

Syndromic Surveillance: Lessons Learned from a Rural Region

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Where is Grey Bruce?

Southern Ontario Health Units



Why Grey Bruce?

- Walkerton Outbreak of Walkerton Gastroenteritis, May 2000
 - E.coli O157:H7 and Campylobacter illnesses associated with a municipal water supply
 - 2300 cases associated with this outbreak, 6 deaths

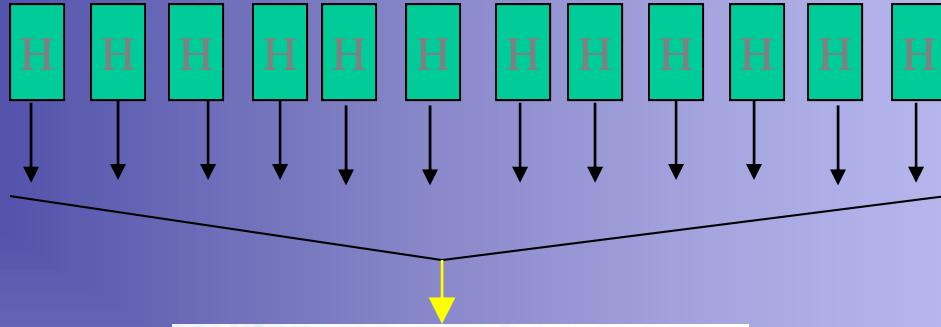


Surveillance in PH – Before

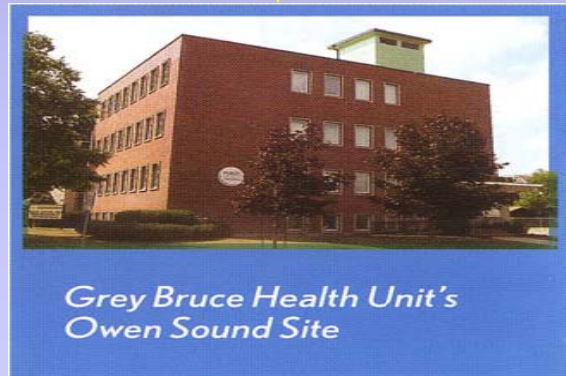
- Investigation of laboratory confirmed cases of Reportable Diseases
- Queries from local GPs & Emergency Depts to local Medical Officer of Health
- Other sources of info – LTC facilities, Daycares, and School absenteeism (>10%)
- OTC Sales since fall 2004 (at first twice per month, then weekly)

What is ECADS?

- Early CBRN Attack Detection by Computerized Medical Record Surveillance (ECADS)
- Began as a pilot project funded through NRC – CRTI:
 - to retrospectively test a RODS (Real time Outbreak Detection and Surveillance) based system on Walkerton outbreak data
 - demonstrate real-time data capture in Grey Bruce



RODS
server



What is it?

- Takes Emergency Department patient Chief Complaint text data (from all hospitals in Grey Bruce)
- Categorizes it into one of eight syndromes
 - Gastrointestinal (pain, cramps, vomiting, diarrhoea)
 - Respiratory (sore throat, congestion, cough, asthma, cold symptoms)
 - Constitutional (fever, chills, weakness, faintness, malaise)
 - Hemorrhagic (bleeding from any sight)
 - Neurological (headache, seizure, loss of consciousness)
 - Rash (rashes, hives)
 - Botulinic (ocular abnormalities, difficulty speaking or swallowing)
 - Other (trauma, chest pain, earache, etc.)

Anomaly Detection Methods

- CUSUM – cumulative sum of a series of measurements; detects changes in trend from expected value
- Recursive Least Squares (RLS) – detects sudden increases in daily surveillance data counts

What Does ECADS Look Like?

Sample Email Alert

Bruce Telecom Web Mail - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address <http://webmail.bmts.com/cgi-bin/mmstdol2.cgi> Go Links >>

[2-1]

BRUCE TELECOM

Web Mail

#	View	Mark	Message	Date	Size	Delete
2	View	<input type="checkbox"/>	From: rods@gbhs.on.ca Subject: EpiAlert (HIGH) Rash in Cou...	Wed, 12 Apr 2006 17:56:12 - 0400 (EDT)	1	
1	View	<input type="checkbox"/>	From: rods@gbhs.on.ca Subject: EpiAlert Rash in County GRE...	Wed, 12 Apr 2006 17:56:11 - 0400 (EDT)	1	

[Reload](#) [Log Out](#) [Compose](#) [Help](#)

