



C-EnterNet News

Volume 8, Spring 2010

C-EnterNet - Canada's National Integrated Enteric Pathogen Surveillance System

Editor's Note

In 2009, the C-EnterNet team scientists responded to the need for public health expertise in other areas, including H1N1 pandemic response at the national level and participating in a STOP mission in Burundi.

We have received the final report from the government evaluators, which reviewed the C-EnterNet program relevance, design and future direction. The evaluation verified the relevance of C-EnterNet, especially in light of recent reports such as the Standing Committee on Agriculture and Agri-Food and the Weatherill Report that call for enhanced surveillance for food-borne illnesses. Seven important recommendations were highlighted in the review. Additional funding and further expansion were identified to be critical for C-EnterNet's future.

Dr. André Ravel led a number of important source attribution efforts in 2009 and authored a number of new manuscripts that have been accepted or submitted recently for publication.

And, we are busy expanding the program into our second sentinel site within the Fraser Health Authority in the lower mainland of British Columbia.

I hope that you enjoy reading about the activities highlighted in this newsletter. Feel free to contact us for further information.

Dr. Frank Pollari
C-EnterNet Program Lead

In this issue:

- o Editor's Note
- o C-EnterNet Central
- o Sentinel Site 1
- o Retail Food & Agriculture
- o Water
- o Source Attribution
- o Knowledge Exchange

Note from C-EnterNet Central

A comprehensive evaluation of C-EnterNet, performed by Public Works and Government Services Canada, wrapped up in November. Research methods used included: 25 key stakeholder interviews (with C-EnterNet team, PHAC senior management, program partners and advisors, and experts external to the program); a document review; a survey of 102 recipients of C-EnterNet information products; a review of administrative and financial data; a survey of partners to determine the value of in-kind support leveraged by the program; and a focus group at the sentinel site (ROWPH). C-EnterNet was found to be relevant, with a recommendation to review potential collaboration with other federal and provincial organizations and programs, and future funding partners. The skills, knowledge and composition of the C-EnterNet team were identified by stakeholders as key strengths of the program, but a review of the structure and responsibilities of



Dr. Rick Holley (University of Manitoba), Barb Marshall, Andrea Nesbitt and Dr. Jeff Farber (Health Canada's Bureau of Microbial Hazards) at the Federal Food Safety and Nutrition Meeting, Ottawa, November 2009

C-EnterNet was recommended, particularly in light of future expansion. Recipients of C-EnterNet information reported a high degree of satisfaction with the information produced, but an improvement in timeliness of the information was requested.

The key message from the report was that C-EnterNet does need to expand and therefore must find resources to do so, or develop innovative mechanisms to partner with other federal, provincial and municipal agencies to facilitate the development of a national integrated surveillance system. The C-EnterNet team was encouraged by the report and the resounding conclusion that this system is necessary in Canada.

Additional sentinel sites should be pursued, as envisioned in the original program design, while ensuring stability in the first site. It was recommended that C-EnterNet develop a marketing and knowledge dissemination strategy, with input from the Advisory Committee. The program design and delivery approach was developed to ensure cost-efficiency and has benefited from substantial in-kind

support. However, the value of the program will not be fully realized until C-EnterNet becomes pan-Canadian in scope.

The C-EnterNet team developed an action plan to respond to these recommendations and as a first step met with the Advisory Committee in February to receive their valuable input. In regards to the recommendation to develop a knowledge dissemination strategy, C-EnterNet is working with Dr. Maureen Dobbins at McMaster University. Dr. Dobbins has concentrated her research efforts on



Andrea Nesbitt (C-EnterNet) leading a discussion on integrated surveillance with epidemiologists from Belize at the GFN in Barbados

understanding knowledge transfer and exchange and evidence-informed decision making among public health decision makers in Canada. <http://health-evidence.ca/html/AboutOurTeam#01>

In 2009, as well as running C-EnterNet, scientific staff lent their expertise in other public health priority areas. Dr. Ravel traveled to Burundi, Africa in April to help with the STOP mission program, which was started in 1999 by the CDC, WHO, UNICEF, Rotary and CPHA to eradicate polio. www.cdc.gov/vaccines/programs/stop/default.htm In July, C-EnterNet and others met with members of the One World One Health team at the federal level to lend their expertise. <http://un-influenza.org/node/2341>

