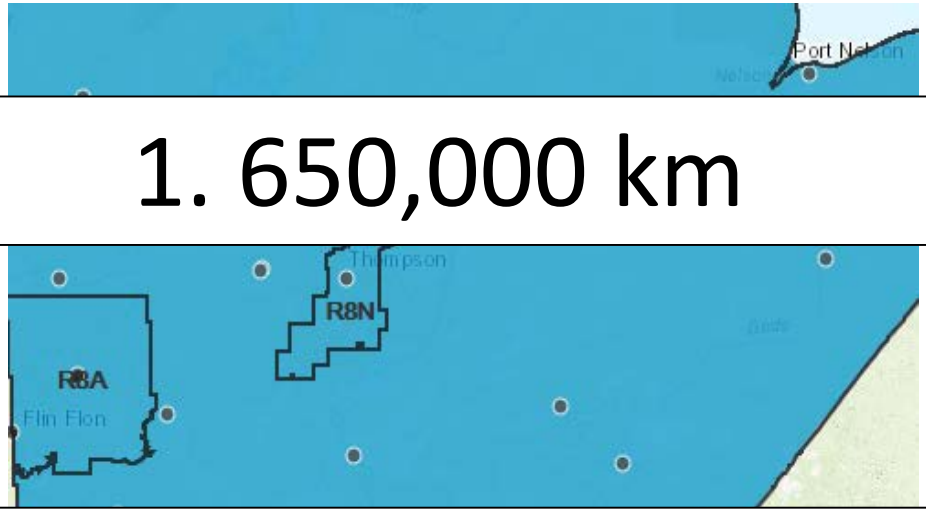
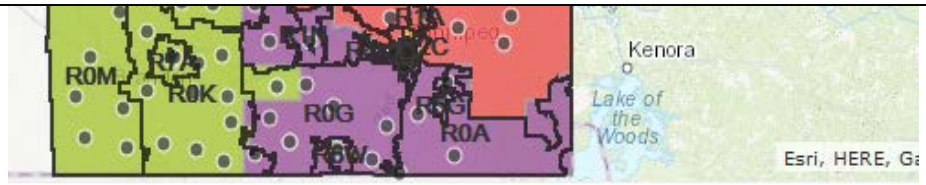
1. 650,000 km



2. 300,000 km

3. 150,000 km



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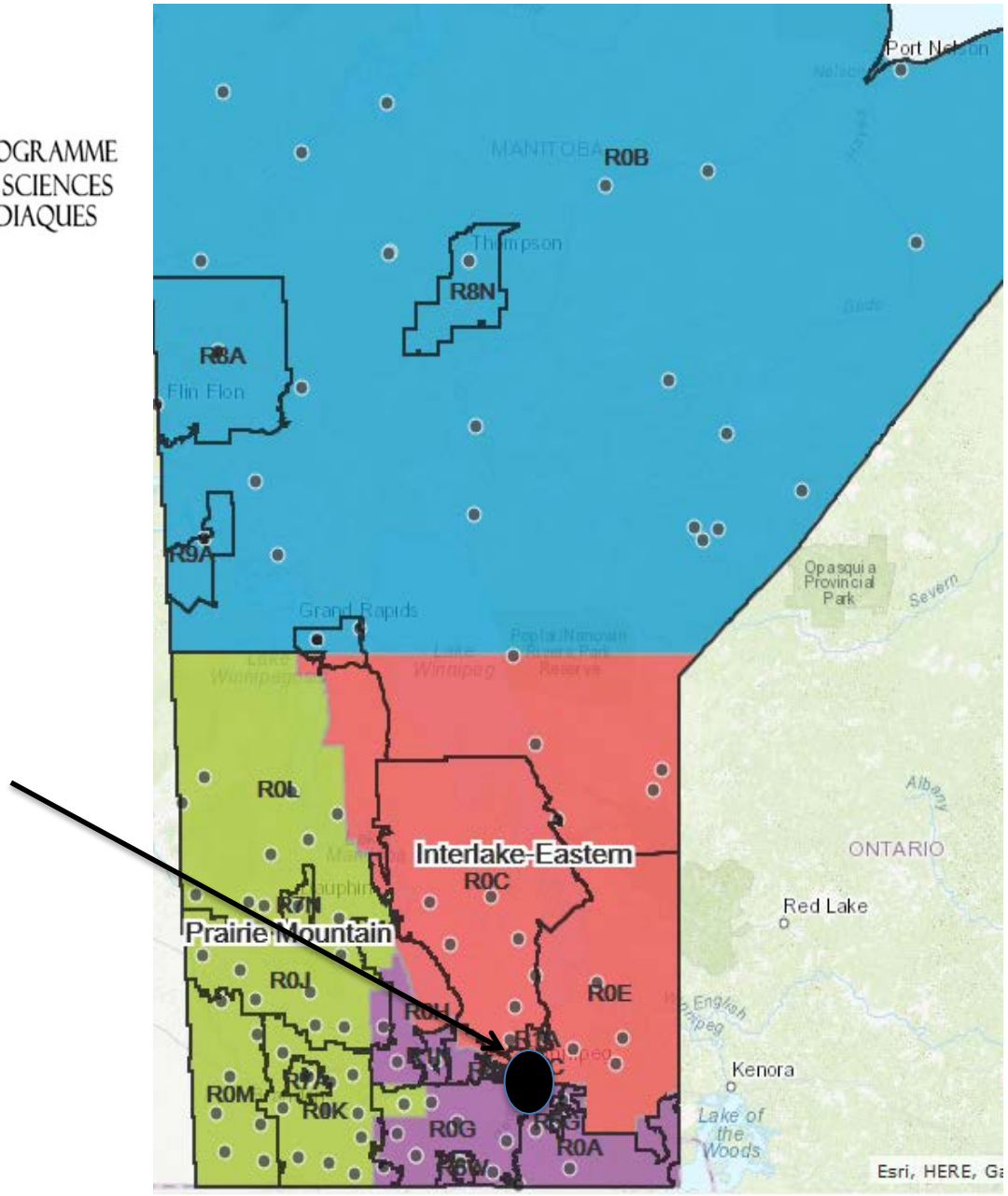