EpiAlert Report in County GREY_BRUCE, ON

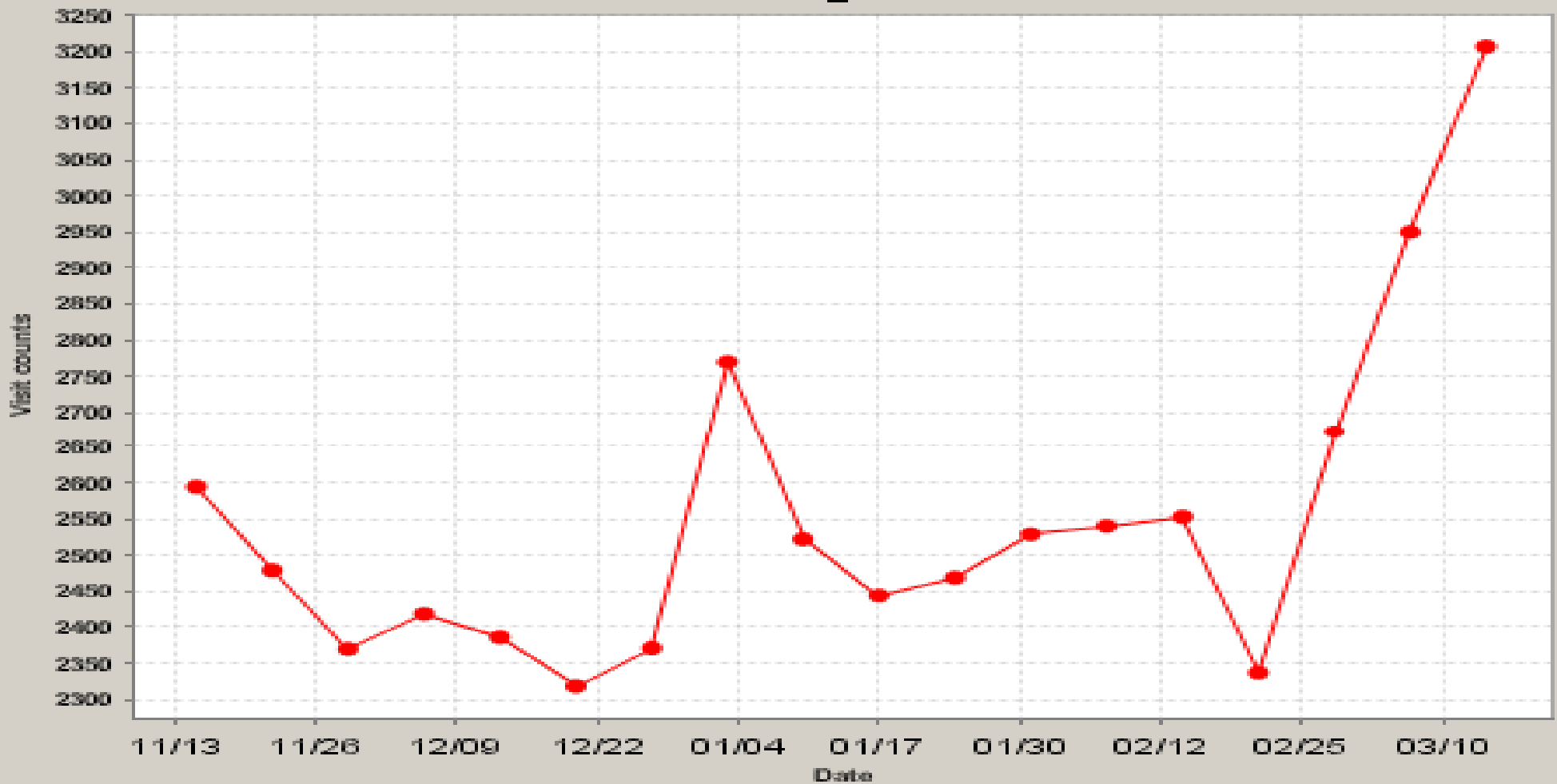
Date: 2006-04-12 Minute: 3
Prodrome: Rash in County GREY_BRUCE, ON
Observed normalized count: 100.000 (81.0/81.0)
Threshold value: 68.211 (52.714)
Number of Std Devs: 5.475735933528261
Last two months plot based on minute 3:
RLSCharts?start=1134511515210&end=1144879515210&minutes=3&alarmDate=2006-04-12

