# 15th Annual Meeting of the Canadian Animal Health Laboratorians Network (CAHLN)

**June 5-8, 2016**

**Atlantic Veterinary College (AVC)**
**University of Prince Edward Island (UPEI)**
**550 University Avenue**
**Charlottetown, PEI**
**C1A 4P3**

The CAHLN was established in 2002 to facilitate exchange of information on animal health diagnostic trends, techniques and research, to provide a venue for networking, to identify common issues of concern, and to improve linkages among organizations and scientific staff involved in animal health diagnostic work in Canada.

The CAHLN is comprised of individuals across the wide spectrum of laboratory disciplines, including bacteriology, pathology, immunology, virology, parasitology, toxicology and molecular biology.

Previous annual meetings have been held:

2002 – Ottawa (CFIA - OLF)
2003 – Ottawa (CFIA - OLF)
2004 – Guelph (Ontario Veterinary College)
2005 – St-Hyacinthe (Faculté de Médecine Vétérinaire)
2006 – Ottawa (CFIA - OLF)
2007 – Saskatoon (Western College of Veterinary Medicine/Prairie Diagnostic Services)
2008 – Ottawa (CFIA - OLF)
2009 – Charlottetown (Atlantic Veterinary College)
2010 – Calgary (College of Veterinary Medecine, University of Calgary)
2011 – Guelph (Ontario Veterinary College)
2012– Winnipeg (CFIA – NCFAD)
2013– St.-Hyacinthe (Faculté de Médecine Vétérinaire)
2014– Ottawa, (CFIA – OLF)
2015– Saskatoon, SK (Western College of Veterinary Medicine/Prairie Diagnostic Services), in conjunction with the World Association of Veterinary Laboratory Diagnosticians meeting

## 15e congrès annuel du réseau canadien des travailleurs des laboratoires de santé animale (RCTLSA)

**Du 5 au 8 juin 2016**

**Atlantic Veterinary College (AVC)**
**University of Prince Edward Island (UPEI)**
**550 University Avenue**
**Charlottetown, PEI**
**C1A 4P3**

Le RCTLSA a été créé en 2002 dans le but de favoriser l'échange d'information sur les tendances, les techniques et la recherche en matière de diagnostic en santé animale; de fournir une occasion de réseautage afin de dégager des sujets de préoccupation communs dans ce domaine; et de faciliter les relations entre les organisations et le personnel scientifique dont le travail touche le diagnostic en santé animale au Canada.

Le RCTLSA comprend des personnes provenant de toutes les spécialités de diagnostic en laboratoire, incluant des spécialistes en bactériologie, en pathologie, en immunologie, en virologie, en parasitologie, en toxicologie et en biologie moléculaire.

Les congrès annuels précédents ont eu lieu à :

2002 – Ottawa (CFIA - OLF)
2003 – Ottawa (CFIA - OLF)
2004 – Guelph (Ontario Veterinary College)
2005 – St-Hyacinthe (Faculté de Médecine Vétérinaire)
2006 – Ottawa (CFIA - OLF)
2007 – Saskatoon (Western College of Veterinary Medicine/Prairie Diagnostic Services)
2008 – Ottawa (CFIA - OLF)
2012 – Charlottetown (Atlantic Veterinary College)
2013 – Calgary (College of Veterinary Medicine, University of Calgary)
2014 – Guelph (Ontario Veterinary College)
2012– Winnipeg (CFIA – NCFAD)
2013– St. Hyacinthe (Faculté de Médecine Vétérinaire)
2014– Ottawa, (CFIA – OLF)
2015– Saskatoon, SK (Western College of Veterinary Medicine/Prairie Diagnostic Services)

## CAHLN / RCTLSA AWARDS

### 1. CAHLN Laboratorian of the Year - Prix du Diagnosticien du RCTLSA

The Canadian Animal Health Laboratorians Network (CAHLN) awards a plaque annually to a laboratorian based on his or her noteworthy contributions to veterinary laboratory medicine in Canada. A nominee might be an outstanding diagnostician, educator, researcher, mentor of future laboratorians, or other contributor to the field. The award is presented at the conclusion of the CAHLN Annual meeting.

Le Réseau canadien des travailleurs des laboratoires de santé animale (RCTLSA) décerner chaque année une plaque à un des siens, pour sa ou ses contributions à la médecine vétérinaire de laboratoire au Canada. Le comité des récompenses accueillera les noms qui seront proposés par tout travailleur canadien de laboratoire. Le candidat peut être un diagnosticien, un éducateur, un chercheur, un mentor de la relève ou n'importe qui du domaine, dont l'apport est remarquable. La récompense est décernée à la fin de la réunion annuelle du Réseau.

Past winners:
2003 - Lloyd Spencer, CFIA, Nepean, ON
2004 - Ian Barker, OVC, Guelph, ON
2005 - Marcelo Gottschalk, FMV, St. Hyacinthe, QC
2006 - John Robinson, MAL, Abbotsford, BC
2007 - John Fairbrother, FMV, St. Hyacinthe, QC
2008 – W.D.G (Bill) Yates, CFIA, Lethbridge, AB
2009 – Gerald R. Johnson, AVC, Charlottetown, PEI
2010 – Ted Clark, Calgary, AB
2011 – Josepha DeLay, AHL,Guelph, ON
2012 – Mark Swendrowski, MAFRI, Winnipeg, MB
2013 – Grant Maxie, U. of Guelph, Guelph, ON
2014 – John Pasick, CFIA, Winnipeg, MB
2015 – James P. Goltz, NBDFA, Fredericton, NB

## 2. CAHLN Graduate Student Presentation Award

A plaque is awarded annually to a graduate student based on the quality of their presentation at the CAHLN annual meeting. Presentations are judged on the originality of the subject, contribution of the presentation to our knowledge base, the student's understanding and delivery of the topic, and their ability to deal with questions. The award is presented at the conclusion of the CAHLN Annual meeting.

Chaque année, une plaque est remise au finissant qui a présenté le meilleur exposé dans le cadre de l'assemblée annuelle du Réseau canadien des travailleurs des laboratoires de santé animale (RCTLSA). Les exposés sont jugés selon l'originalité du sujet, la contribution de l'exposé à notre base de connaissances, la compréhension et la présentation de la matière, ainsi que la capacité des finissants de répondre aux questions. La récompense est décernée à la fin de la réunion annuelle du Réseau.

Past winners of the CAHLN Graduate Student Presentation Award:
2003 – Sherry Andrews, WCVM, Saskatoon, SK
2004 – Noel Harrington, OVC/CFIA, ON
2005 – Guillaume Bruant, FMV, St. Hyacinthe, QC
2006 – Yuanmu Fang, WCVM, Saskatoon, SK
2007 – Kathi Ellis, WCVM, Saskatoon, SK
2008 – Angela Catford, OVC, Guelph, ON
2009 – Raphael Vanderstichel, AVC, Charlottetown, PEI
2010 – Guilherme Gomes Verocai, UCVM, Calgary, AB
2011 – Olivier Côté, OVC, Guelph, ON
2012 – Jason Struthers, WCVM, Saskatoon, SK
2013 – Janet Sunohara-Neilson, OVC, Guelph, ON
2014 – Cathy Bauman, OVC, Guelph, ON

Canadian Animal Health Laboratorians Network

Réseau canadien des travailleurs des laboratoires de santé animale

# A very special thanks is extended to all our sponsors for your contributions to CAHLN / RCTLSA 2016 Annual Meeting

# Platinum Sponsors

Agence canadienne d'inspection des aliments
Canadian Food Inspection Agency
www.inspection.gc.ca

www.upei.ca/avc

www.upei.ca

www.gnb.ca

www.gov.nf.ca

www.gov.ns.ca

www.gov.pe.ca

# Gold Sponsors

# Silver Sponsors





# Bronze Sponsors





**PRECONFERENCE WORKSHOPS AND**
**CAHLN / RCTLSA WELCOME RECEPTION**
Sunday, June 5, 2016

**CAVP-ACPV Annual Meeting**

| | |
|---|---|
| 8:00 – 16:30 | Annual General Meeting and Conference<br>Room 287N, AVC Learning Commons |

**Preconference Diagnostic Test Validation Workshop**

| | |
|---|---|
| 8:00 – 17:00 | Room 286A – N, AVC Learning Commons |

**CAHLN / RCTLSA 15th Annual Meeting** **Page**

| | | |
|---|---|---|
| 15:00 – 19:00 | CAHLN 2016 Registration open | |
| 17:00 – 19:00 | Opening Reception – Market Square, McDougall Hall<br>Trade Show<br>Networking | |
| 19:00 | Welcome Message and Introduction of the Guest Speaker<br>Dr. James P. Goltz, CAHLN / RCTLSA President<br>Alex H. MacKinnon Amphitheatre, Room 242, MacDougall Hall | |
| 19:15 | Presentation<br>Talk to and About the Animals<br>Speaker: **Dr. Lamont Sweet**, retired Chief Public Health Officer of Prince Edward Island<br>Alex H. MacKinnon Amphitheatre, Room 242, MacDougall Hall | 21 |
| 20:00 – 21:00 | Networking | |