During the H1N1 response, Dr. Pollari was instrumental in the design and implementation of a new H1N1 Influenza Antiviral and OTC Surveillance system and Andrea Nesbitt traveled to Ottawa to assist with H1N1 surveillance. Andrea also facilitated a course along with epidemiologist Andrea Currie at the Global Food-borne Infections Network in Barbados in November. Barb Marshall, Nancy Sittler and CFEZID's Outbreak Division and others helped plan the multi-agency, Foodborne Diseases Investigation and Management: An Ontario Symposium. www.health.gov.on.ca/en/news/bulletin/2009/foodborne_symposium.aspx

As well, Barb represents PHAC as a member of the Board of Directors of the Canadian Partnership for Consumer Food Safety Education (CPCFSE). www.canfightbac.org/cpcfse/en/about/members



Barb Marshall joins Marty Brett, Chicken Farmers of Canada, and Brenda Watson, Executive Director of the CPCFSE at the Royal Agricultural Winter Fair, November 2009

Kevin R Smith, who oversees C-EnterNet's complex data management, is acting as C-EnterNet's representative on the Labware Committee headed by Rama Viswanathan, Head IT Applications Unit Laboratory for Food-borne Zoonoses (LFZ) Guelph. Labware (LIMS) has been established as a standardized Laboratory Data Management system within the National Micro-biology Laboratory (NML), PHAC, Winnipeg to replace the outdated infrastructure for the present Laboratory Data Management System (LDMS) used within LFZ.

And in other news, C-EnterNet finalized agreements with the Fraser Health Authority and the BCPHL to launch our second sentinel site. We look forward to the implementation of integrated enteric disease surveillance in BC in 2010 and are grateful for the supportive response we've had from all members from the second site implementation team at the BCCDC, Fraser Health Authority, and BCPHL.

Note from C-EnterNet Sentinel Site 1: The Region of Waterloo

As with many government agencies in Canada, H1N1 pandemic planning and clinics in the fall resulted in the scaling back of C-EnterNet activities at the sentinel site. Workshop #9 scheduled for December was postponed and rescheduled to March 2010. The workshop focused on core competencies in public health. Enteric worksheets/questionnaires used for communicable disease investigation and follow up are in the final stages of editing. The objective was to streamline the format and to link high risk foods and activities to reflect a more disease-specific

approach to the investigation process. The review of the final questionnaires will be done by both ROWPH and C-EnterNet. Between January and March 2010, the C-EnterNet site coordinator (Nancy Sittler) worked with PHAC and the C-EnterNet team in Guelph as a part of the practicum component of her MPH degree from the University of Waterloo.



Nancy Sittler at PHAC offices in Guelph, ON

The C-EnterNet program at the site continues to be useful and informative. Recently, the enhanced risk factor information was used to analyze parasitic infections (*Giardia*, *Cryptosporidium*) when a rise in incidence was observed.

During the summer months, C-EnterNet supported a practicum position for the University of Guelph, Dept of Population Medicine, MPH student Nousheen Kanji, in collaboration with the Region of Waterloo Public Health. Nousheen's project addressed the public health issue of the consumption of unpasteurized (raw) milk among cases of enteric illness, particularly *Campylobacter* and *Salmonella* (C-EnterNet Annual Report 2007). Working with C-EnterNet, ROWPH and in consultation with the Ontario Ministry of Health and Long Term Care and other stakeholders, Nousheen produced draft public



Jason Stone (Fraser Health), Marsha Taylor (BCCDC), Greg Embree (Fraser Health) and Andrea Nesbitt (C-EnterNet) discussing the implementation of sentinel site #2 in BC



Nousheen Kanji, University of Guelph MPH Practicum student at the Region of Waterloo Public Health unit in the summer of 2009

education products for identified target audiences, which provide information on the hazards of the consumption of unpasteurized milk. Currently, the ROWPH is finalizing the development of these products for the public. Another example of how C-EnterNet evidence is informing knowledge and decision-making at the community level.

And, finally, ROWPH welcomes two new managers to their public health team: Brenda Miller (who comes with many years of experience in communicable diseases at Waterloo) and Dave Young (who brings many years of experience as a former manager of the Food Safety program at Niagara Region Public Health).

Note from C-EnterNet's Retail Food and Agriculture Component

The retail component of C-EnterNet initiated weekly sampling of bagged leafy greens in the first sentinel site in April, 2009. Since then, over 375 samples have been collected and tested for a variety of enteric bacteria, parasites and viruses. Results from this on-going work will be available in the 2009 annual reports.

Dr. Angela Cook, the lead of C-EnterNet's Agri-food component was invited to participate in the CIPARS' expert review committee for the development of a farm-based surveillance framework that will provide trend data on antimicrobial use and resistance in broiler chickens.