Size of alert

Start | Inbox - Microsoft Outlook | Bruce Telecom Web ... | Internet | 9:31 AM

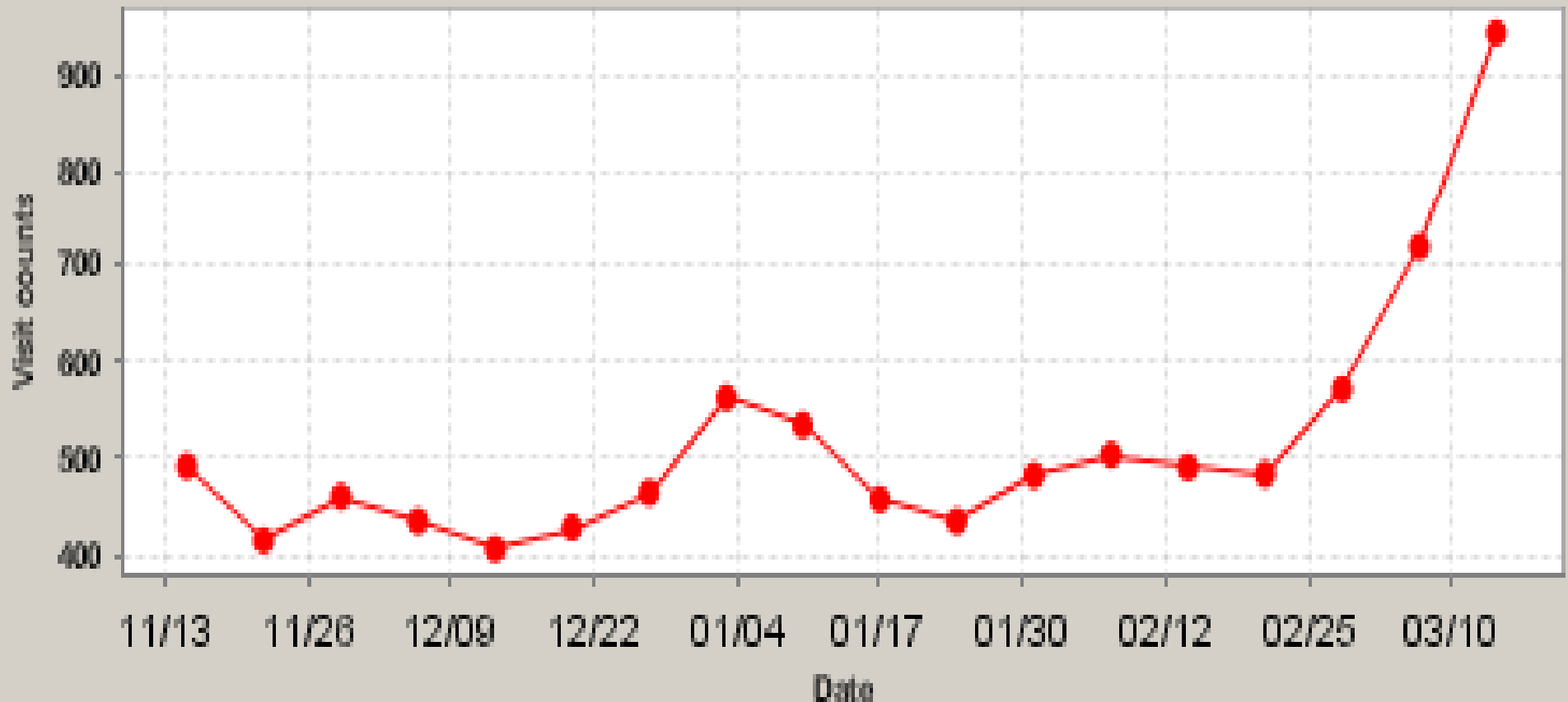