**CAHLN / RCTLSA 15th Annual Meeting**
**Opening Plenary Session**
Monday, June 6, 2016
8:30 – 12:00

Duffy Amphitheatre, Duffy Building

**Overall Theme: Collaboration in Veterinary Laboratory Diagnostics and Animal Health**

*Simultaneous translation will be available for all sessions on Monday June 6*

| | | |
|---|---|---|
| Moderator: | Dr. James P. Goltz | |
| 7:45 – 10:00 | Registration – McDougall Hall | |
| 8:30 – 17:00 | Exhibitors Hall Open – McDougall Hall | |
| 8:05 – 8:30 | Official Opening and Welcome<br>**Dr. Robert Gilmour**, Vice-President Academic and Research, University of Prince Edward Island<br>**Dr. Greg Keefe**, Dean of Atlantic Veterinary College<br>**Brian Matheson**, Director of the Agriculture Policy and Regulatory Division, PEI Dept. of Agriculture and Fisheries<br>**Ian Alexander**, Executive Director of the Canadian Food Inspection Agency Animal Science Directorate<br>**Dr. James P. Goltz**, President, CAHLN / RCTLSA | |
| 8:30 – 12:00 noon | **Plenary Session** | |
| | | Page |
| 8:30 | Collaboration – Diagnostic Test Validation for Diagnostics and Surveillance (mammalian and aquatic)<br>Speaker: **Dr. Ian Gardner**, Professor and Canada Excellence Research Chair (CERC) in Aquatic Epidemiology, Atlantic Veterinary College (AVC). | 24 |
| 9:15 | Laboratory Collaboration: A Legacy of Overachieving and Being Undervalued<br>Speaker: **Dr. Brian Evans**, World Organization for Animal Health (OIE), Paris, France | 25 |
| 10:00 – 10:30 | **HEALTH BREAK, POSTER, TRADE SHOW AND NETWORKING** | |
| 10:30 | Collaboration in Veterinary Diagnostics – Surveillance and Public Health<br>Speaker: **Dr. Michael Drebot**, Director, Zoonotic Diseases and Special Pathogens, National Microbiology Laboratory, Public Health Agency of Canada | 26 |

| | | Page |
|---|---|---|
| 11:15 | Evolution of Technologies and Their Application for Diagnostics and Surveillance<br>Speaker: **Dr. François Elvinger**, Professor of Epidemiology, Assistant Dean for Diagnostic Operation and Executive Director, Animal Health Diagnostic Center and New York State Veterinary Diagnostic Laboratory, Ithaca, New York. | 27 |
| 12:00 - 13:30 | **LUNCH BREAK, POSTER VIEWING, TRADE SHOW AND NETWORKING** | |
| 12:00 - 13:00 | **TRANSMISSIBLE SPONGIFORM ENCEPHALOPATHY (TSE) NETWORK MEETING**<br>Room 318, MacDougall Hall | |

**CAHLN / RCTLSA 15th Annual Meeting**
**Opening Plenary Session**
Monday, June 6, 2016
13:00 – 17:00

Duffy Amphitheatre, Duffy Building

**Overall Theme: Collaboration in Veterinary Laboratory Diagnostics and Animal Health**

Moderator: Dr. James P. Goltz

**Plenary Session** continued

| | | Page |
|---|---|---|
| 13:00 | Animal Health Surveillance Systems in Canada<br>Speaker: **Dr. Cheryl James**, National Manager, National Coordination of Animal Health, Canadian Food Inspection Agency (CFIA) | 30 |
| 13:30 | Aquatic diagnostics and epidemiological analyses for monitoring microbes in finfish: current challenges and ongoing progress<br>Speaker: **Dr. Raphael Vanderstichel**, Assistant Professor in Epidemiology, Center for Veterinary Epidemiological Research (CVER) and Department of Health Management, AVC | 31 |
| 14:00 | Innovation and update from Canadian Wildlife Health Cooperative<br>Speaker: **Dr. Craig Stephen**, Executive Director, Canadian Wildlife Health Center (CWHC) | 32 |
| 14:30 | Evolution of Diagnostic Pathology and its integration / collaboration with other disciplines<br>Speaker: **Dr. Grant Maxie**, Director of the Animal Health Laboratory and Co-Executive Director of Laboratory Services, University of Guelph | 33 |
| 15:00 – 15:30 | **HEALTH BREAK, TRADE SHOW, POSTER VIEWING AND NETWORKING** | |
| 15:30 | Industry Perspectives – What is the role of industry in aquatic animal health and disease surveillance?<br>Speaker: **Dr. Diane Morrison**, Fish Health and Food Safety Director, Marine Harvest, Campbell River, British Columbia | 34 |
| 16.00 | Industry Perspectives – What is the role of industry in terrestrial animal health and disease surveillance?<br>Speaker**: Dr. Dan Hurnik**, Professor of Swine Health Management, AVC | 35 |

| | | Page |
|---|---|---|
| 16:30 – 17:30 | **Panel Discussion on Collaboration - Issues and Solutions**<br><br>*What is the future? How can we improve collaboration in Animal Health and Surveillance in Canada?*<br><br>Panel Participants: All speakers from two plenary session.<br>Moderator: Dr. James P. Goltz | |
| 17:30 – 20:00 | Explore Charlottetown on your own. | |
| 20:00 – 21:00 | Special Workshop – Quality Assurance: Design consideration and tools for analysis.<br>Speaker**: Liza M. Cabuang**, Team Leader, External Quality Assessment Schemes (EQAS) or Proficiency Testing, National Reference Laboratory – Australia, Melbourne, Victoria, Australia | 36 |

CAHLN / RCTLSA 15th Annual Meeting

**Scientific Session**

Tuesday, June 7, 2016

8:30 – 12:00 PM

Alex H. MacKinnon Amphitheatre, Room 242, McDougall Hall

The Atlantic Veterinary College and Animal Health

**Theme: Industry-Government-Academia Animal Health Collaboration**

| | | |
|---|---|---|
| Moderator: | Dr. Larry Hammell | |
| | | Page |
| 8:30 – 17:00 | Exhibitors Hall Open – McDougall Hall | |
| 8:30 | Collaborative research in aquatic animal health<br>Speaker: **Dr. Larry Hammell**, Professor of Aquatic Epidemiology and Associate Dean, Graduate Studies and Research, AVC | 39 |
| 9:00 | Collaborative research in dairy health<br>Speaker: **Dr. Greg Keefe**, Professor of Dairy Health and Dean of AVC | 40 |
| 9:30 | Academia-industry collaborations to develop preclinical animal models of neurological disease<br>Speaker: **Dr. Andrew Tasker**, Professor of Neuropharmacology, AVC | 41 |
| 10:00– 10:30 | **HEALTH BREAK, TRADE SHOW, POSTER VIEWING AND NETWORKING** | |
| 10:30 | A collaborative approach to cancer research: Investigating therapeutic targets and disease mechanisms in head and neck cancer<br>Speaker: **Dr. Chelsea Martin**, Assistant Professor of Anatomic Pathology, AVC | 42 |
| 10:50 | CRVE-net: A platform for risk analysis training and research<br>Speaker**: Dr. Javier Sanchez**, Associate Professor of Epidemiology, AVC | 43 |
| 11:10 | The cost of delaying disease management strategies in salt water net pen aquaculture<br>Speaker: **Dr. Sophie St-Hilaire**, Associate Professor and Canada Research Chair in Sustainable Aquaculture, AVC | 44 |
| 11:30 – 12:00 | Panel Discussion – *Current issues in Industry-Government -Academia collaboration: How to be more effective in collaborative efforts.*<br><br>Panel Participants: All speakers from AVC Session<br>Moderator: Dr. Larry Hammell | |