C-EnterNet's Agriculture component has active sampling of swine, beef, dairy and broiler chicken farms in Sentinel Site 1 (ROWPH). This sampling framework provides valuable surveillance information for C-EnterNet and is also being utilized by collaborative partners. For example, in 2010 we will be collecting 120 additional swine manure samples for Dr. Kirsten Mattison, a research scientist at the Food Virology Reference Centre of the Bureau of Microbial Hazards, of Health Canada for her virus research. Also, Dr. Rebecca Guy, a Research Scientist in microbiology at the Laboratory for Foodborne Zoonoses in Saint-Hyacinthe, QC will be utilizing C-EnterNet's beef and dairy manure samples to complete the optimization of a real time PCR assay for detection of *E. coli* O157.

Note from C-EnterNet's Water Component

In the water component, Dr. Yemisi Dare continued to work with University of Guelph's Laboratory Services Division and Hyperion Research Ltd. to optimize laboratory protocols that will enhance testing procedures for the watershed monitoring. Various laboratory protocol changes throughout 2009 have affected prevalence estimates for certain pathogens—this will be further analyzed in the short and long reports. It is an important reminder of the influence of laboratory methodology on epidemiological/monitoring data, particularly in an on-going surveillance system.

In June, Dr. Dare represented C-EnterNet at the "1st International Conference on Microbial Transport and Survival in the Subsurface", which provided a platform for sharing cutting edge research on microbial transport and survival through porous media and subsurface environments, as well as risks of groundwater contamination by pathogens. In November, Dr. Dare along with Pia Muchall from PHAC



Dr. Dare, Pia Muchall (PHAC), Natalie Prystajek (BCPHL) and other members of the newly created FEPN

became members of the newly-developed Food and Environmental Parasitology Network (FEPN), a national association of experts from multidisciplinary fields, for the purposes of information exchange on issues related to food-borne and environmental parasites, and to provide expert advice in support of outbreak investigations and aid in knowledge translation for risk assessment.

And, C-EnterNet is also collaborating with other divisions (Emerging Infections Division) to address enteric disease in vulnerable populations. Dr. Dare is presently working with experts from different divisions of PHAC on a new large-scale initiative, examining the status of zoonotic parasitic diseases in Aboriginal/First Nations/Inuit populations in Canada. Also, Dr. Dare co-authored a summary paper on hospitalization records of *Trichinella* and *Echinococcus* infections across Canada has been accepted for publication (ref below).

In 2010, we are excited to announce that we are a part of a multidisciplinary research group that is led by Dr. Ed Topp (Agriculture and Agri-Food Canada), funded through the Growing Forward SAGES (Sustainable Agriculture and Environment Systems) program, to address the issue of pathogens in Canadian watersheds from human, animal and poultry origin. C-EnterNet is closely aligned with the objectives of this project and will be involved in developing some quantitative microbial risk assessment models (QMRA) in collaboration with Aamir Fazil (LFZ) and the SAGES project team. We are in the process of hiring a post-doctoral fellow to develop these models.

And, with the launch of C-EnterNet's second site, we are looking to initiate watershed surveillance in the BC site, while recognizing that we will need to find partner funding and collaborative opportunities. Please contact Dr. Katarina Pintar if you are aware of any opportunities to make this happen in BC. And on that note, Dr. Pintar is back from her parental leave and happy to be part of the C-EnterNet team again!



Dr. Pintar back at her desk reviewing data

Note from C-EnterNet's Source Attribution Component

The survey of Canadian food safety experts on food attribution was completed in 2009. Best estimates were provided by approximately 60 experts on the proportions of cases that are foodborne for 9 gastrointestinal diseases. For 6 diseases there was a clear disagreement between experts, with one group estimating the proportion below 50% and a second above 50%. The panel was large and heterogeneous compared to previous studies that have been pursued and it seems to be the first study showing such discrepancy between experts. A manuscript was submitted to the journal 'Foodborne Pathogens and Disease' for review in early 2010.

An in-depth analysis of the travel-related cases in C-EnterNet's first sentinel site between June 2005 and May 2009 was started in the fall of 2009. The work is in progress but the results suggest that travel-related cases are numerous (actually greater than estimated through the other scarce data sources available in Canada), that profiles of sick travelers based on destination, length of travel, accommodation in resort or not, and age do exist and that such profiles are associated with some diseases. A manuscript is under preparation for submission in early 2010.

In December, Dr. André Ravel was invited to France by Institut Pasteur and AFSSA (the French agency for food safety) to attend the defense of a PhD student whose thesis topic was source attribution. Dr. Julie David used the Danish human salmonellosis attribution model developed by Hald *et al* with French food safety data. She highlighted some limitations and issues with the model for its application beyond Denmark and proposed some solutions to overcome them. Dr. David's work was remarkable and the solutions she proposes will be used as C-EnterNet adapts the Danish model to Canadian data.