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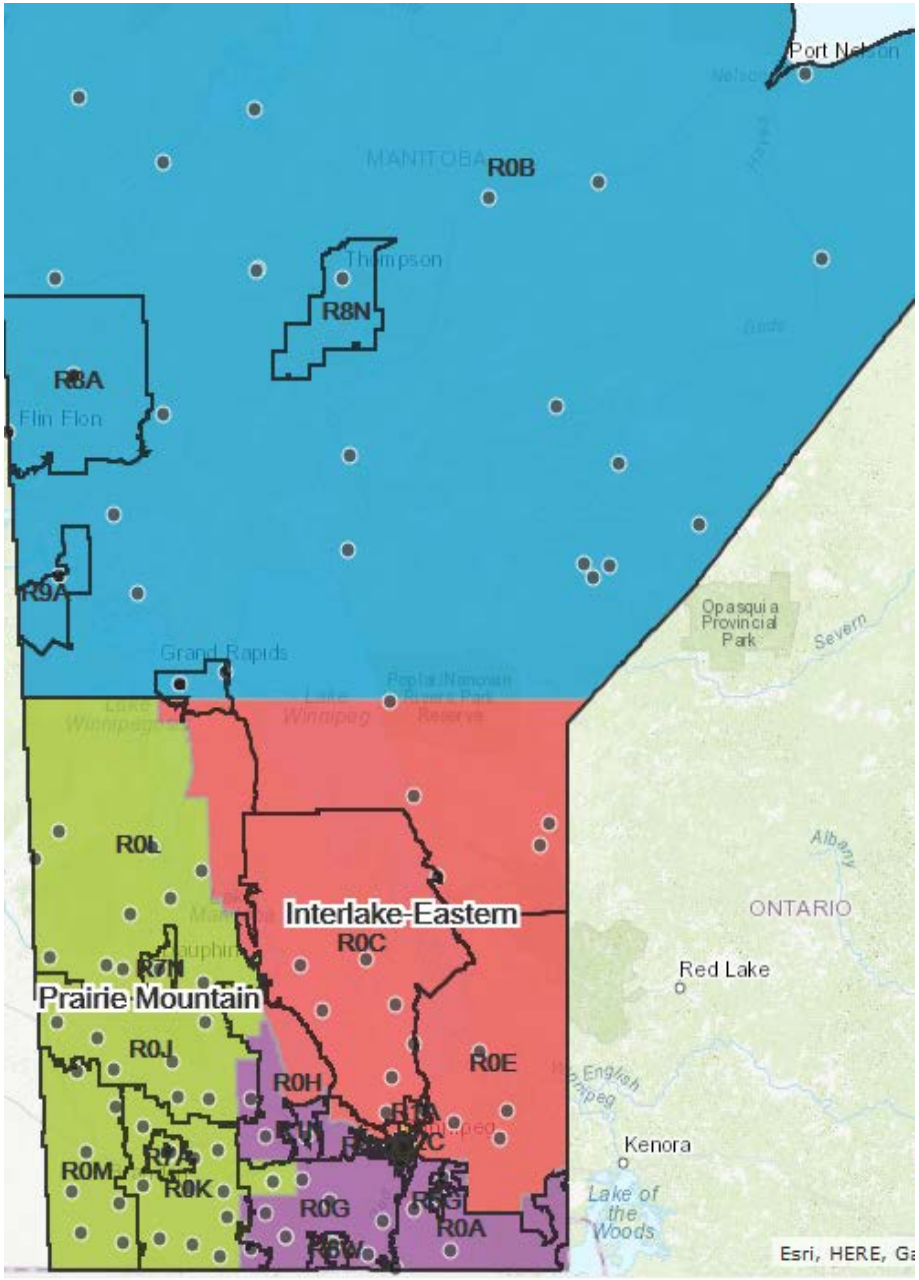