12:00 – 1:30 **LUNCH BREAK, TRADE SHOW, POSTER VIEWING AND NETWORKING**

12:15 – 1:30 **CAHLN BUSINESS MEETING**
Room 286A,B,C–N AVC Learning Commons

CAHLN / RCTLSA 15th Annual Meeting

**General – Scientific Oral Presentation Session**

Tuesday, June 7, 2016

13:30 – 16:45

Alex H. MacKinnon Amphitheatre, Room 242, McDougall Hall

| | | |
|---|---|---|
| Moderator: | Dr. James P. Goltz | |
| | | Page |
| 13:30 | Quality Assurance in Diagnostics for *Homo sapiens*: The Other Mammals<br>**Liza Cabuang**, Scientist and Team Leader – External Quality Assessment Schemes (EQAS) or Proficiency Testing, National Reference Laboratory – Australia, Melbourne, Victoria, Australia | 47 |
| 14.00 | Pilot ring test evaluating PCR testing for selected wildlife Pathogens in 19 diagnostic and research laboratories<br>**Maria J. Forzan**, John Wood, J. Patrick Powers and Raphael V. Vanderstichel | 48 |
| 14:15 | Case definitions for Bacterial Kidney Disease (BKD) using industry data from New Brunswick, Canada<br>**Anne S. Boerlage**, Henryk Stryhn, Javier Sanchez and Larry Hammell | 49 |
| 14:30 | Cilia Associated Respiratory (CAR) Bacillus-Like Organisms in Cats with pulmonary inflammation<br>[Graduate Student Presentation]<br>**Fany Marron-Lopez**, Alfonso Lopez and Shannon Martinson | 50 |
| 14:45 | Comparison of MALDI-TOF, ELISA, Iodine Precipitation and UV Spectrometry in selection of Aleutian Disease resistant mink<br>**Arnost Cepica**, Tokinori Iwamoto, Carmencita Yason and Elizabeth Dobbin | 51 |
| 15:05 – 15:30 | **HEALTH BREAK, TRADE SHOW, POSTER VIEWING AND NETWORKING** | |
| 15:30 | Evaluation of Mid Infrared Spectroscopy for quantification of bovine serum and colostrum IgG concentration<br>[Graduate Student Presentation]<br>**Ibrahim Elsohaby**, J. Trenton McClure, Marguerite Cameron, Luke Heider and Greg Keefe | 52 |
| 15:45 | High-Throughput Automated Analysis of Virus Neutralization Assays Against Animal Viruses<br>[Graduate Student Presentation]<br>**Cristina Solis Worsfold**, Michael Eschbaumer, Rkia Dardari, Sampson Law, Frank Marshall, Frank van der Meer and Markus Czub | 53 |

| | | Page |
|---|---|---|
| 16:00 | Diagnosis of diarrhea in calves and piglets: histopathology and microbiology examination<br>**Musangu Ngeleka**, Dale Godson, Chris Wojmarowicz, Soraya Sayi and Yanyun Huang | 54 |
| 16:15 | The Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS): integrated surveillance supported by an engaged network<br>**E. Jane Parmley**, Carolee Parson, David Leger, Brent Avery, Danielle Daignault, Richard J. Reid-Smith and Rebecca J. Irwin | 55 |
| 16:30 | Recent trends in pathogenic *Escherichia coli* in pigs in Quebec: Emergence of a new ETEC: F4 *E.coli* virotype<br>**Ghyslaine Vanier**, Gabriel Desmarais, Maud de Lagarde and John Morris Fairbrother | 56 |
| 16:45 | Assuming Leadership Beyond Diagnostics: Veterinary Laboratorians Tackle Raccoon Rabies Variant in New Brunswick<br>**James P. Goltz** | 57 |
| 17:00 – 17:45 | **TOUR OF THE ATLANTIC VETERINARY COLLEGE** | |
| 18:30 – 19:15 | **RECEPTION / CASH BAR**<br>MacMillan Hall, W.A. Murphy Student Center | |
| 19:15 - 22:00 | **LOBSTER SUPPER AND KITCHEN PARTY**<br>MacMillan Hall, W.A. Murphy Student Center | |

CAHLN / RCTLSA 15th Annual Meeting

**General – Scientific Oral Presentation Session**

Wednesday, June 8, 2016

8:30 – 11:30 AM

Alex H. MacKinnon Amphitheatre, Room 242, McDougall Hall

| | | |
|---|---|---|
| **Moderator:** | **Dr. Paul Hanna,** Department of Pathology and Microbiology, AVC | |
| 8:30 | Exhibitors Hall Open – McDougall Hall | |
| | | Page |
| 8:30 | Design standards for experimental studies to evaluate diagnostic accuracy of tests for infectious diseases in aquatic animals<br>**Emilie Laurin**, Paul Hick, Ian A. Gardner, Nicholas J.G. Moody, Mark St. J. Crane, Charles G.B. Caraguel and Ingo Ernst | 60 |
| 8:45 | Measuring diagnostic accuracy for Bacterial Kidney Disease (BKD) in Atlantic Salmon<br>**Diana Jamarillo**, Holly Burnley, Ian A. Gardner, Henrik Stryhn and Larry Hammell | 61 |
| 9:00 | Development of multiplex detection assay for salmonid pathogens utilizing fluidic bead-based technology<br>**Dante Mateo**, Larry Hammell, Ian A. Gardner and Carmencita Yason | 62 |
| 9:15 | Development of fully-automated microfluidic assay for Multiplex detection and subtyping of livestock pathogens<br>**Oliver Lung**, Cody Buchanan, Matt Fisher, Niroshan Thanthrige-Don, Tara Furukawa-Stoffer, John Pasick, Charles Nfon, Tomy Joseph, Dale Godson, John Gilleard, Trevor Alexander, Brent Selinger and Aruna Ambagala | 63 |
| 9:30 | Development of a multiplex nucleic acid assay for salmonid immunological assessment<br>**Sara L. Purcell** and Mark D. Fast | 64 |
| 9:45 | Increasing standardization in Real-Time PCR testing with a modular platform and its benefit to laboratory throughput<br>Martina Kahila, **Kristen Roza-Sutherland**, Wendy Witbeck, Valerie Leathers, Kathy Velek, Lori Plourde, Christian Leutenegger and Martin Angelichio | 65 |
| **10:00 – 10:30** | **HEALTH BREAKS, TRADE SHOW AND NETWORKING** | |
| 10:30 | Gene Expression in chicken lung and brain in response to infection with two recombinant H5N3 Avian Influenza viruses that possess a Polybasic $HA_o$ Cleavage Site<br>**John Pasick**, Sandra Diederich, Yohannes Berhane and Carissa Embury-Hyatt | 66 |

| | | Page |
|---|---|---|
| 10:45 | Field-deployable Reverse Trancription-Insulated Isothermal PCR (RT-iiPCR) Assay for Rapid and Sensitive Detection of Foot-and-Mouth Disease Virus<br>Aruna Ambagala, Mathiew Fisher, Melissa Goolia, **Charles Nfon**, Tara Furukawa-Stoffer, Rodrigo Ortega Polo and Olivia Lung | 67 |
| 11:00 | Big Data Has Arrived: Implications, Opportunities and Challenges for Collaboration<br>**Anatoliy Trokhymchuk**, Harold Kloeze, Glen Duizer, Theresa Burns and Shamir Mukhi | 68 |
| 11:15 | Graduate Student Travel Award, Graduate Student Oral Presentation Award, Graduate Student Poster Presentation Award and Laboratorian of the Year Award | |
| 11:30 | CAHLN 2017 – Dr. Grant Maxie<br>Closing Remarks – Dr. James P. Goltz | |
| 11:45 | LUNCH | |
| 12:15 – 15:00 | **CANADIAN ANIMAL HEALTH SURVEILLANCE NETWORK ANNUAL MEETING**<br>Room 286A,B,C–N AVC Learning Commons | |

## Poster Presentations

| Poster No. | Authors | Title | Presenter |
|---|---|---|---|
| 1 | Babafela Awosile, Matt Saab, J. Trenton McClure and Luke Heider | Antimicrobial resistance in selected pathogens isolated from dogs at a referral diagnostic laboratory in Atlantic Canada: 1994-2013 | Babafela Awosile [Graduate Student Presentation] |
| 2 | Chantale Provost, Phillipe Garneau, Davor Ojkic, Josee Harel and Carl Gagnon | Development of a new molecular method for discriminating infectious versus non-infectious viral particles in food additives derived from swine | Chantale Provost |
| 3 | Mhamdi Zeineb, Christian Savard, Chantale Provost and Carl Gagnon | Detection of Influenza A virus strains resistant to antiviral drugs, including | Mahmdi Zeineb [Graduate Student Presentation] |
| 4 | Niorn Ratanapob, John VanLeeuwen, Shawn McKenna, Maureen Wichtel, Juan C. Rodriguez-Lecompte, Paula Menzies and Jeff Wichtel | A retrospective postmortem study of young calves in lambs in PEI (2005-2014) | Niorn Ratanpob [Graduate Student Presentation] |
| 5 | Ines Walther, Andrei Soutyrine, Antanas Staskevicius, Patricia Shaffer and Gordon Mitchell | Transmissibility of CWD to domestic sheep and goats | Ines Walther |
| 6 | Iman Mehdizadh Gohari, Andrew M. Kropinski, Scott J. Weese, Valeria R. Parreira, Ashley E. Whitehead, Patrick Boerlin, John F. Prescott | Comparative genomic and cgMLST analysis of netF-positive *Clostridium perfringens* isolates from foal and canine necrotizing enteritis | Iman Mehdizadeh Gohari [Graduate Student Presentation] |

The presenters will be available in the poster area during Health Breaks on Monday and Tuesday.