All Emergency Department Visits

Total visits in GREY_BRUCE, ON

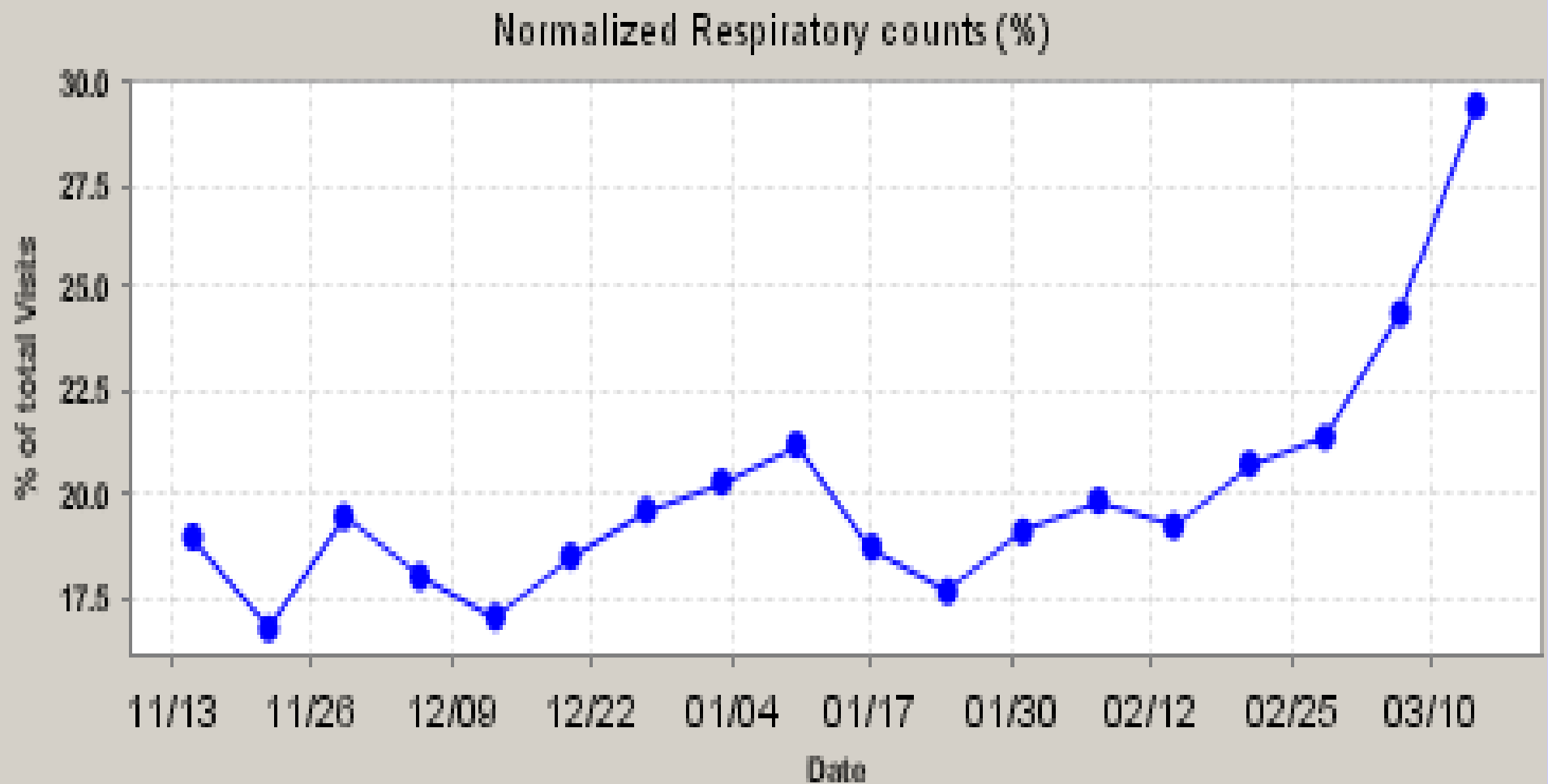