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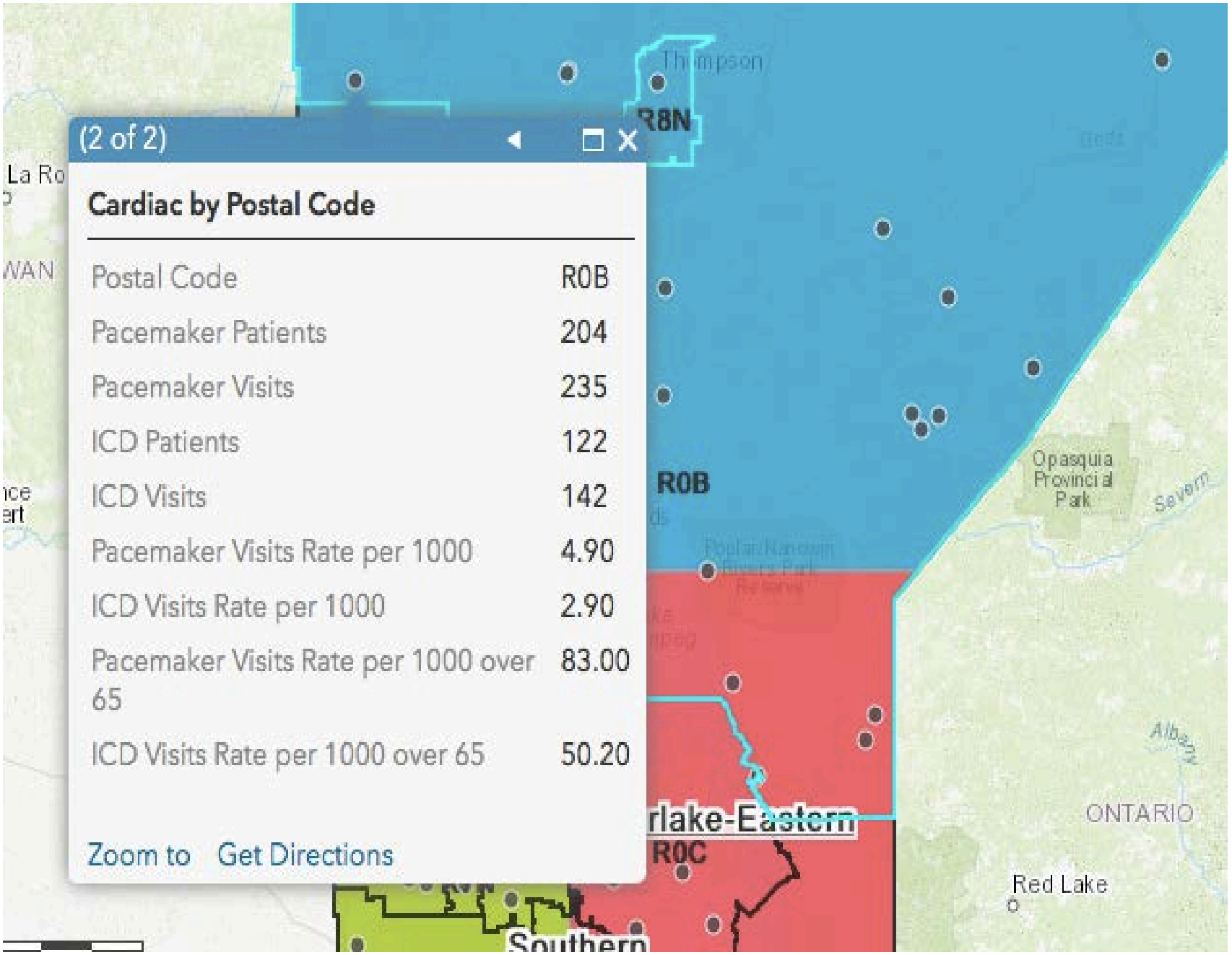
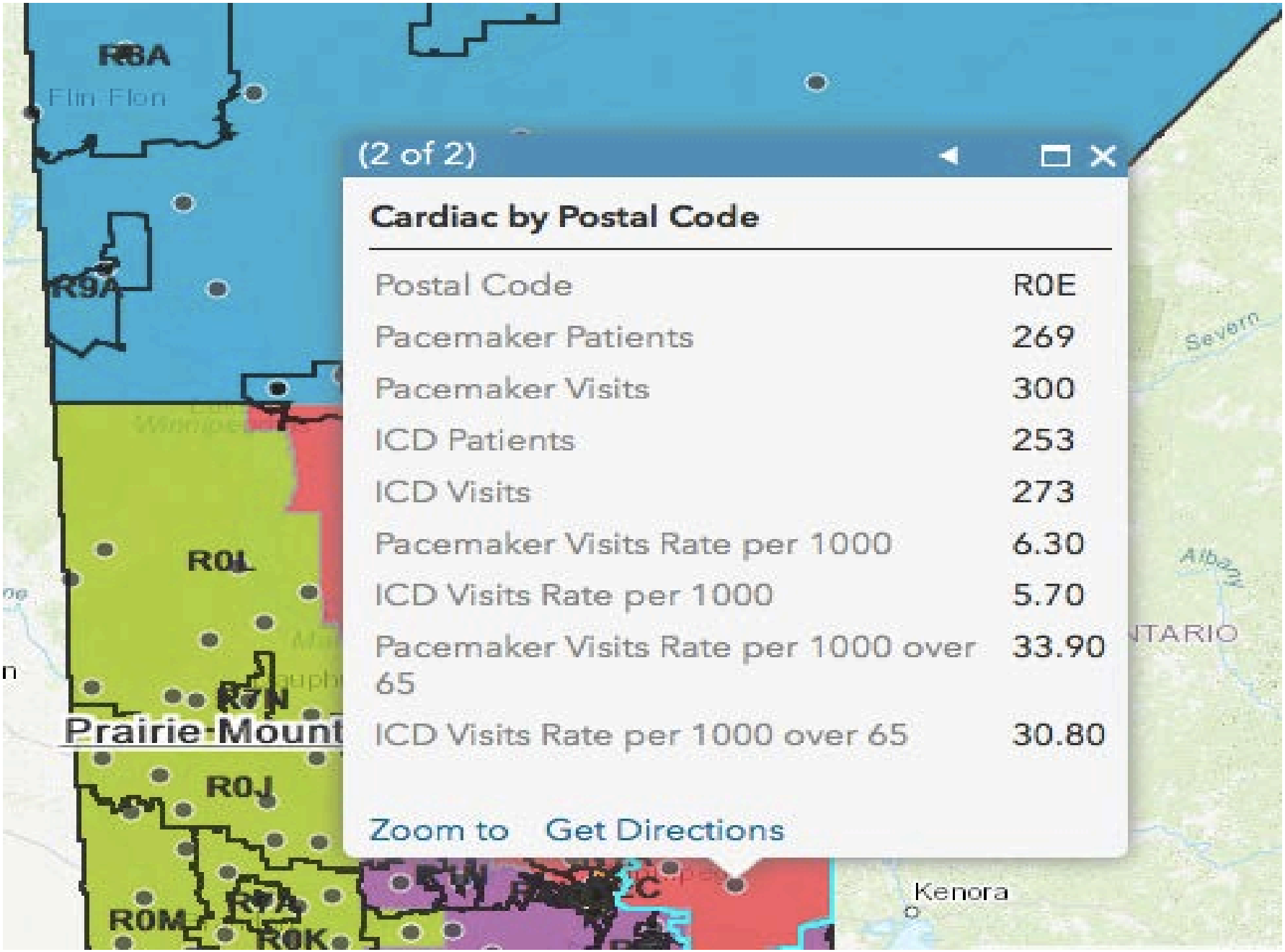
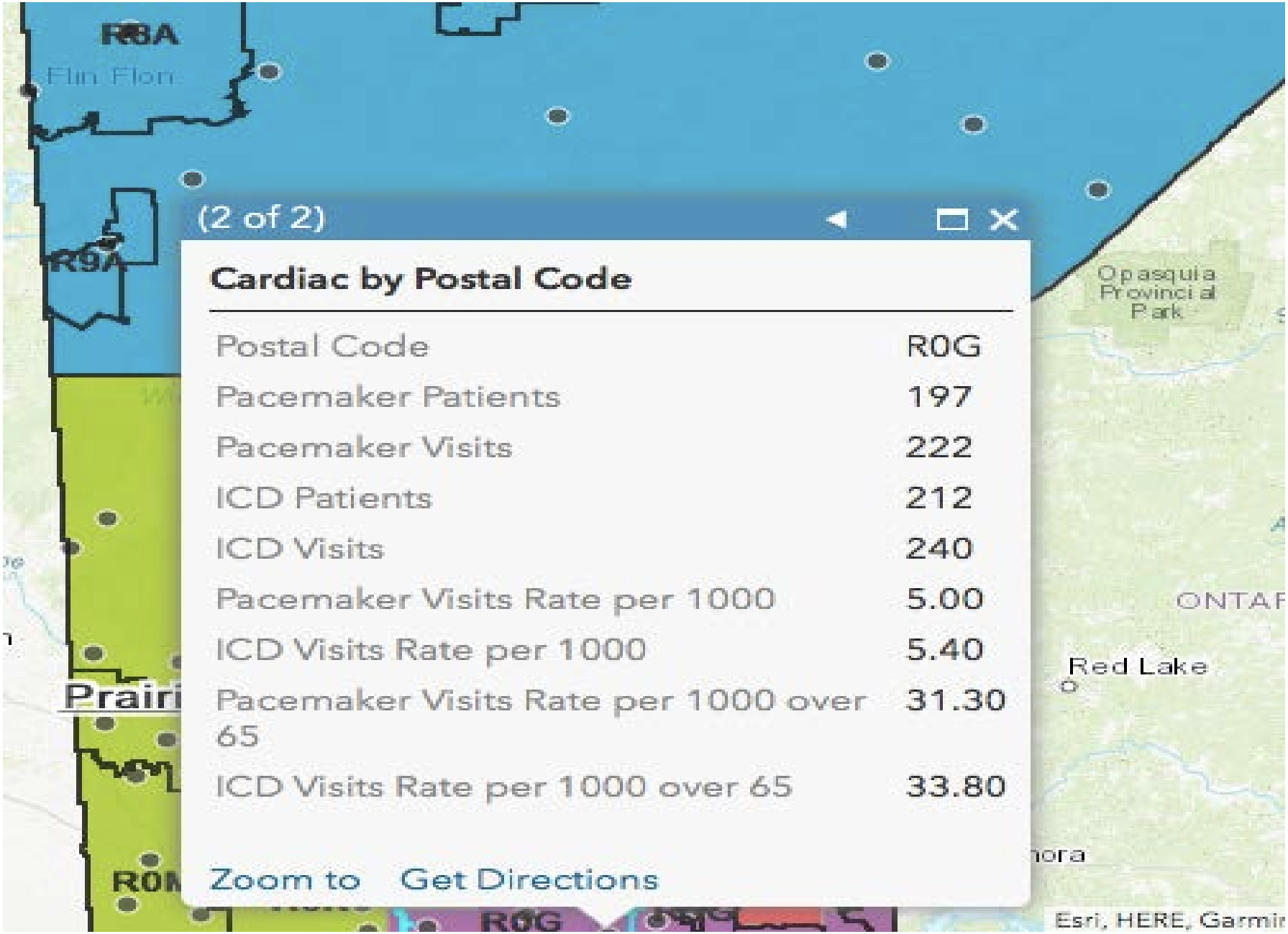