PRECONFERENCE WORKSHOPS AND
CAHLN / RCTLSA WELCOME RECEPTION
Sunday, June 5, 2016

**CAVP-ACPV Annual Meeting**

| | |
|---|---|
| 8:00 – 16:30 | Annual General Meeting and Conference<br>Room 287N, AVC Learning Commons |

**Preconference Diagnostic Test Validation Workshop**

| | |
|---|---|
| 8:00 – 17:00 | Room 286A – N, AVC Learning Commons |

**CAHLN / RCTLSA 15th Annual Meeting** **Page**

| | | |
|---|---|---|
| 15:00 – 19:00 | CAHLN 2016 Registration open | |
| 17:00 – 19:00 | Opening Reception – Market Square, McDougall Hall<br>Trade Show<br>Networking | |
| 19:00 | Welcome Message and Introduction of the Guest Speaker<br>Dr. James P. Goltz, CAHLN / RCTLSA President<br>Alex H. MacKinnon Amphitheatre, Room 242, MacDougall Hall | |
| 19:15 | Presentation<br>**Talk to and About the Animals**<br>Speaker: **Dr. Lamont Sweet**, retired Chief Public Health Officer of Prince Edward Island.<br>Alex H. MacKinnon Amphitheatre, Room 242, MacDougall Hall | 21 |
| 20:00 – 21:00 | Networking | |

**Talk to and About the Animals**

Dr. Lamont Sweet

Retired Chief Public Health Officer of Prince Edward Island.

**Speaker Biography**: Dr. Lamont Sweet was PEI's Chief Public Health Officer for 17 years, before transitioning to the role of Deputy Chief Public Health Officer for 7 years to enable good succession planning. He is credited with helping to bring new vaccine programs to the province for chicken pox, meningococcal infection and human papilloma virus, and is an honourary lifetime member of the Canadian Public Health Association, the Canadian Medical Association and the Canadian Institute of Public Health Inspectors. Lamont received a BSc from Acadia, a medical degree from McGill, a pediatrics speciality from Dalhousie and a Master of Community Medicine from the University of British Columbia. He practiced as a family doctor in Nova Scotia and a pediatrician in Nova Scotia and Newfoundland. For the past year, he has worked at an opiate addiction facility in PEI. In addition to having dedicated much of his life to health care and public health, Lamont is also a very colourful speaker and is renowned for his humorous poems.

**CAHLN / RCTLSA 15th Annual Meeting**
**Opening Plenary Session**
Monday, June 6, 2016
8:30 – 12:00

Duffy Amphitheatre, Duffy Building

**Overall Theme: Collaboration in Veterinary Laboratory Diagnostics and Animal Health**

*Simultaneous translation will be available for all sessions on Monday June 6*

| | | |
|---|---|---|
| Moderator: | Dr. James P. Goltz | |
| 7:45 – 10:00 | Registration – McDougall Hall | |
| 8:30 – 17:00 | Exhibitors Hall Open – McDougall Hall | |
| 8:05 – 8:30 | Official Opening and Welcome<br>**Dr. Robert Gilmour**, Vice-President Academic and Research, University of Prince Edward Island<br>**Dr. Greg Keefe**, Dean of Atlantic Veterinary College<br>**Brian Matheson**, Director of the Agriculture Policy and Regulatory Division, PEI Dept. of Agriculture and Fisheries<br>**Ian Alexander**, Executive Director of the Canadian Food Inspection Agency Animal Science Directorate<br>**Dr. James P. Goltz**, President, CAHLN / RCTLSA | |
| 8:30 – 12:00 noon | **Plenary Session** | |
| | | Page |
| 8:30 | Collaboration – Diagnostic Test Validation for Diagnostics and Surveillance (mammalian and aquatic)<br>Speaker: **Dr. Ian Gardner**, Professor and Canada Excellence Research Chair (CERC) in Aquatic Epidemiology, Atlantic Veterinary College (AVC). | 24 |
| 9:15 | Laboratory Collaboration: A Legacy of Overachieving and Being Undervalued<br>Speaker: **Dr. Brian Evans**, World Organization for Animal Health (OIE), Paris, France | 25 |
| 10:00 – 10:30 | **HEALTH BREAK, POSTER, TRADE SHOW AND NETWORKING** | |
| 10:30 | Collaboration in Veterinary Diagnostics – Surveillance and Public Health<br>Speaker: **Dr. Michael Drebot**, Director, Zoonotic Diseases and Special Pathogens, National Microbiology Laboratory, Public Health Agency of Canada | 26 |

| | | Page |
|---|---|---|
| 11:15 | Evolution of Technologies and Their Application for Diagnostics and Surveillance<br>Speaker: **Dr. François Elvinger**, Professor of Epidemiology, Assistant Dean for Diagnostic Operation and Executive Director, Animal Health Diagnostic Center and New York State Veterinary Diagnostic Laboratory, Ithaca, New York. | 27 |
| 12:00 - 13:30 | **LUNCH BREAK, POSTER VIEWING, TRADE SHOW AND NETWORKING** | |
| 12:00 - 13:00 | **TRANSMISSIBLE SPONGIFORM ENCEPHALOPATHY (TSE) NETWORK MEETING**<br>Room 318, MacDougall Hall | |

**Test validation for diagnostic and surveillance purposes in terrestrial and aquatic animals: past, present and future**

Ian Gardner

Atlantic Veterinary College, University of Prince Edward Island, Charlottetown, PE, C1A 4P3

Evaluation of the diagnostic accuracy (parameters such as sensitivity, specificity and area under the receiver-operating characteristic curve) of assays is important to ensure appropriate interpretation of results for purposes such as diagnosis, surveillance, and use in epidemiologic studies (e.g. prevalence surveys, risk analyses, and risk factor studies). These diagnostic performance measures are important considerations in addition to factors such as cost, rapidity, reproducibility and repeatability in selection of a test or a combination of tests for a defined purpose.

In its Manual of Diagnostic Tests and Vaccines, the World Organisation for Animal Health (OIE) recommends a 4-stage validation pathway appropriate for infectious diseases in the context of fitness-for-purpose and this validation framework provides useful guidance regardless of whether the pathogen is OIE listed or not. However, there is still a paucity of published estimates of diagnostic sensitivity and specificity for many animal diseases and there are few studies which have presented comparative data on diagnostic sensitivity in clinically-affected animals and in infected but asymptomatic animals. The latter data are most relevant to decisions related to animal movements and trade, including decisions about the appropriate sample size for evaluating animal populations.

My presentation will focus on 3 aspects of test evaluation: 1) design and reporting considerations which are still in need of improvement in peer-reviewed publications in people, and both terrestrial and aquatic animals, 2) use of latent class analysis methods and the perils of not knowing what you are doing, and 3) considerations regarding validation of high-throughput sequencing methods and other novel diagnostic technologies. Examples will be used to demonstrate key issues and relevant standards for design (QUADAS-2) and reporting (STARD and STRADAS) will be discussed as ways to improve the quality of the primary literature to facilitate systematic reviews and meta-analyses.

**Speaker Biography**: Dr. Ian Gardner is the Canada Excellence Research Chair in Aquatic Epidemiology at the University of Prince Edward Island, and has extensive experience and more than 40 publications on test validation in terrestrial and aquatic animal species. He has participated in several OIE *ad hoc* groups on the Validation of Diagnostic Tests and is one of the authors of the OIE Manual Chapter and its guidelines. In addition, with colleagues at the University of California, Davis, he developed and applied latent class analysis methods for estimation of sensitivity and specificity of diagnostic tests when the true status of samples is unknown. Dr. Gardner continues to work on application of latent class methods and his current research is focussed on design and reporting standards for diagnostic accuracy studies including use of pooling.

**Laboratory Collaboration: A Legacy of Overachieving and Being Undervalued**

Brian Evans

World Organisation for Animal Health (OIE), Paris, France

For over ninety–two years the World Organisation for Animal Health has been the intergovernmental standard setting organization mandated for global animal disease information reporting and dissemination.

The organization's scientific excellence is founded in its network of 301 reference centres. However, the true integrity and credibility of its disease information capture rests with the capacity and competency of the national animal health laboratory systems of its 180 Member countries, and 18 additional reporting countries, and their compliance with their reporting obligations to the World Animal Health Information System (WAHIS).

Failure in terms of timeliness or validity of animal disease information can have profound consequences for animal health, food security and safety, public health, individual livelihoods and national economies well beyond national borders. In the complex and convergent risk reality in which we live, a potential weakness or vulnerability in the detection capability of one country is a potential threat to all countries.

In addition, the development of international science based standards for the control of terrestrial and aquatic animal and zoonotic diseases, including standards for diagnostic methods and vaccines, and certification for safe trade is a moot exercise if countries are not able to effectively implement them.

Consequently the OIE has developed the Performance of Veterinary Services Pathway, in support of good governance and the quality of veterinary services, as well as capacity building programs such as laboratory twinning in order to support global health security efforts to better manage animal health risks at the interface between animals, humans and ecosystems.