Category-Specific Trends (counts)

Respiratory counts



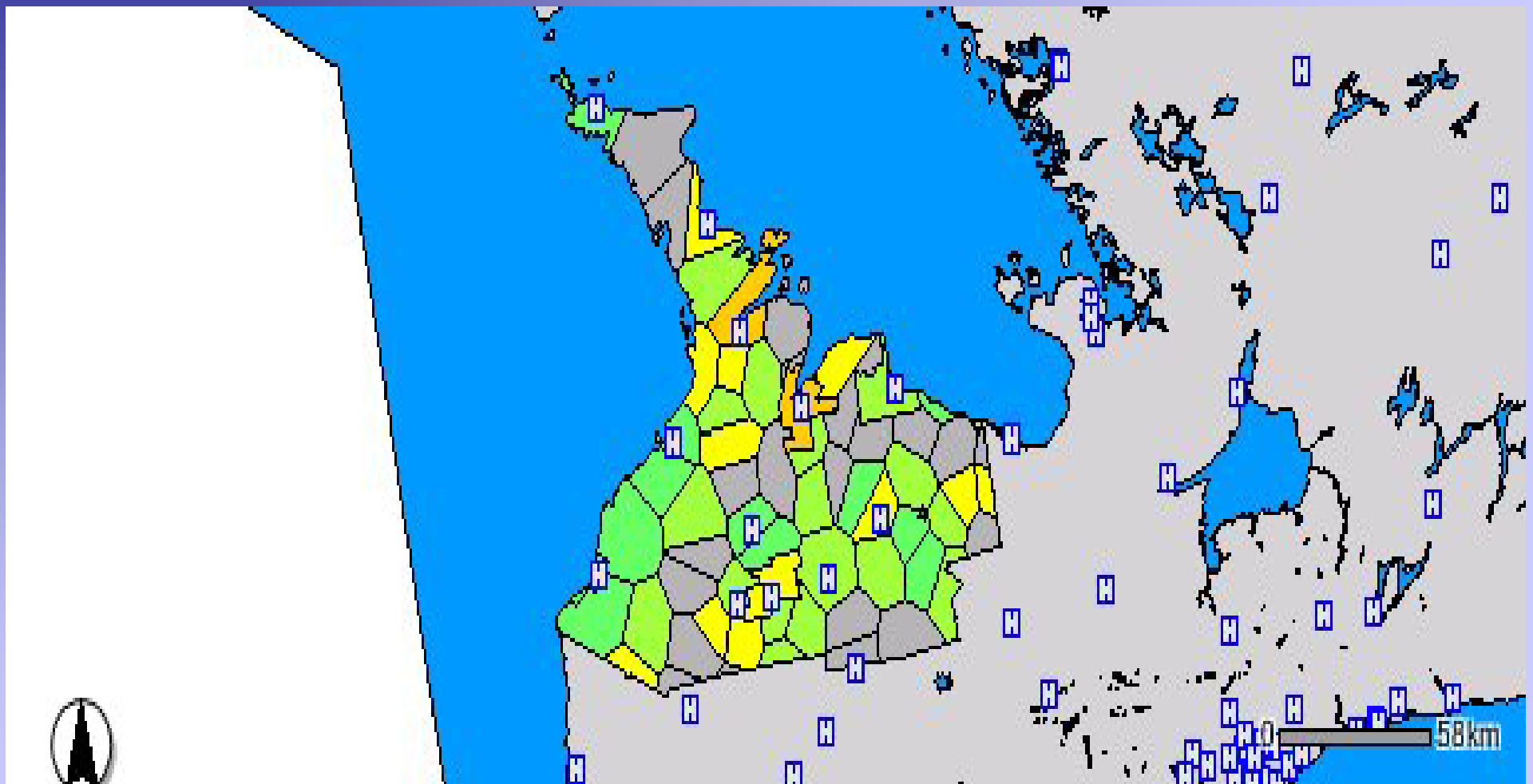
Category-Specific Trends (%)