(2 of 2)
Cardiac by Postal Code
Postal Code R0B
Pacemaker Patients 204
Pacemaker Visits 235
ICD Patients 122
ICD Visits 142
Pacemaker Visits Rate per 1000 4.90
ICD Visits Rate per 1000 2.90
Pacemaker Visits Rate per 1000 over 65 83.00
ICD Visits Rate per 1000 over 65 50.20
Zoom to
Get Directions
Thompson
R8N
R0B
Opasquia Provincial Park
R0C
Red Lake
ONTARIO


R8A
Flin Flon
R9A
R0L
R0N
Prairie Mount
R0J
R0M
R0K
(2 of 2)
Cardiac by Postal Code
Postal Code R0E
Pacemaker Patients 269
Pacemaker Visits 300
ICD Patients 253
ICD Visits 273
Pacemaker Visits Rate per 1000 6.30
ICD Visits Rate per 1000 5.70
Pacemaker Visits Rate per 1000 over 65 33.90
ICD Visits Rate per 1000 over 65 30.80
Zoom to
Get Directions
Severn
Albany
ONTARIO
Kenora


R8A
Flin Flon
R9A
(2 of 2)
Cardiac by Postal Code
Postal Code R0G
Pacemaker Patients 197
Pacemaker Visits 222
ICD Patients 212
ICD Visits 240
Pacemaker Visits Rate per 1000 5.00
ICD Visits Rate per 1000 5.40
Pacemaker Visits Rate per 1000 over 65 31.30
ICD Visits Rate per 1000 over 65 33.80
Zoom to
Get Directions
Opasquia Provincial Park
Red Lake
R0G
Esri, HERE, Garmin

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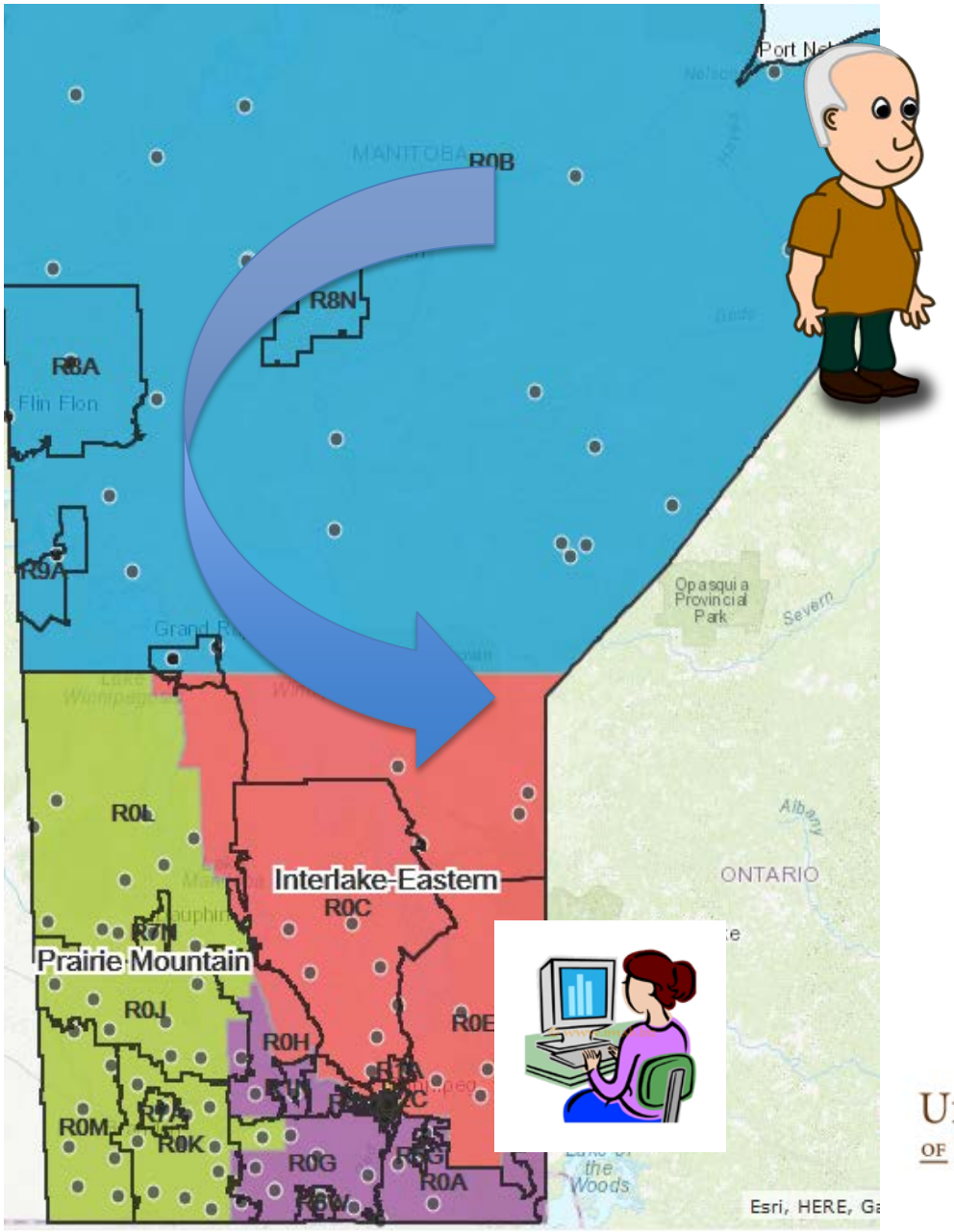