And finally, just before Christmas a manuscript entitled 'Seasonality in Human Salmonellosis: Assessment of Human Activities and Chicken Contamination as Driving Factors' was accepted in Foodborne Pathogens and Disease. Using C-EnterNet's human and retail surveillance data, the analysis shows the seasonality of human domestic salmonellosis (with a peak in June and July) linked with ambient temperature, but not with precipitation. It fails to show seasonality in

retail chicken contamination by *Salmonella* and a good match in terms of serotypes between human and chicken isolates. In brief, retail chicken is not the driving factor of seasonality in human salmonellosis.



Dr. André Ravel presenting C-EnterNet at AFSSA in Ploufragan, France

C-EnterNet: Knowledge Exchange and Dissemination

Recent Publications and Reports Authored or Co-Authored by C-EnterNet scientists:

Farzan, A., Friendship, R. M., Cook, A., Pollari, F. "Occurrence of *Salmonella*, *Campylobacter*, *Yersinia enterocolitica*, *Escherichia coli* O157 and *Listeria monocytogenes* in Swine". Zoonoses and Public Health 2009 (Published online July 23, 2009, 1-9).

Keegan, V., Majowicz, S., Pearl, D., Marshall, B., Sittler, N., Knowles, L., Wilson, J. "Epidemiology of enteric disease in C-EnterNet's pilot site - Waterloo Region, Ontario, 1990-2004". Can J Infect Dis Med Microbiol. 2009; 20(3):79-87.

Pintar, K.D., Fazil, A., Pollari, F., Charron, D.E., Waltner-Toews, D., McEwen, S.A. "A risk assessment model to evaluate the role of fecal contamination in recreational water on the incidence of cryptosporidiosis at the community level in Ontario". Risk Anal. 2010 Jan;30(1):49-64. Epub 2009 Dec 11.

Pintar, K.D., Pollari, F., Waltner-Toews, D., Charron, D.E., McEwen, S.A., Fazil, A., Nesbitt, A. "A modified case-control study of cryptosporidiosis (using non-*Cryptosporidium*-infected enteric cases as controls) in a community setting". Epidemiol Infect. 2009 Dec;137(12):1789-99. Epub 2009 Jun 16.

Pintar, K.D., Waltner-Toews, D., Charron, D., Pollari, F., Fazil, A., McEwen, S.A., Nesbitt, A., Majowicz, S. "Water consumption habits of a south-western Ontario community". J Water Health. 2009 Jun;7(2):276-92.

Pollari, F., Ravel, A., Pintar, K., Cook, A., Marshall, B., Nesbitt, A. "C-EnterNet 2007 Annual Report".

Pollari, F., Ravel, A., Pintar, K., Cook, A., Marshall, B., Nesbitt, A., Smith, K. "C-EnterNet 2008 Short Report".

Ravel, A., Smolina, E., Sargeant, J.M., Cook, A., Marshall, B., Fleury, M., Pollari, F. "Seasonality in Human Salmonellosis: Assessment of Human Activities and Chicken Contamination as Driving Factors". (Submitted to Foodborne Pathogens and Disease on Sept 2009).

Ravel, A., Davidson, V., Ruzante, J., Fazil, A. "Foodborne proportion of gastrointestinal illness: Estimates from a Canadian expert elicitation survey". (Submitted to Foodborne Pathogens and Disease February 2010).

Pham, M.T., Jones, A.Q., Sargeant, J.M., Marshall, B.J., Dewey, C.E. "Specialty Food Safety Concerns and Multilingual Resource Needs: An Online Survey of Public Health Inspectors". Submitted to Foodborne Pathogens and Disease in February 2010.

Gilbert, N., Dare, O., Libman, M., Muchaal, P., Ogden, N. "Hospitalization for trichinellosis and echinococcosis in the Canadian Arctic, 2001-2005: the tip of the iceberg?" Accepted February 2010, Canadian Journal of Public Health.