However science is not static and we are collectively challenged to interpret information derived from new technologies to properly inform decision making and public discourse. As information platforms and pathways change, we must enable both the trust and partnerships necessary to support data collection, information and knowledge dissemination to achieve global health and food security and economic prosperity.

**Speaker Biography**: Following several years in private veterinary practice with a professional focus on reproductive herd health and embryo transfer, Dr. Evans was recruited by the federal government of Canada into public practice to develop domestic and international standards and certification programs in support of the safe international movement of animal embryos and germplasm. His interest in reproduction also extended to his personal life where he and his wife and best friend Laurianne have been blessed as parents to four unique, diverse and wonderful children….Kyle, Amanda, Heather-Jo and Tyler.

Dr. Evans had a distinguished career of thirty-two years in public service which included serving as Canada's Chief Veterinary Officer for a period of fifteen years as well as Governor-In-Council appointments as the Executive Vice President of the Canadian Food Inspection Agency, Canada's first Chief Food Safety Officer and finally as Special Advisor to the President of the Canadian Food Inspection Agency.

Dr. Evans is currently the Deputy Director General for International Standards and Science with the World Organisation for Animal Health (OIE) based in Paris, France.

He is the recipient of numerous national and international awards and has been conferred with Honorary Degrees of Laws from both the University of Guelph and the University of Calgary.

**Collaboration in Veterinary Diagnostics – Surveillance and Public Health**

Michael Drebot

Director, Zoonotic Diseases and Special Pathogens, National Microbiology Laboratory, Public Health Agency of Canada

The majority of emerging infectious diseases are zoonotic or of animal origin and collaborative efforts among veterinarians, physicians, and public health professionals are key in both responding to and preparing for novel pathogenic agents. The foundation of an effective surveillance system requires diagnostic support and capability along with networking platforms/approaches to facilitate information sharing and technology transfer. In recent decades the enhancement of animal and human health partnerships in Canada have been highlighted when addressing diagnostic and surveillance needs during emerging zoonotic disease incursions such as West Nile virus (WNV) expansion. Cross disciplinary group participation in committees such as the WNV National Steering Committee and National Non-Enteric Zoonotic Disease Committee provided forums for veterinarians, public health and other partners and stakeholders to discuss their surveillance programs and exchange timely information.

Collaborative diagnostic and surveillance partnerships involving various veterinarian and public health groups have encompassed initiatives pertaining to a number of emerging pathogens including WNV, hantaviruses, Eastern equine encephalitis virus (EEEV), and mosquito-borne bunyaviruses. Veterinarians have played a central role as collaborators on West Nile virus surveillance providing diagnostic samples (dead birds and other wildlife) to track the annual occurrence and distribution of this virus across the country. Increased awareness and diagnostic capacity for EEEV and bunyaviruses such as the California serogroup and Cache Valley viruses have also been established in partnership with veterinarians and public health agencies. As well, surveillance for Schmallenberg virus incursion and additional domestic vector-borne agents has led to cooperative and beneficial partnerships involving PHAC, CFIA and provincial veterinarians. The continuing development of diagnostic and surveillance capacity remains an essential pursuit when responding to emerging agents of concern for both public and animal health.

**Speakers Biography**: Dr. Michael Drebot received his PhD in Microbiology in 1988 from Dalhousie University and was then awarded a postdoctoral fellowship in genetics from the Hospital for Sick Children (Toronto, 1988-1991). In 1991 he joined the National Centre for Enteroviruses in Halifax where he conducted research on the molecular biology of polioviruses and various enteric pathogens and was cross appointed as a professor adjunct within the Department of Microbiology and Immunology at Dalhousie University. In 1996, Dr. Drebot joined the Zoonotic Diseases program of Health Canada, Ottawa as a research scientist. In 1999 he became the Chief of Viral Zoonoses within the Zoonotic Diseases and Special Pathogens (ZDSP) section of the National Microbiology Laboratory (NML) (Winnipeg) and in 2013 also took on the responsibilities of Director of the ZDSP division. As well, Dr. Drebot was Director of the NML's Science Technologies Core from 2007-2013 and is an Associate Professor within the Medical Microbiology department, University of Manitoba.
The focus of his research and reference services activities has been collaborative work on the establishment of applied and basic research programs for various zoonotic disease agents including: arboviruses (such as West Nile virus and California Serogroup, Cache Valley virus bunyaviruses, tick borne Powassan viruses, etc.) and rodent-borne pathogens such as hantaviruses.

**Evolution of New Technologies and Their Application for Diagnostics and Surveillance**

François Elvinger, Ed Dubovi, Amy Glaser, Laura Goodman, Kim Ramm, Anil Thachil, Belinda Thompson, Bettina Wagner

Animal Health Diagnostic Center / New York State Veterinary Diagnostic Laboratory, College of Veterinary Medicine, Cornell University, Ithaca, NY 14853

New technologies are continuously reshaping delivery of services for clients of veterinary diagnostic laboratories. Changes in definition, precision and accuracy, speed and cost, as well as progress in specimen transportation, data handling and report delivery are requiring deep and frequent readjustments of the services that any public or private laboratory can offer.

Our clients in the public and private domain request greater sophistication and faster turn-around times that go hand in hand with greater need not only for advanced technologies, but also for support in preparation of diagnostic plans and in interpretation of ever evolving diagnostic reports. Inputs in the diagnostic process have not changed; that is, accessions at laboratories still consist of tissues, fluids, swabs or other, in various formats and packaging, from either clinically ill animals or population samples in outbreak investigations that now need to be worked up. Tests need to be properly matched to those inputs to ensure that they are fit for the purpose of accurately detecting intended or unintended pathogens and allow for translation of results into actionable treatment, control and prevention plans.

Careful evaluation of utility to our laboratories' clients, of benefits to animal and public health, and of quality control and implementation costs needs to precede adoption of new tests and testing platforms. Detection of pathogenic determinants, agents or reactions may or may not translate into diagnosis of disease, and may have ethical, public health or regulatory implications that need to be considered.

**Speaker Biography**: François Elvinger is professor of epidemiology and the Executive Director of the Animal Health Diagnostic Center / New York State Veterinary Diagnostic Laboratory at the College of Veterinary Medicine at Cornell since fall 2015. Previously he has been a Virginia Tech faculty member at the Virginia-Maryland College of Veterinary Medicine for 17 years, heading the Department of Population Health Sciences and building and directing the Public Health Program that administers the Virginia Tech CEPH accredited Master of Public Health degree program. His educational background includes the Dr.med.vet. from the Hannover Veterinary School in Germany and a Ph.D. in Dairy Science from the University of Florida. He is a diplomate of the American College of Veterinary Preventive Medicine and of the European College of Veterinary Public Health. He has taught professional and graduate courses in biostatistics, epidemiology, infectious diseases, and production management. His research interests are in study design and analysis of infectious disease diagnostics and health surveillance systems. He is a member and has chaired various committees of the American Association of Veterinary Laboratory Diagnosticians (AAVLD) and the US Animal Health Association, including the Steering Committee of the National Animal Health Surveillance System for USDA:APHIS:VS. He currently is the immediate Past President of the AAVLD.

**CAHLN / RCTLSA 15th Annual Meeting**
**Opening Plenary Session**
Monday, June 6, 2016
13:00 – 17:00

Duffy Amphitheatre, Duffy Building

**Overall Theme: Collaboration in Veterinary Laboratory Diagnostics and Animal Health**

Moderator: Dr. James P. Goltz

**Plenary Session** continued

| | | Page |
|---|---|---|
| 13:00 | Animal Health Surveillance Systems in Canada<br>Speaker: **Dr. Cheryl James**, National Manager, National Coordination of Animal Health, Canadian Food Inspection Agency (CFIA) | 30 |
| 13:30 | Aquatic diagnostics and epidemiological analyses for monitoring microbes in finfish: current challenges and ongoing progress<br>Speaker: **Dr. Raphael Vanderstichel**, Assistant Professor in Epidemiology, Center for Veterinary Epidemiological Research (CVER) and Department of Health Management, AVC | 31 |
| 14:00 | Innovation and update from Canadian Wildlife Health Cooperative<br>Speaker: **Dr. Craig Stephen**, Executive Director, Canadian Wildlife Health Center (CWHC) | 32 |
| 14:30 | Evolution of Diagnostic Pathology and its integration / collaboration with other disciplines<br>Speaker: **Dr. Grant Maxie**, Director of the Animal Health Laboratory and Co-Executive Director of Laboratory Services, University of Guelph | 33 |
| 15:00 – 15:30 | **HEALTH BREAK, TRADE SHOW, POSTER VIEWING AND NETWORKING** | |
| 15:30 | Industry Perspectives – What is the role of industry in aquatic animal health and disease surveillance?<br>Speaker: **Dr. Diane Morrison**, Fish Health and Food Safety Director, Marine Harvest, Campbell River, British Columbia | 34 |
| 16.00 | Industry Perspectives – What is the role of industry in terrestrial animal health and disease surveillance?<br>Speaker**: Dr. Dan Hurnik**, Professor of Swine Health Management, AVC | 35 |

| | | Page |
|---|---|---|
| 16:30 – 17:30 | **Panel Discussion on Collaboration - Issues and Solutions**<br><br>*What is the future? How can we improve collaboration in Animal Health and Surveillance in Canada?*<br><br>Panel Participants: All speakers from two plenary session.<br>Moderator: Dr. James P. Goltz | |
| 17:30 – 20:00 | Explore Charlottetown on your own. | |
| 20:00 – 21:00 | Special Workshop - Quality Assurance: Design consideration and tools for analysis.<br>Speaker**: Liza M. Cabuang**, Team Leader, External Quality Assessment Schemes (EQAS) or Proficiency Testing, National Reference Laboratory – Australia, Melbourne, Victoria, Australia | 36 |