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HOW REMOTE MONITORING WORKS

1 SCHEDULE
Clinic schedules dates for the patient to send information from their device to the clinic.

2 SEND
Device information is sent automatically (for wireless ICDs) or manually by the patient (for pacemakers).

3 TRANSMIT
Device information travels from the remote monitor to the clinic.

4 REVIEW
The clinic reviews the device information on a secure website.

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http://www.medtronic.com/us-en/patients/treatments-therapies/remote-monitoring.html

Biotronik Cardiomessenger™ mobile transmitter of the Home Monitoring system

St-Jude Medical Merlin@home™ wireless transmitter

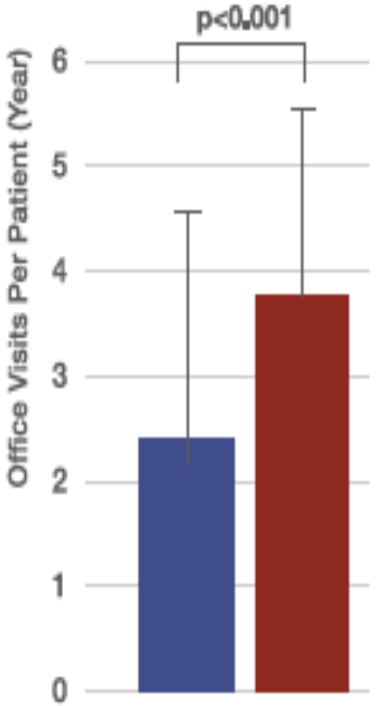
Boston Scientific wireless transmitter, weight scale, and blood pressure monitor of the Latitude Patient Management™ system

Medtronic transmitter (Home Monitor) of the CareLink™ network

HRS Expert Consensus Statement on remote interrogation and monitoring for cardiovascular implantable electronic devices

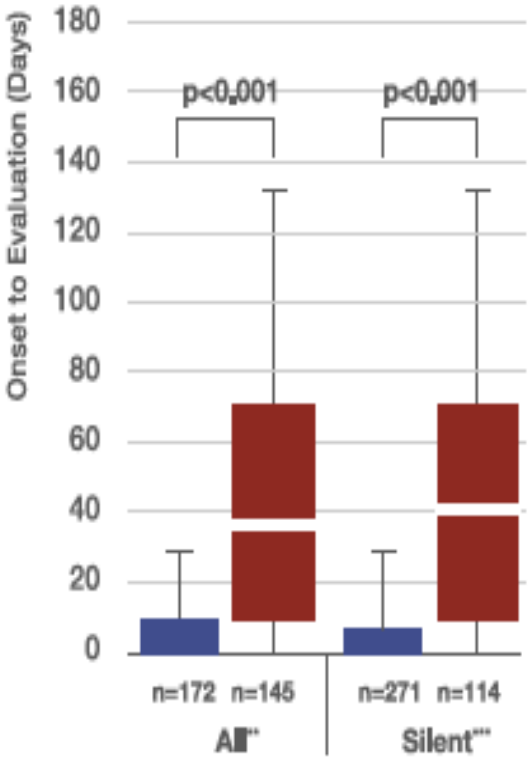
Heart Rhythm 2015;12:e69–e100

Reduction in In-Clinic Evaluations*



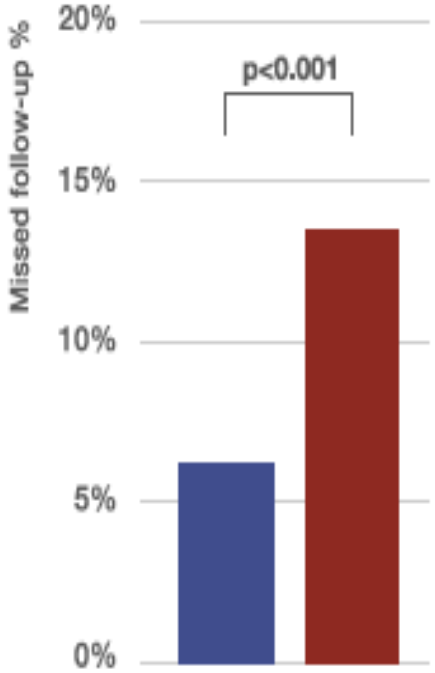
*Data from TRUST are presented and show that remote monitoring reduced in-clinic evaluations by 45% per year. A similar effect was seen in the CONNECT trial in which remote management was associated with a reduction of office visits from 6.3 in conventional care to 3.9 per person year.

Early Detection*



*Data from TRUST are presented. The CONNECT Trial shows similar results for early detection
**In CONNECT, median time from event to clinical decision was 4.6 days in the Remote arm vs. 22 days in conventional care.
***Time to detect clinically asymptomatic (silent) conditions was not reported in CONNECT".

Rates of failed scheduled evaluations in remote only vs. conventional care over 1 year*



*Data from TRUST are presented. Rates of failed calendar-based evaluations in remote only vs. conventional care over 1 year data information was not available from the CONNECT Trial

— REMOTE MONITORING — CONVENTIONAL

HRS Remote Monitoring Consensus Statement Recommendations

Device Follow-Up Paradigm	Class of Recommendation	Level of Evidence
A strategy of remote CIED monitoring and interrogation, combined with at least annual IPE, is recommended over a calendar-based schedule of in-person CIED evaluation alone (when technically feasible).	I	A
All patients with CIEDs should be offered RM as part of the standard follow-up management strategy.	I	A

Remote monitoring of pacemaker patients

Anna Sampson, Project Manager for the Remote Monitoring Pacemaker Project at St. Mary's General Hospital.

St. Mary's General Hospital in Kitchener is the first Ontario hospital to offer a satellite location for pacemaker patients to perform device checkups remotely. This has the potential to significantly reduce patient travel time and expense, while ensuring their pacemakers are operating properly. The hospital operates a tier one Regional Cardiac Care Centre, which offers a full range of cardiac services to residents of Waterloo-Wellington Region and beyond.