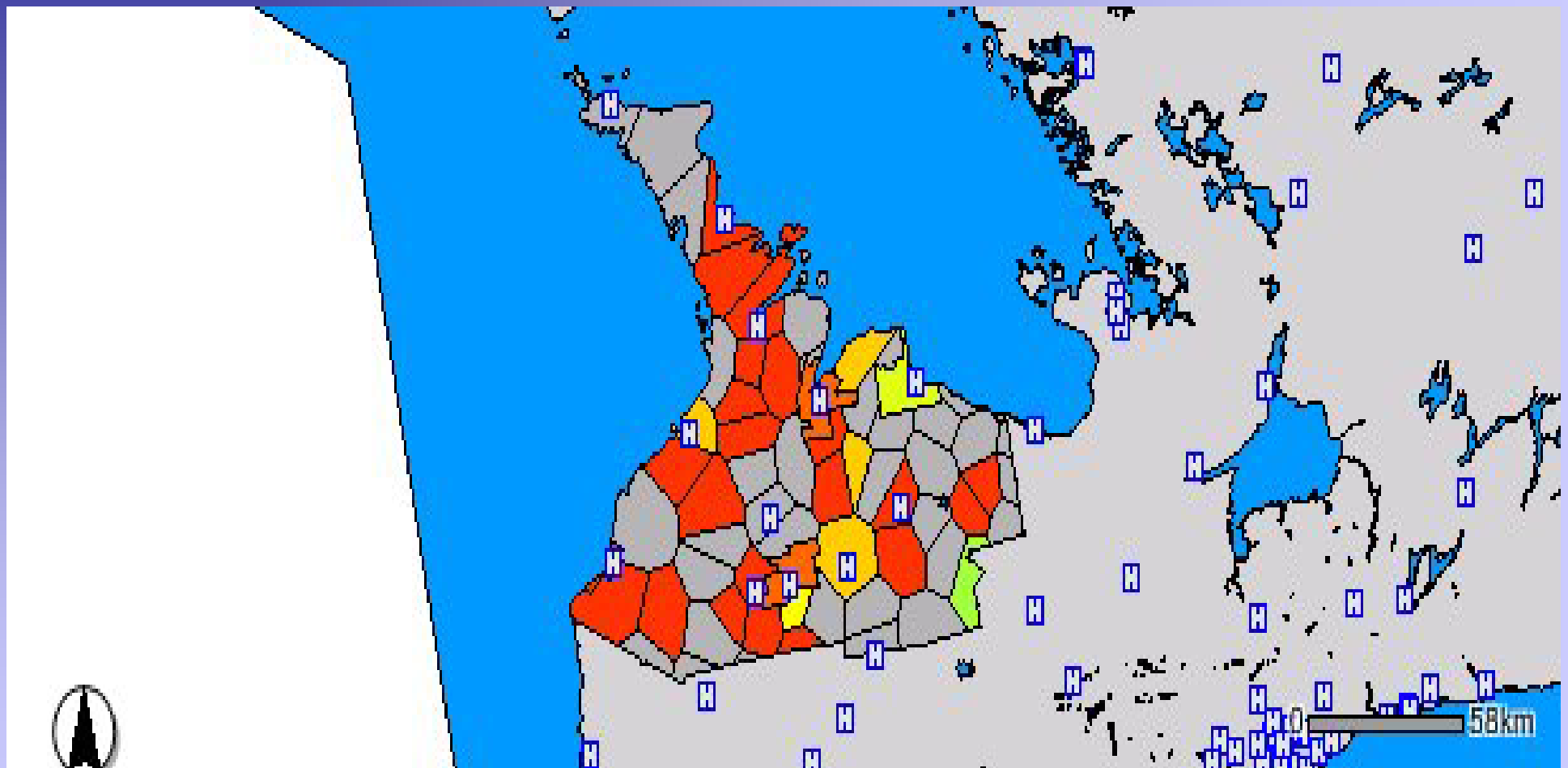
Anonymized Case Information

Date Admitted	Age (Deciles)	Gender	Home Postal Code	Chief Complaint
22:12.0	60	M	N0G1L	SHORTNESS OF BREATH
30:05.0	50	F	N0H2C	cough / throat
18:26.0	10	F	N0G1W	COUGH& CHEST CONGESTION
08:37.0	20	M	N4N2Y	SOB
55:39.0	20	F	N4K2P	COUGH
39:59.0	10	F	N0H1P	COLD, COUGH
21:47.0	50	M	N2Z1T	CONGESTION
57:57.0	20	M	N0G1C	COUGH
54:44.0	10	F	N2Z2R	SORE THROAT/FEVER
53:20.0	30	F	N0G1L	COLD, CHEST CONGESTION

Map of Cases



Map of Cases by Age (0 to 12)



What do we do with ECADS?

- The system categorized data and analyzes it every six hours to determine if trends indicate that the number of cases is higher than expected (>3 standard deviations)
 - If YES, then an alert is issued via email to Public Health
- System is monitored each day by Public Health
 - Alerts are reviewed and interpreted
 - Some may require Public Health action

What do we do with the info?

- Action may be required if:
 - If an alert is sustained or
 - Other supporting information indicates a potential problem (e.g., laboratory results, Over-the-Counter sales, school absenteeism, LTC outbreaks)
- Action may consist of:
 - Calls to EDs for more information (diagnoses)
 - Physician Alerts to all GPs and EDs (may include requests for laboratory testing)

Surveillance in PH –After ECADS

- Real-time chief complaint data from the entire Grey Bruce region from all hospitals
- Easily integrated with other syndromic surveillance tools (OTC sales)
- Watchful waiting - monitoring potential outbreaks of disease (i.e., during a BWA; CIOS alerts)
- Ability to alert the medical community of increased illness and request testing