**Animal Health Surveillance Systems in Canada**

Cheryl James

Canadian Food Inspection Agency, Animal Health Science Directorate, Ottawa, Ontario

A report on animal health surveillance in Canada, commissioned by the National Farmed Animal Health and Welfare Council (NFAHWC), concluded there were weaknesses in decision-making and coordination at the national level, and in information and data sharing. Recognizing the successes of several surveillance systems and networks already operating, it was determined that collaborative governance would be the best approach to encourage more effective, responsive and integrated animal health surveillance. The Canadian Animal Health Surveillance System (CAHSS) is a recently established federal-provincial-territorial and industry collaboration that encompasses all animal health surveillance issues of interest, including reportable, emerging, zoonotic and production limiting diseases as well as antimicrobial usage in animals. It includes livestock, poultry, aquaculture species, honeybees and companion animals, as well as wildlife species. A high level review of current animal health surveillance systems in Canada and progress towards a more integrated approach will be presented. This is followed by a discussion on a vision for the future and potential implications for laboratory diagnosticians.

**Speaker Biography**: Cheryl James, DVM, MSc, is a veterinary epidemiologist (DVM University of Guelph, MS University of Prince Edward Island) who has spent the last 30 years developing her skills and capabilities at the Canadian Food Inspection Agency and the Canadian Department of Agriculture. Dr. James' experience spans integrated information systems for animal health and agriculture, animal health risk analysis and terrestrial animal health epidemiology and surveillance. In January 2016, Dr. James was appointed coordinator for the Canadian Animal Health Surveillance System, to help guide the building of this network of networks in collaboration with many partners.

**Aquatic diagnostics and epidemiological analyses for monitoring microbes in finfish: current challenges and ongoing progress**

Raphaël Vanderstichel

Atlantic Veterinary College, University of Prince Edward Island, Charlottetown, PE, C1A 4P3

Infectious diseases of marine finfish have an important economic impact on the global aquaculture industry. Farm-to-farm spread of pathogens in Atlantic salmon aquaculture has been described in several countries, including Canada, usually in reference to the physical distance between farms. However, the role of coastal water (hydrodynamic) and wild fish movements in pathogen diffusion and transmission are poorly understood. Equally important, and a current topic of intense research, is the potential impact of pathogen transmission between farm-raised and wild fish populations.

As part of the Strategic Salmon Health Initiative program, led by the Pacific Salmon Foundation, researchers at the Department of Fisheries and Oceans, Canada (DFO) have developed and evaluated the performance of the Fluidigm BioMark™ high-throughput microfluidics platform for use in microbe monitoring. Forty-five microbes (including 4 OIE-listed viruses) suspected or known to cause disease in salmon worldwide are now available on the BioMark™ platform. A thorough analytic validation of the BioMark™ use for finfish microbe detection was recently concluded. The validation study found that the platform produced reliable, rapid and inexpensive quantitative data on microbe presence and load. Over the past decade, more than 30,000 fish samples have been collected by DFO from wild, hatchery, and aquaculture salmon in British Columbia (BC). The BioMark™ platform, as well as other novel genomic technologies, will be applied to these samples to examine microbes' evolutionary relationships and their spatiotemporal distributions.

Along with novel diagnostic tools of increased efficiency like the BioMark™, new epidemiological, analytical, and modeling tools are being developed to accommodate these large and complex datasets. The challenges and unique opportunities in microbe monitoring of finfish using novel diagnostic and analytical tools will be presented.

**Speaker Biography:** Dr. Raphaël Vanderstichel is an Assistant Professor in Veterinary Epidemiology at the Atlantic Veterinary College. Raphaël began his career in a mixed-animal Veterinarian in England. His interest in research prompted him to return in 2007 to the Atlantic Veterinary College to pursue a PhD in epidemiology. In 2011, he became a Research Associate in the Department of Health Management working in conjunction with CFIA to develop statistical models to establish freedom from disease in Canadian swine and increase foreign trade. In 2014, Raphaël joined the Canada Excellence Research Chair team, led by Dr Ian Gardner, as a Research Scientist working on surveillance and transmission of pathogens affecting the aquaculture and shellfish industries. Raphaël's current work focuses on disease surveillance and spatial epidemiology. Applying his experience of veterinary medicine and spatial epidemiology, Raphaël has developed an extensive network of collaborations in the fields of aquatic epidemiology, wildlife health and disease surveillance. He has taught workshops on spatial epidemiology with an emphasis on the utilization of open-source software in North America, Asia and Latin America.

**Innovation and update from the Canadian Wildlife Health Cooperative (CWHC)**

Craig Stephen

Executive Director, Canadian Wildlife Health Center (CWHC)

In response to an unprecedented pace of social and environmental change, wildlife health programs are being to evolve from systems for monitoring pathogens and pathologies to a program that integrate multiple clues from multiple lines of evidence to help protect and promote health. The CWHC is no exception. The CWHC is championing a National Fish and Wildlife Health Strategy with federal and provincial partners. The purpose of the strategy is to ensure strong, shared leadership to protect and sustain wild animal health and the values they bring Canadians by promoting, sustaining, coordinating and integrating infrastructure and expertise in Canada. The strategy aims to support capacity that is adequate not only for today's concerns but also tomorrow's challenges. Its strategic goals are to; (i) strengthen Canada's capacity to identify and reduce wild animal health factors that put conservation, public health or cultural opportunities at risk, and to reduce the economic impacts of fish and wildlife diseases in Canada; (ii) develop, implement and assess programs and policies whose specific objective is to sustain healthy wild animals and the positive contributions they make to Canada by reducing disparities and differences in fish and wildlife health capacity across the country; (iii) encourage population health strategies that improve anticipation of fish and wildlife health policy and practice needs in the face of rapidly changing social and environmental conditions; and (iv) improve efficiency and effectiveness of public services by working together. This presentation will introduce the strategy and discuss some of the new developments at the CWHC aimed at ensuring we deliver on its objectives.

**Speaker Biography**: Dr. Craig Stephen is the CEO of the Canadian Wildlife Health Cooperative and a Professor at the Western College of Veterinary Medicine. He is also a clinical professor at the School of Population and Public Health at UBC and holds 3 other adjunct positions. He is a veterinarian with doctoral training in epidemiology. His research interests have focused on emerging environmental threats at the human-animal-environment interface as well as the application of population health principles to fish and wildlife health.

**Evolution of diagnostic pathology and its integration/collaboration with other disciplines**

Grant Maxie

Animal Health Laboratory, Laboratory Services Division, University of Guelph, Guelph, Ontario

Although diagnostic pathology is still the point at which results are integrated and increasingly sophisticated technologies are interpreted, it has become much more integrated with multidisciplinary support systems. This is not without challenges, as infinitesimally small bits of nucleic acid can be extracted from diseased tissues, and must then be explained, especially difficult when multiple agents are detected. Contaminant or cause? Emergence of the ABC (avidin-biotin-peroxidase complex) or "brown revolution" of immunohistochemistry – an antibody-based protein expression assay - has helped to maintain anatomic pathology as a centerpiece in the diagnostic process as agents can be localized within lesions and hence are presumed to be causative. Various imaging technologies, such as CT scans, have become useful tools for pathologists. High-throughput microarray technology is still on the horizon. Although the '-omics" – genomics (DNA, genome), transcriptomics (RNA, transcriptome), proteomics (protein), metabolomics (metabolites) – have come to hold sway, tissue morphology remains the gold standard, and is supported by, rather than replaced by, molecular pathology. In the field of cytopathology and Romanowsky stains, molecular pathology is also becoming additive, as flow cytometry and clonality testing become commonplace. For histopathologists, hematoxylin and eosin and the microscope remain safe!