The first group of patients completed their pacemaker device checkups at the YMCA-YWCA in Guelph, Ontario in late May. This was after months of research, planning and screening of potential St. Mary's patients. The YMCA-YWCA has been a key partner in bringing this service to patients and allowing St. Mary's to work within the community at a convenient and accessible location which

FastPath™ Summary

2 Alerts

Battery
Longevity: 8.4 yrs

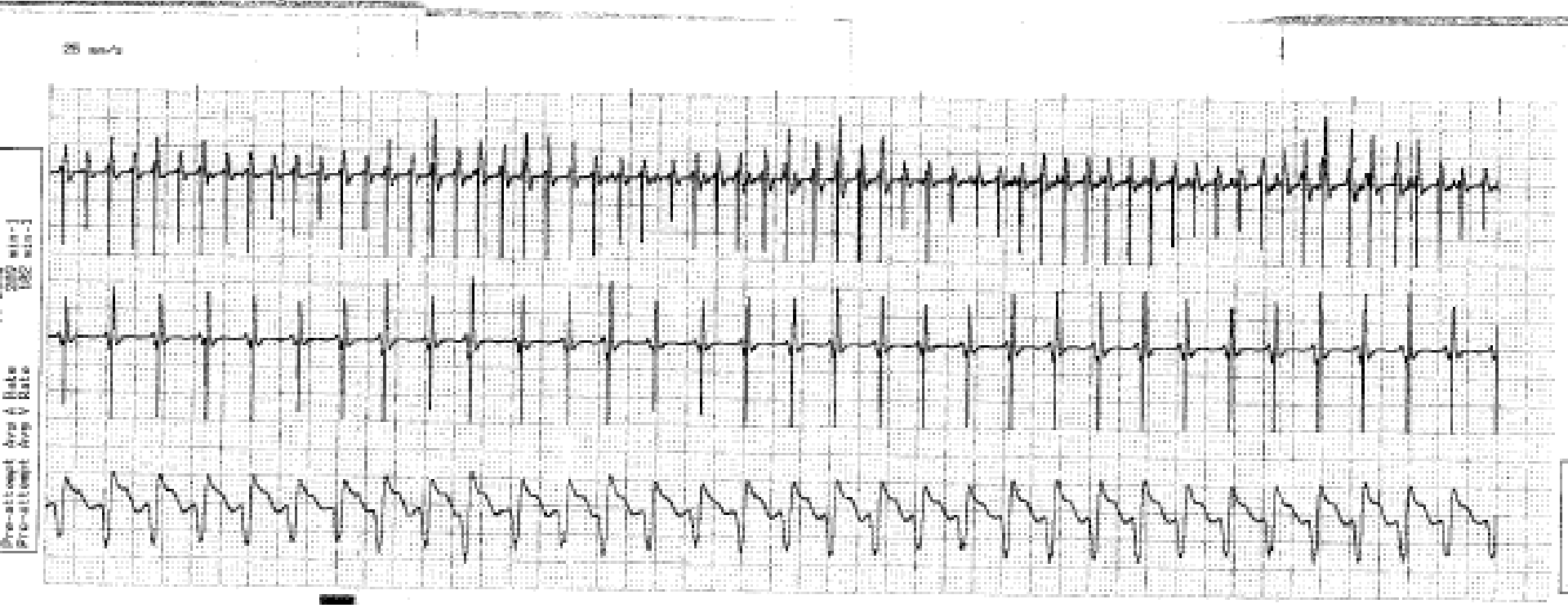
Implant Date:	Mar 16, 2018
Last Max Charge	7.8 sec (Jul 16, 2018)
Battery Current	12 uA
Remaining Capacity to ERI	93%

Test Results Sep 20, 2018

(A) Automatic

	Capture	Sense	Lead Impedance
A	Not Performed 0.5V @ 0.5ms (Bi) Jul 30, 2018	3.0mV (Bi) (A) >5.0mV (Bi) Jul 30, 2018	330 Ω (Bi) (A) 380 Ω (Bi) Jul 30, 2018
V	Not Performed 0.75V @ 0.5ms (Bi) Jul 30, 2018	11.7mV (Bi) (A) 11.7mV (Bi) Jul 30, 2018	2500 Ω (Bi) (A) 560 Ω (Bi) Jul 30, 2018
HV			45 Ω (RV to SVC & Can) (A) 49 Ω (RV to SVC & Can) Jul 30, 2018

Intracardiac Electrogram



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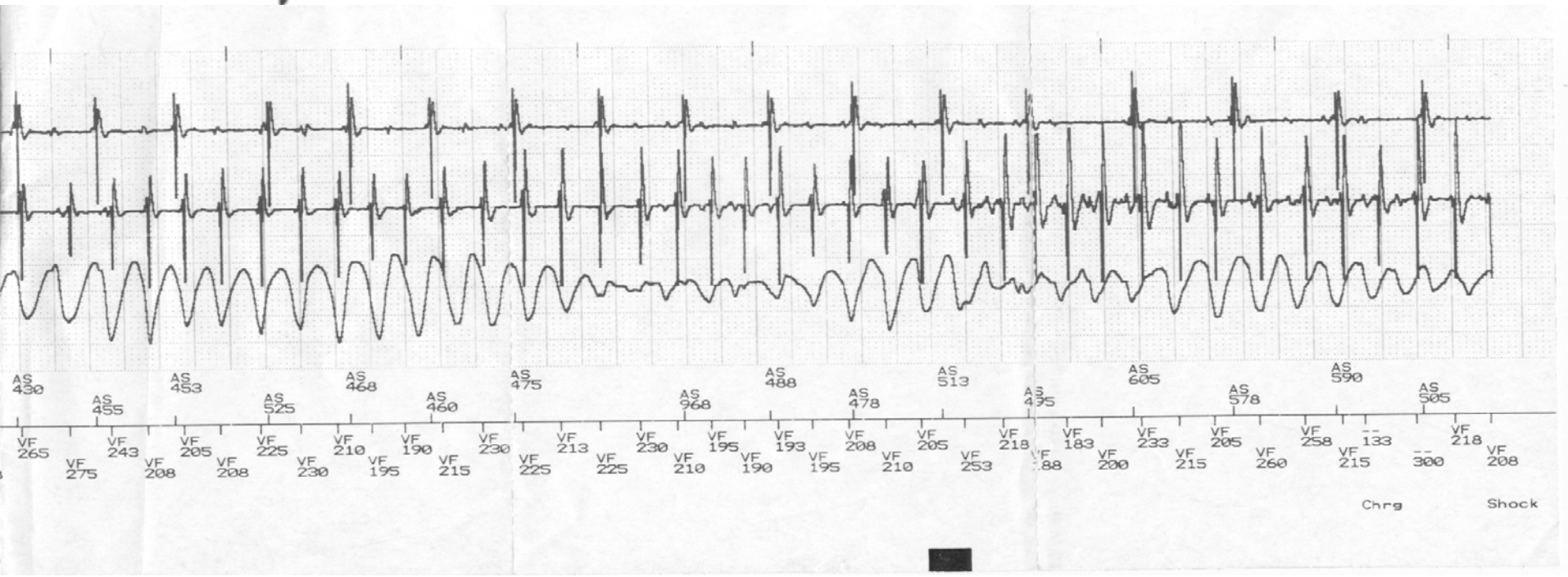
Intracardiac Electrogram



Remote Monitoring

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Firmware Update to Address Cybersecurity Vulnerabilities Identified in Abbott's (formerly St. Jude Medical's) Implantable Cardiac Pacemakers: FDA Safety Communication

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Date Issued

August 29, 2017

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Cybersecurity for Cardiac Implantable Electronic Devices

What Should You Know?