Putting it all Together

ECADS

OTCs

CIOS

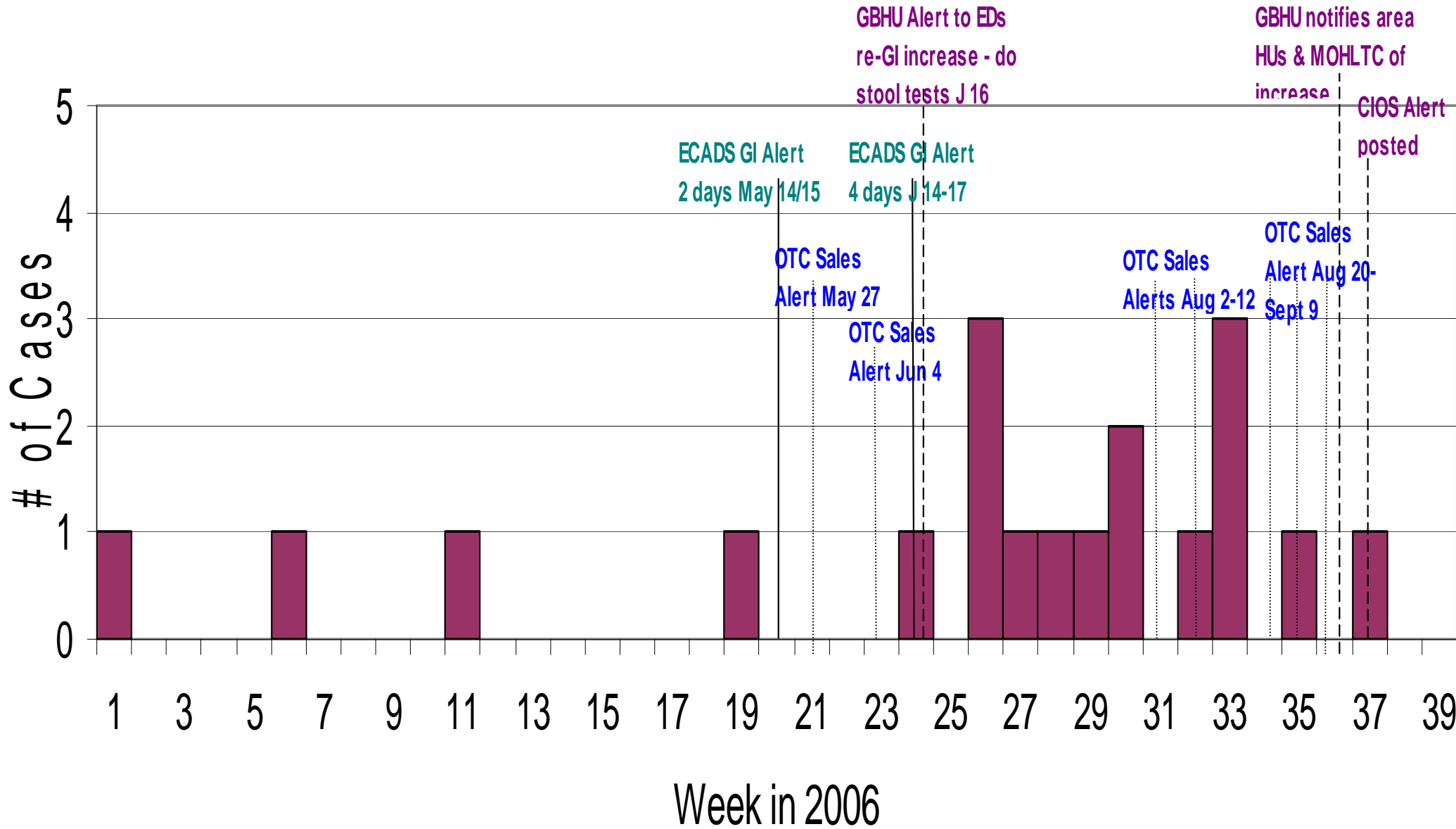
Cryptosporidiosis

- An example of how OTC Sales, ECADS alerts, communication to our EDs, and laboratory results detected an increase of cryptosporidiosis in Grey Bruce
- After posting a CIOS alert, 5 other Central Ontario health departments reported higher than expected numbers of cases

Cryptosporidium in Grey Bruce

- Average number of cases per year is 13 (range 7 to 19)
- Crude incidence rates more than double the provincial average
- Local cases usually associated with direct exposure to livestock manure or swallowing recreational water
- One outbreak in region in 1998 associated with Collingwood municipal water system