*"You are young still, pathologist", the old professor said,*
*"And your slides aren't just purple and pink,*
*They have staining in brown, of both nuclei and membranes,*
*Pray, is this a good thing, do you think?"*
Rather dramatically adapted from 'Father William' by Lewis Carroll.
http://www.pathsoc.org/files/history/c15.pdf

**Speaker Biography**: Grant Maxie, DVM, PhD, Diplomate ACVP - After completing his DVM at WCVM, Saskatoon, in 1969, and PhD in Clinical Pathology at the Ontario Veterinary College in Guelph in 1973, Dr. Maxie worked in Kenya investigating the pathology of trypanosomiasis and theileriosis (1974-77). He worked on faculty at the OVC (1977-82, tenured associate professor) and as a Veterinary Pathologist (1982-94), and then as Guelph Laboratory Head (1994-97), for Veterinary Laboratory Services of the Ontario Ministry of Agriculture, Food and Rural Affairs. He was board certified as an anatomic pathologist by the American College of Veterinary Pathologists in 1984. He is currently the Director of the Animal Health Laboratory (1997 - ) and co-Executive Director (2007 - ) of the Laboratory Services Division at the University of Guelph.

Dr. Maxie was the editor-in-chief of the *Canadian Veterinary Journal* (1986 - 1991), and chair of the editorial committee of the CVMA until 1998. His scientific publications include 10 book chapters and >50 peer-reviewed articles. He edited the 3 volumes, and co-authored chapters, in the 5th and 6th editions of "*Jubb, Kennedy and Palmer's, Pathology of Domestic Animals*", published in 2007 and 2016. He is a past-president of the American Association of Veterinary Laboratory Diagnosticians (AAVLD) (2007-08), a long-time member of the AAVLD Accreditation Committee, and past-chair of the Strategic Planning Committee. He was the 2011-12 president of the Canadian Animal Health Laboratorians Network (CAHLN). He is the current editor-in-chief of the *Journal of Veterinary Diagnostic Investigation* (2014- ).

**Industry Perspective – What is the role of industry in aquatic animal health and disease surveillance?**

Diane Morrison

Fish Health and Food Safety Director, Marine Harvest Canada, 124-1334 Island Highway, Campbell River BC V9W 8C9

The British Columbian salmon farming industry started in the early 1980's. The last 30 years has seen significant changes and improvements to the industry's health management practices. Together with regulators, the industry has a number of different health monitoring programs, ranging from targeted surveillance, auditing of fish health status, routine health monitoring and broodstock disease screening. Decisions on sampling method, how many fish to sample, which testing methodology to use and which laboratory accreditation is required will be driven by the purpose of the program. Case scenarios will be used to illustrate examples from British Columbia salmon farming.

**Speaker Biography**: Dr. Morrison, DVM, earned her B.Sc. from the University of Guelph in 1984, and her DVM from the Ontario Veterinarian College in 1992. During her time in Guelph she was focused on aquaculture and took every opportunity to gain additional experience with fish.

Dr. Morrison has worked in the BC salmon farming industry for over 25 years with the goal of being on the cutting edge of fish health incentives. She uses well established and proven approaches from land based farming health management and applies them to salmon aquaculture with the primary focus being preventative medicine and optimizing productivity.

Diane works closely with other veterinarians and researchers in aquaculture worldwide to ensure that Marine Harvest Canada has access to the most current developments.

**What is the role of industry in terrestrial animal health and disease surveillance?**

Daniel Hurnik

University of Prince Edward Island

Animal health and surveillance is a priority for all food animal production systems because disease is a major factor in profitability and sustainability of livestock production. As a consequence, there is a significant investment in diagnostics and data analytics. The major emphasis of the diagnostics is for: disease detection to prevent and treat outbreaks, verification that groups of animals are negative for key diseases, and monitoring of preventative programs to ensure they remain effective. While historically diagnostics to investigate disease outbreaks predominated, changes in the structure of the industry have increased the use of diagnostics for the other reasons outlined. As livestock production has moved from single site production to multisite production within a vertically integrated animal flow, monitoring of animals at each stage to ensure absence of key pathogens has increased. Significant effort is put into verifying health status of animals prior to movement to other locations, particularly if international sales are involved. When monitoring groups of animals, test specificity becomes paramount and sampling calculations to optimize detection are used. We have also seen a movement to larger herd sizes with intensive preventative program. Vaccination is common place, efforts to ensure adequate protection and timing employ various diagnostic techniques. Biosecurity practices to prevent disease transmission have increased to ensure populations remain negative for key diseases. Molecular diagnostics are now used to detect the presence of pathogens at livestock facilities and vehicles, all in an effort identify and mitigate transmission disease risk. All these surveillance and diagnostics create a significant source of data to monitor health of the national herd. Recent industry advances to eliminate disease from a region have required that farms and production companies share their animal health data. Producers and industry have voluntarily done that with data sharing agreements. As long as producers are able to see long term benefits from sharing health data they will share data to help control industry wide health concerns. Advances in Area PRRSv elimination programs and the sharing of PED outbreak data nationally through an industry led organization (CSHIN) are examples of health data sharing and what role industry can play in terrestrial animal health and disease surveillance.

**Speaker Biography:** Daniel Hurnik, DVM, MSc, is a professor of swine health management who has been working with the swine industry in Atlantic Canada since 1989. He has been heavily involved in disease surveillance with the industry in topics ranging from SPF pig production, mycoplasma and PRRSv elimination programs and more recently in PED monitoring and eradication. He has also been active nationally with the Canadian Pork Council, the Canadian Centre for Swine Improvement, and the Canadian Swine Health Board.

Special Workshop: **Quality Assurance: Design considerations and tools for analysis**

Liza M. Cabuang

National Research Laboratory – Australia, Victoria, Melbourne, Australia

Quality Assurance (QA) programmes for diagnostic laboratories generally consist of External Quality Assessment Schemes (EQAS – also known as Proficiency Testing) and Quality Control (QC) programmes. This one hour workshop aims to give insight on how NRL designs QA programmes not only to help a laboratory maintain its accreditation, but to provide samples and clinical situations that challenge and educate scientists and managers.

An expanding network of participants can make data submission and analysis for both EQAS and QC difficult to manage. NRL (in collaboration with Oneworld Accuracy, Canada) have developed an internet-based data submission portal which also has built in analysis tools to make EQAS analysis and report writing easier.

Diagnostic laboratories are required under ISO:15189 and ISO:17025 to demonstrate regular monitoring of their quality systems and QC data provides objective evidence. NRL developed a software tool (EDCNet) which diagnostic laboratories are free to use on the purchase of NRL QConnect QC samples. EDCNet is also internet based, which allows for real-time monitoring of QC results, regular creation of QC reports and annual Uncertainty of Measurement (MU) reports for test systems used by diagnostic laboratories. A live demonstration of both software tools will be conducted during this workshop.

**Speaker Biography:** Liza M. Cabuang earned a Bachelor in Applied Science (Medical Laboratory Science) from RMIT University. She spent ten years at the Victorian Infectious Diseases Reference Laboratory (VIDRL); eight of which were spent consolidating her knowledge of Hepatitis viruses in both the diagnostic and research fields. Liza joined NRL in 2009, bringing her knowledge to the design of External Quality Assessment Schemes (EQAS) and Quality Control programmes for Nucleic Acid Tests (NAT). In January 2016, she was appointed Team leader of NRL EQAS and is responsible for overseeing improvement and expansion projects.

CAHLN / RCTLSA 15th Annual Meeting

**Scientific Session**

Tuesday, June 7, 2016

8:30 – 12:00 PM

Alex H. MacKinnon Amphitheatre, Room 242, McDougall Hall

The Atlantic Veterinary College and Animal Health

**Theme: Industry-Government-Academia Animal Health Collaboration**

| | | |
|---|---|---|
| Moderator: | Dr. Larry Hammell | |
| | | Page |
| 8:30 – 17:00 | Exhibitors Hall Open – McDougall Hall | |
| 8:30 | Collaborative research in aquatic animal health<br>Speaker: **Dr. Larry Hammell**, Professor of Aquatic Epidemiology and Associate Dean, Graduate Studies and Research, AVC | 39 |
| 9:00 | Collaborative research in dairy health<br>Speaker: **Dr. Greg Keefe**, Professor of Dairy Health and Dean of AVC | 40 |
| 9:30 | Academia-industry collaborations to develop preclinical animal models of neurological disease<br>Speaker: **Dr. Andrew Tasker**, Professor of Neuropharmacology, AVC | 41 |
| 10:00– 10:30 | **HEALTH BREAK, TRADE SHOW, POSTER VIEWING AND NETWORKING** | |
| 10:30 | A collaborative approach to cancer research: Investigating therapeutic targets and disease mechanisms in head and neck cancer<br>Speaker: **Dr. Chelsea Martin**, Assistant Professor of Anatomic Pathology, AVC | 42 |
| 10:50 | CRVE-net: A platform for risk analysis training and research<br>Speaker**: Dr. Javier Sanchez**, Associate Professor of Epidemiology, AVC | 43 |
| 11:10 | The cost of delaying disease management strategies in salt water net pen aquaculture<br>Speaker: **Dr. Sophie St-Hilaire**, Associate Professor and Canada Research Chair in Sustainable Aquaculture, AVC | 44 |
| 11:30 – 12:00 | Panel Discussion – *Current issues in Industry-Government -Academia collaboration: How to be more effective in collaborative efforts.*<br><br>Panel Participants: All speakers from AVC Session<br>Moderator: Dr. Larry Hammell | |