Adrian Baranchuk, MD,[a] Marwan M. Refaat, MD,[b] Kristen K. Patton, MD,[c] Mina K. Chung, MD,[d] Kousik Krishnan, MD,[e] Valentina Kutyifa, MD, PhD,[f] Gaurav Upadhyay, MD,[g] John D. Fisher, MD,[h] Dhanunjaya R. Lakkireddy, MD,[i] from the American College of Cardiology's Electrophysiology Section Leadership

J Am Coll Cardiol 2018

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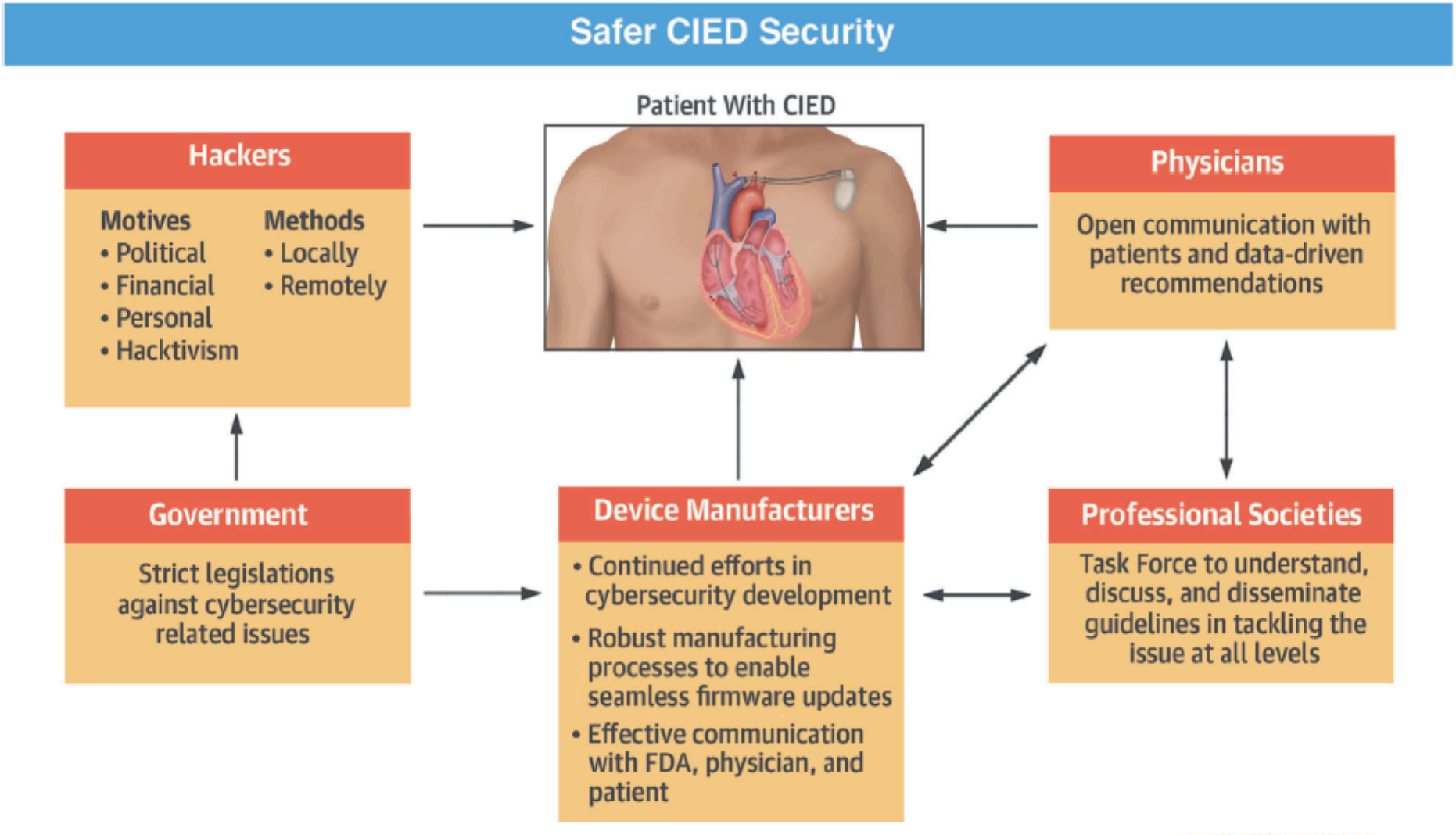
CENTRAL ILLUSTRATION Interaction Amongst Various Stake Holders in Addressing the Cybersecurity Issue



Patient Satisfaction

- <5% of patients decline home monitoring
  - Privacy concerns
  - Fear of technology
  - Loss of contact with clinicians

Morichelli L, Ricci RP. Remote monitoring of implantable devices: the European experience. *Heart Rhythm* 2009;**6**:1077–80.

SBH Pacemaker and Defibrillator Clinic

- All ICD patients are offered remote monitors
- No cost to the patient
- Pacemaker patients are currently not offered remote monitoring*

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Remote Patient Management for Cardiac Implantable Electronic Devices (RPM-CIED)- Pacemaker

Principal Investigator: Dr. Ratika Parkash,
QEII Health Sciences Centre, Halifax, Nova Scotia

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Cardiac Sciences Program / Programme des sciences cardiaques

Adult Patients undergoing Pacemaker Implant

Randomized 1:1

Standard of Care
-yearly in clinic f/up

Intervention Group
-remote f/up
-q3monthly transmissions

-Cost effectiveness
-Safety (major adverse outcomes)

