Objective

- Describe
  - Enteric Surveillance
  - C-EnterNet Background

Design, Results, Future
Infectious Disease Prevention and Control Branch
Centre for Food-borne Environmental and Zoonotic Infectious Diseases

- Outbreak Management Division
- Enteric Surveillance and Population Studies Division
- Environmental Issues Division
- Zoonoses Division
- Creutzfeldt-Jakob Disease Surveillance
- Travel and Migration Health
Enteric Surveillance and Population Studies

- C-EnterNet

- CIPARS

- NESP

- Burden of Illness Studies

- Pharmacy Surveillance
Setting the Context: Surveillance Systems

Surveillance is a key **public health tool** to monitor and prevent human illness, including chronic & infectious diseases

- Detect outbreaks in a timely fashion
- Measure magnitude and burden of disease
- Monitor and evaluate trends for understanding of disease, risks and prevention targets
- Assess effectiveness of interventions

Surveillance is for **action**
- *not* just about collecting numbers and preparing reports
PHAC Surveillance Goals

1. Governance and Organization
2. Integrated Surveillance
3. Knowledge Management
4. Performance Measurement, Quality Assurance, Evaluation
5. Partnerships and Collaboration

To effectively manage and maintain internal/external partnerships and engage them in collaborative surveillance activities that support public health action.
Integrated surveillance

Requirements

• Availability and comparison of data from animals, food and humans
• Lab and epi-based
• Often uses active and passive surveillance and sentinel sites

Benefits

• Can identify links between human disease and food/animal sources
• Can assess effectiveness of food safety policies
• Can estimate burden of foodborne disease by food/animal category
National Enteric Surveillance Program (NESP)

- NESP collects weekly data from provincial laboratories on enteric diseases for outbreak detection and reports national annual trends for food-borne pathogens and related subtypes.
- Annual reports can be found at www.nml-lnm.gc.ca

Relative national incidence rates (compared to the 2002-2006 baseline period) of lab-confirmed cases of *Salmonella*, *Shigella* and *E. coli* O157 reported to NESP by year, 2007 to 2011
**C-EnterNet Overview**

**C-EnterNet** is an integrated surveillance program designed to monitor human enteric illness and to inform food & water safety policy.
C-EnterNet Overview

C-EnterNet is an integrated surveillance program designed to monitor human enteric illness and to inform food & water safety policy.

Core Objectives:

• Detect changes in **trends** of human enteric disease incidence and pathogen exposure levels from food, animal and water sources.

• **Source attribution**: determine the proportion of human cases that are due to water, food & animal contact and determine statistically significant risk factors for enteric illness.
How are the data being gathered?
C-EnterNet Framework

PHAC
C-EnterNet Central

Sentinel Sites across Canada

Continuous
Episodic

Human
Food
On-farm
Water

*similar to but broader than CDC FoodNet
Sentinel Sites

Site#1 Region of Waterloo, ON & Public Health Ontario – Toronto PHL
- Pilot site
- Full implementation: Human, Retail, Farm & Water
- Since June 2005

Site#2 Fraser Health Authority, BC & BCPHRL
- Partial implementation: Human, Retail, Water
- Since June 2010
C-EnterNet Exposure Assessment

Human case information and enhanced risk factor information collected through standardized questionnaires

Retail sampling
- raw pork chops
- ground beef
- chicken breasts
- produce e.g. lettuce, berries

Animal / Farm sampling
- Beef
- Swine

Dairy Poultry

Enhanced Lab Testing

Surface Water testing
- 5 sites
- Physical parameters and pathogens

Enhanced Lab Testing
Integrated Surveillance

• Primary goal is linking source and human illness and ultimately attribution
  
  – Integrate laboratory and epi information
  – Integrate across sources
  – Incorporate other information sources

Figure 1.2. Estimated sources of 1,647 cases of human salmonellosis in Denmark, 2007
(See also Appendix A, Table A1)

Source: Danish Zoonosis Centre, National Food Institute, Technical University of Denmark
C-EnterNet Component Activities:
What We’re Doing
C-EnterNet Public Health Component

- Linking lab data & rich risk factor data
- Standardized Questionnaire
- Enhancing Capacity - training
- Collaborative projects/research
- Steering Committees
C-EnterNet Water Component

• Ontario Sentinel Site
  » Continued systematic sampling on Grand River at 5 sites with Ont. Ministry of Environment
  » Summer focus on recreational beaches

• BC Sentinel Site
  » Sampling beaches: Cultus Lake, Albert Dyck Lake, and Barnet Marine Park, Burnaby
  » Performed with CIPARS employee & BCRPHL hired a student for lab work
  » Exploring other sampling - irrigation ditches

C-EnterNet Retail Component

• Sampling at the grocery store level helps to characterize the risk of exposure at the food handling & consumption levels

• Census of grocery store outlets in the sentinel sites

• Weekly & randomly select 3 or 4 stores to visit

• Samplers are C-EnterNet employees or Public Health Inspectors
Ontario Site

Sampling in 4 commodities:

- swine operations (since 2005-2011)
- dairy operations (since 2006)
- beef operations (since 2007)
- broiler chicken operations (since 2007)
- egg layer operations (starting 2012)

Third party sampling to maintain confidentiality

(University of Guelph)

- 3 fresh pooled pen manure samples- various age groups and 1 stored manure (manure pit)

BC Site

- currently under development (dairy and poultry)
### C-EnterNet Public Health Component

#### Data Highlights: Human Case Overview – 2010

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Knowledge to Action:
C-EnterNet Trends in Consumption of Raw Milk in ROW (2005-2010)

- C-EnterNet identified consumption of raw milk as a risk factor for *Campylobacter*
- Consumption of raw milk increased the risk of being *Campylobacter* case over 2 times

- Raw Milk Consumption: healthy people from same area <1% (17/2332) consumed raw milk (Nesbitt et al, 2008)
Public Health Action

- PHAC C-EnterNet, U of G MPH & ROWPH collaboration
- Consultation with the community; and ON Ministry of Health raw milk messaging
- Fact sheets developed: educational tool for general public and raw milk distributors
- Linked with PHO and BCDC to share information
Evidence: C-EnterNet Case Information for Most Likely Source

C-EnterNet Outputs

Knowledge Translation

- Reports, Publications & Presentations
  - Rec. Water & Crypto
  - Travel cases*
- “One pagers”

Episodic Research

- Healthy Control Study
- Campylobacter Exposure Study
- Non-O157 E.coli

*Ravel, A et. al. “Description and burden of travel-related cases caused by enteropathogens reported in a Canadian community” Journal of Travel Medicine, 2011
C-EnterNet Moving Forward

- Food safety remains a priority of the government
- Food-borne and waterborne diseases are complex and require multiple surveillance approaches
- Information about cases and exposures are required to target interventions and reduce illness
- C-EnterNet continues efforts to provide rich Canadian data to help inform food safety, water safety and public health action
- Addition of 3rd site is planned in 2013
- C-EnterNet – a platform
- Closer alignment and linkage to sampling, mandates and strategic imperatives within and external to PHAC e.g. - CIPARS, CFIA, HC, Sentinel Sites - Local and Prov. Health, NCCEH.
Thank you!

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