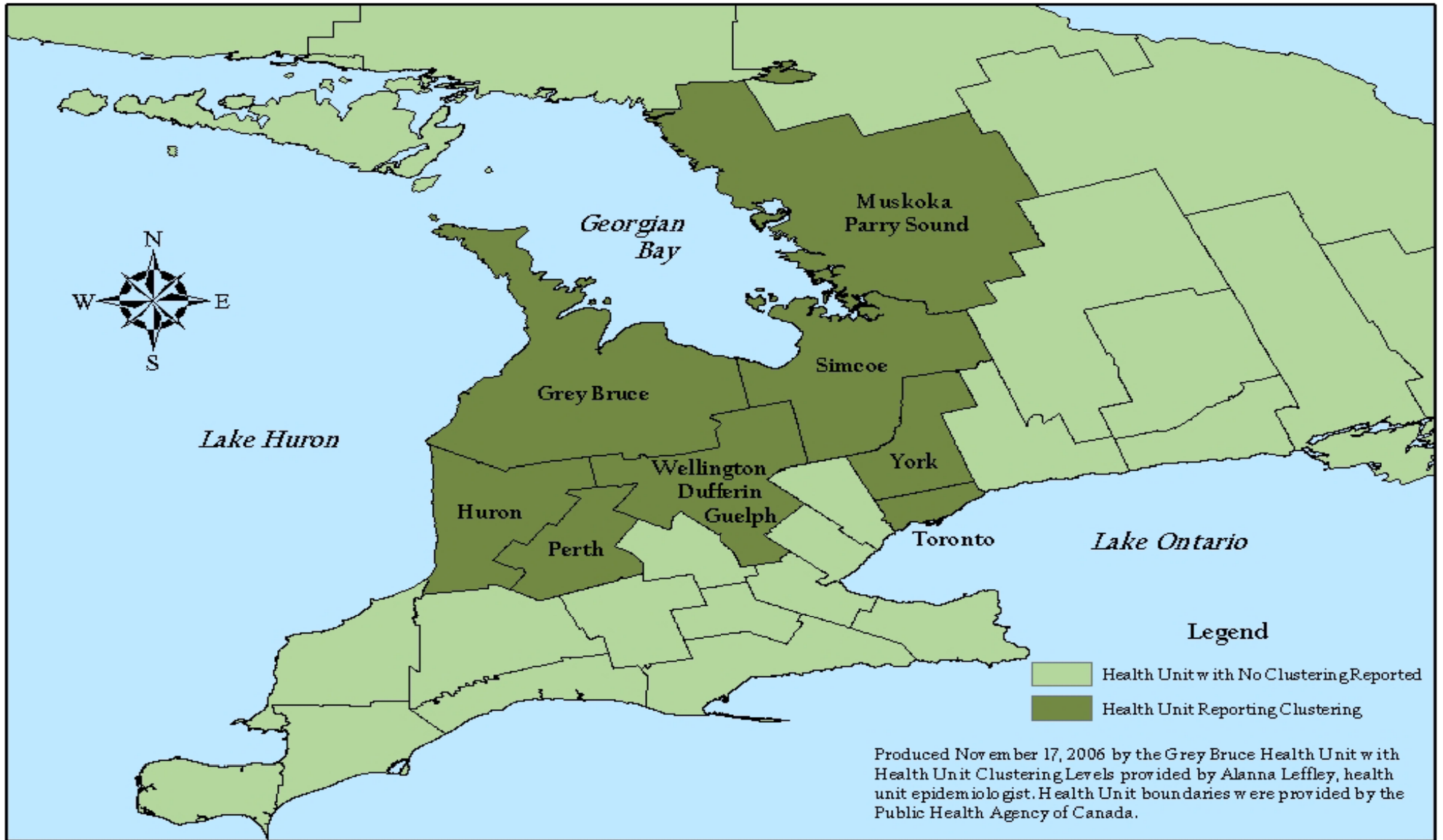
GBHU Cryptosporidiosis Cases 2006 by Week of Onset



Grey Bruce 2006

- 20 cases
- 2 in June, 5 July, 4 August, 5 September – more than a year's worth of cases in four months
- Over 60% of cases under age 19, 62% male
- About 80% in Bruce County but geographically disbursed
- No common links determined but bottled water suspected as possible source
- Field Epidemiologists were called to investigate

Health Units Reporting Clustering and Higher than Normal Cases of Cryptosporidium, 2006



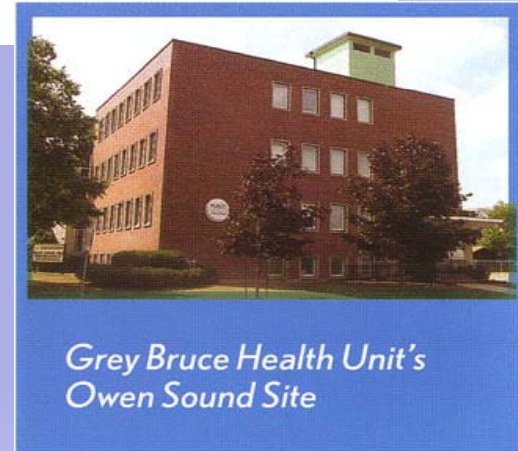
Success Criteria

- 3 hospital corporations in this rural area already work well together
- Easy to install, monitor, access
- Did not require changes to existing procedures – all used the same Cerner system and transmitted data to the main hospital
- Most ED staff did not know that the system was even in place – only alerted them periodically when we required them to do something
- Opportunity for Public Health and Grey Bruce hospitals to work together, share information

Technology in Grey-Bruce Forges Closer Ties Between Community Hospitals and Public Health

By: Hazel R. Lynn

Written for the Summer 2006 edition of the *Sharing Innovations in Health Care – Hospital Perspectives*, published by the Ontario Hospital Association



A successful/useful cooperative project with the hospitals.

Evaluation and Improvements

- On the retrospective project using Walkerton data, the system would have alerted Public Health 3 to 4 days earlier
- No formal evaluation of the current system
- Needs a built-in alert for when data feeds are interrupted
- More detailed geographic mapping
- More refined syndromes for ILI and Enteric illnesses

Next Steps

- In 2008, a new project funded through NRC – CRTI called ASSET (Advanced Syndromic Surveillance and Emergency Triage)
 - Combine the features of current systems with advanced data mining features (including an application to capture French language chief complaints)

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IS BAD..BUT



NOT TO

W **A** **S** **H**

TO KNOW

IS WORSE.

— West Africa

Thank you/Merci

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