University of Manitoba

RPIM-CIED

Emerging Technologies

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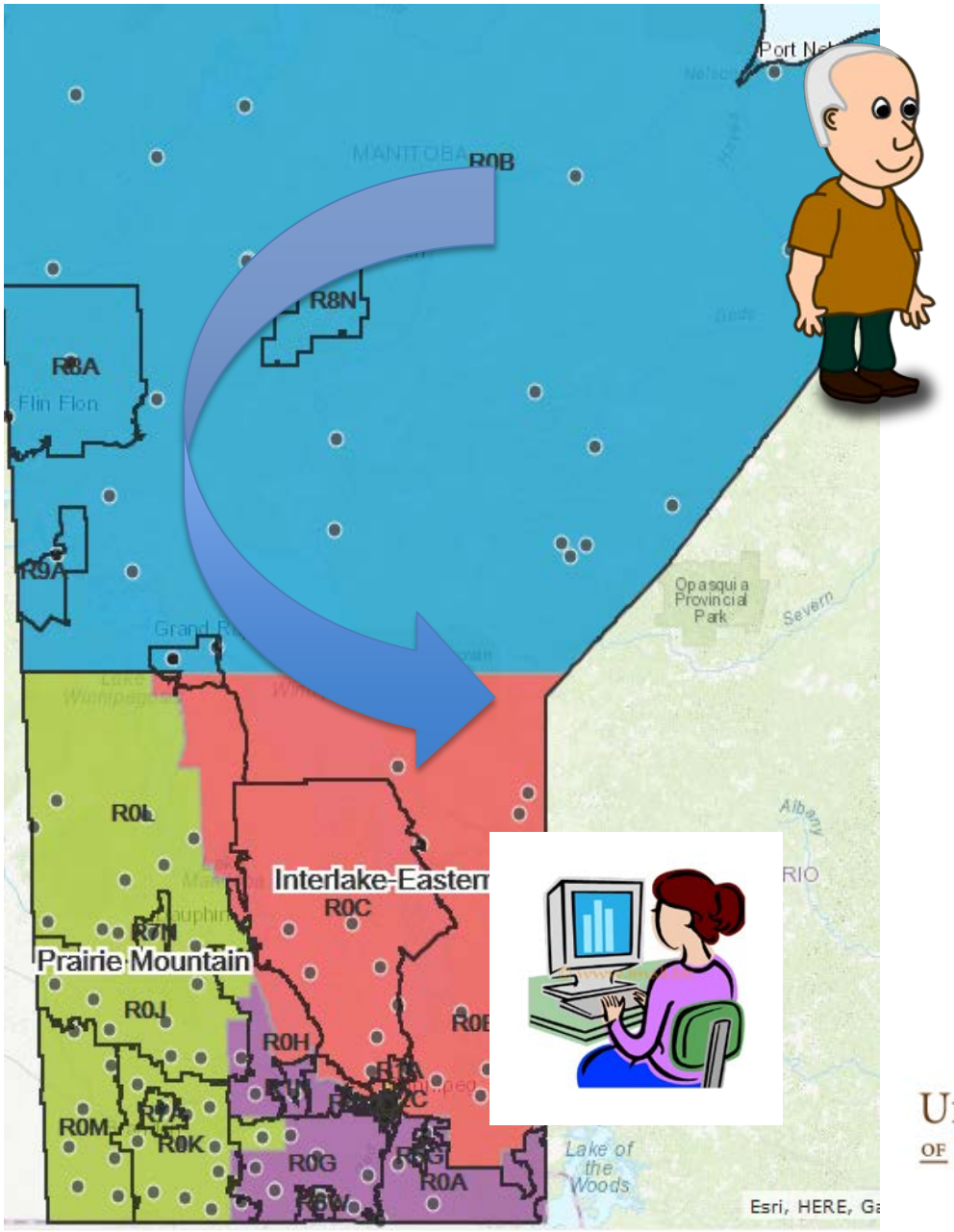

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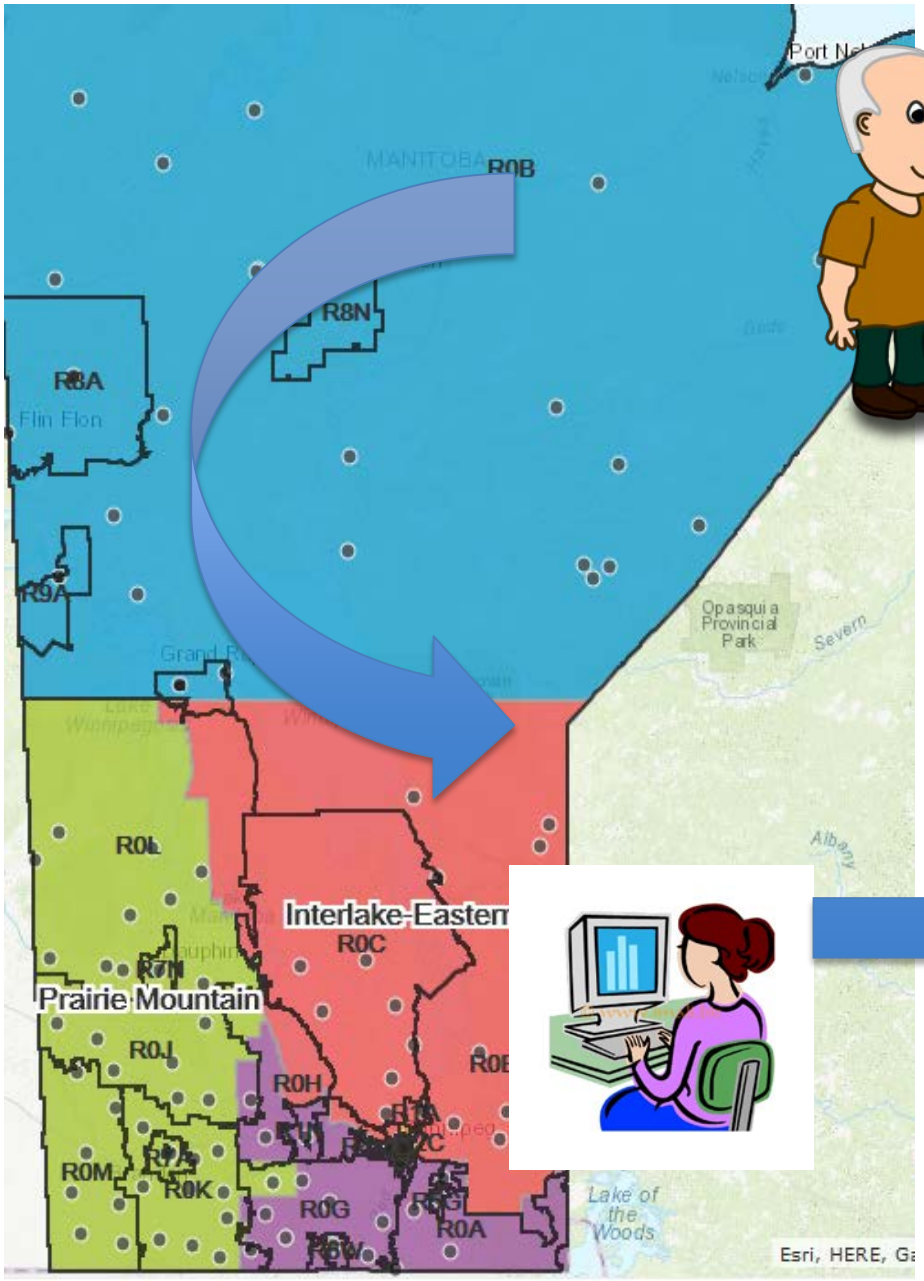

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