Conferences and Meetings Attended:

- Ontario Multi-Agency Salmonella Enteritidis Working Group teleconferences, Guelph, ON
- Produce Sampling meeting January 2009, Ottawa, ON
- Ryerson University lecture January 2009, Toronto, ON
- Toronto Public Health meeting March 2009, Toronto, ON
- One World One Health March 2009, Winnipeg, MB
- Communicable Disease Surveillance Network Education Day March 2009, North York, ON

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| <ul style="list-style-type: none"> • Food Net Vision meeting March 2009, Atlanta, Georgia | <ul style="list-style-type: none"> • International Collaboration for Enteric Disease Burden of Illness teleconference August 2009, Tokyo | <ul style="list-style-type: none"> • CFIA Professional Update, May 2009, Guelph, ON |
| <ul style="list-style-type: none"> • “What’s the risk? Infectious Diseases & Communication” Workshop #8 June 16, 2009, Cambridge, ON | <ul style="list-style-type: none"> • La DSP de la Monteregie (Regional Public Health Authority) meeting September 2009, Longueuil, QC | <ul style="list-style-type: none"> • CPCFSE (Fight BAC) Annual General meeting, June 2009, Ottawa, ON |
| <ul style="list-style-type: none"> • Province of British Columbia meeting April 2009, Vancouver, BC | <ul style="list-style-type: none"> • CFEP “Epi in Action” course September 2009, Ottawa | <ul style="list-style-type: none"> • Canadian Public Health Association conference, June 2009, Winnipeg, ON |
| <ul style="list-style-type: none"> • Centre for Public Health & Zoonoses (CPHAZ) launch May 2009, Guelph, ON | <ul style="list-style-type: none"> • Guelph Food Safety symposium October 2009, Guelph, ON | <ul style="list-style-type: none"> • Ministry of Ontario Health and Long Term Care, June 2009, Toronto, ON |
| <ul style="list-style-type: none"> • Canadian Food Inspection Agency (CFIA) Professional Update course May 2009, Guelph, ON | <ul style="list-style-type: none"> • Food and Environmental Parasitology Network November 2009, Ottawa, ON | <ul style="list-style-type: none"> • Region of Waterloo Public Health C-EnterNet Workshop #8, June 2009, Waterloo, ON |
| <ul style="list-style-type: none"> • Microbial Transport & Survival in Subsurface conference May 2009, Niagara-on-the-Lake, ON | <ul style="list-style-type: none"> • Royal Agricultural Winter Fair exhibit November 2009, Toronto, ON | <ul style="list-style-type: none"> • One World One Health meeting, July 2009, Guelph, ON |
| <ul style="list-style-type: none"> • Association of Supervisors of Public Health Inspectors of Ontario meeting May 2009, Alliston, ON | <ul style="list-style-type: none"> • Global Food-borne Infections Network November 2009, Barbados | <ul style="list-style-type: none"> • International Collaboration of Enteric Disease Burden of Illness Studies meeting, Source Attribution, September 2009, Tokyo, Japan |
| <ul style="list-style-type: none"> • Canadian Partnership for Consumer Food Safety Education AGM June 2009, Ottawa, ON | <ul style="list-style-type: none"> • Federal Food Safety and Nutrition meeting November 2009, Ottawa, ON | <ul style="list-style-type: none"> • Direction générale de la santé publique de la Montérégie, September 2009, Longueuil, QC |
| <ul style="list-style-type: none"> • Canadian Public Health Association conference June 2009, Winnipeg, MB | <ul style="list-style-type: none"> • Meetings with Source Attribution experts December 2009, France | <ul style="list-style-type: none"> • LFZ Science Day presentation & poster October 2009, Guelph, ON |
| <ul style="list-style-type: none"> • Ministry of Health & Long Term Care Food Safety Program meeting June 2009, Toronto, ON | <p><i>Presentations and Posters:</i></p> | |
| <ul style="list-style-type: none"> • Guelph Watersheds meeting June 2009, Guelph, ON | <ul style="list-style-type: none"> • Ontario Association of Poultry Practitioners Salmonellosis presentation May 2009, Guelph, ON | <ul style="list-style-type: none"> • Guelph Food Safety Symposium poster October 2009, Guelph, ON |
| <ul style="list-style-type: none"> • Healthy Control Survey meeting July 2009, Waterloo, ON | <ul style="list-style-type: none"> • Canadian Public Health Association presentation June 2009, Winnipeg, MB | <ul style="list-style-type: none"> • Federal Food Safety and Nutrition Meeting poster & presentation November 2009, Ottawa, ON |
| | <ul style="list-style-type: none"> • APHEO – CSEB conference 2009, May 2009, Toronto, ON | <ul style="list-style-type: none"> • Foodborne Disease Surveillance Meeting (WHO GFN-V) and Burden of Illness workshop, November 2009, Barbados |

Looking Ahead:

2008 Long Report

2009 Short Report

*** Look for these on our website, newly formatted for easier access to reports.**



Some of the C-EnterNet team tree planting at Wellington County's Green Legacy

For further details on C-EnterNet, please contact:

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