12:00 – 1:30 **LUNCH BREAK, TRADE SHOW, POSTER VIEWING AND NETWORKING**

12:15 – 1:30 **CAHLN BUSINESS MEETING**
Room 286A,B,C–N AVC Learning Commons

**Collaborative research in aquatic animal health**

Larry Hammell

Atlantic Veterinary College, UPEI

Collaboration between aquatic animal health researchers and producers can generate exceptionally useful results forming the basis of improved health management policy. However, it also has the potential to generate friction about how to fund and how to maximize the benefits derived from those results. Sometimes, funding challenges arise in which industry wants to own results of value but researchers want to share with the scientific community. One is rewarded by guarding results, the other rewarded by public disclosure in peer-reviewed journals. One wants access to data but the industry owns those data and will want to exert some controls over access and interpretation. Access to public funding provides incentive to industry partners for scientific pursuits but many public agency funding opportunities have moved toward a more commercialization oriented research, an approach that is not as conducive to scientific publications nor the involvement of graduate students. Lastly, short term studies with real world applications do not provide stability for researchers who must have access to sustained, highly trained technical assistance and who need longer term approaches that are compatible with graduate student training terms. In this presentation, the collaborative interactions between aquatic animal health researchers and industry partners will be explored with specific examples from work done by Atlantic Veterinary College epidemiologists.

**Speaker Biography**: As an aquatic veterinary epidemiologist, Larry Hammell DVM, MSc has been the lead proponent on many large, clinical research projects and partnerships with industry and government agencies. His focus is epidemiology applied to aquaculture, including clinical field trials for treatment and prevention of diseases, productivity and health surveillance, and identifying factors for optimal health at fish farms. In collaboration with the National Veterinary Institute of Norway, he is the founding Co-Director of the Collaborating Centre for Epidemiology and Risk Assessment of Aquatic Animal Diseases (ERAAAD) for the World Organisation for Animal Health (OIE). He is currently Professor and Associate Dean (Graduate Studies and Research) at Atlantic Veterinary College, University of Prince Edward Island. He recently completed Directorship of the AVC Centre for Aquatic Health Sciences, and Innovation PEI Research Chair in Epidemiology for Aquatic Food Production.

**Collaborative research in dairy health**

Greg Keefe

Atlantic Veterinary College, University of Prince Edward Island

Dairy production research has flourished at the Atlantic Veterinary College over the last 20 years. The program is rooted in the academic strength of AVC's epidemiology program (CVER). This capacity was subsequently leveraged nationally with other academic partners and organizations such as the Canadian Bovine Mastitis Research Network, the Canadian Johne's Disease Working Group and Dairy Farmers of Canada.

In 2006, a College centre for dairy research was formed called Maritime Quality Milk (MQM). The model of MQM involves priority setting with an industry advisory panel, which is dominated by dairy producers. This approach has allowed MQM to remain focused on the priorities of industry, which drive government and other funding opportunities.

Among the key success stories of the program has been assessment of Johne's disease (*M. paratuberculosis*) testing and control methodologies. This research led to the development of the Atlantic Johne's Disease Initiative (www.atlanticjohnes.ca), which has engaged 70% of Atlantic dairy farms in control strategies. The success of the program has led to the development of a more comprehensive dairy health program called Atlantic Healthy Herds, which extends the activities of the program to include cow comfort, calf health, BVD and BLV. MQM has also led the development of programs and technologies for more strategic use of antimicrobials in dairy cattle with clinical mastitis and for non-lactating (dry) cows. Additionally, among our most cited papers are those that examined the on-farm risk factors for lower quality raw milk. This research has led to demonstrable improvement in milk quality.

Collaboration-based dairy research at the AVC has resulted in nearly 50 unique research grants or contracts, and led to an academically rigorous program that has supported more than 25 graduate students. The program has resulted in more than 200 peer-reviewed publications and has generated $6 million dollars directly at AVC with an additional $6 million in funding spent at collaborative institutions with AVC co-investigators in the last 10 years alone. Most importantly, the research program has advanced dairy cattle health and milk quality for the industry.

**Speaker Biography:** Greg Keefe DVM (Guelph) MSc (UPEI) MBA (Guelph), became Dean of the University of Prince Edward's Atlantic Veterinary College in March of 2015. Dr. Keefe joined the AVC faculty in 1996 as an assistant professor, was tenured and promoted to Associate in 2000 and to Full Professor in 2005. Prior to his deanship, as a Professor of Dairy Production Medicine, Dr. Keefe was one of AVC's foremost researchers, educators, and professional service providers. He has published 105 papers in peer-reviewed journal and additional 120 in peer-reviewed conference proceedings. He is the founder and director of Maritime Quality Milk, a program for milk quality and disease surveillance research, and leads numerous regional and national research projects. Greg was an inaugural recipient of an Industry Research Chair by the Province of Prince Edward Island, a role he relinquished when he accepted the dean position. Dr. Keefe is respected mentor to veterinary and graduate students and is an award winning teacher and researcher. Among his numerous awards are the UPEI Presidential Award of Merit and the Canadian Veterinary Medical Association award for Advancement of Large Animal Medicine in Canada.

**Academia-industry collaborations to develop preclinical animal models of neurological disease**

R. Andrew Tasker

Department of Biomedical Sciences, University of PEI, Charlottetown, PEI

It is now well established that many forms of neurological disease are progressive; often taking years or even decades to develop in humans. This means that by the time diagnosable symptoms arise the disease process is already well developed and therapeutic options are largely palliative in nature. In other species our understanding is far less developed, but will presumably advance rapidly with the increasing availability of new diagnostic modalities in veterinary practice including high resolution imaging and molecular probes.

While it may seem disconcerting to think of neurological dysfunction progressing over time in the absence of obvious symptoms, there is also a tremendous opportunity and value in identifying verifiable biomarkers of presymptomatic disease that would allow for earlier diagnosis / risk assessment, and hopefully intervention, prior to symptom onset.

Developing such an understanding of disease development, however, requires preclinical animal models that replicate the progressive nature of neurological dysfunction rather than simply mimicking end-stage symptoms. Working in collaboration with other academic institutions, local industry (notably Neurodyn Life Sciences Inc.), large and medium-sized pharmaceutical companies, and EPMA (European Association for Predictive, Preventive and Personalised Medicine) we have been developing, characterizing and validating a number of rat models of progressive neurological dysfunction that have face and construct validity relevant to one or more disease conditions.

This presentation will briefly overview the rationale for this work and will introduce several of the disease models that have been developed and are now being utilized by both academia and industry. In so doing, I hope to illustrate both the value of collaboration and the potential that such models represent for developing new diagnostic tests and modalities that will permit early, presymptomatic identification of neurological disease in both humans and other species.

**Speaker Biography:** R. Andrew Tasker, PhD FCAHS, is Professor of Neuropharmacology at AVC/UPEI and holds an Honorary Professorship in the Department of Clinical Medicine, Aarhus University, Denmark. He obtained PhD and Post-doctoral training at Queen's University and McGill University, respectively and joined AVC in 1987, subsequently receiving accelerated promotion to Associate (1991) and Full (1994) Professor in the Department of Anatomy & Physiology (now Biomedical Sciences). A former Department Chair, Associate Dean for Graduate Studies and Research and Founding Director of the Atlantic Centre for Comparative Biomedical Research (ACCBR), Dr. Tasker was elected a Fellow of the Canadian Academy of Health Sciences (CAHS) in 2010. Author of over 100 refereed publications and more than 50 invited international talks he also currently Chairs the Board of Directors of CNS-CRO Inc. and the Scientific Advisory Board of Neurodyn Life Sciences Inc. and is a co-founder of NoNO Inc., a Toronto-based biotech company with a lead compound currently in Phase 3 clinical trials.

**A collaborative approach to cancer research: Investigating therapeutic targets and disease mechanisms in head and neck cancer**

Chelsea Martin

Department of Pathology and Microbiology, Atlantic Veterinary College, University of Prince Edward Island

Despite years of intense scientific investigation on a global scale, cancer remains a deadly disease and is the leading cause of mortality in Canada. Head and neck cancer, otherwise known as oral and oropharyngeal squamous cell carcinoma (OSCC), is the 8th most common cancer world-wide. In 2015, the Canadian Cancer Society estimated that there was 4,400 new cases of OSCC and 1,200 deaths. There is a paucity of animal models that mimic the highly aggressive behaviour of OSCC in people. Interestingly, feline and human OSCC is very similar. Studying OSCC in cats not only benefits our feline patients diagnosed with this aggressive form of invasive cancer, (the average survival is only 2-3 months after diagnosis) but may also reveal important mechanisms and treatment strategies that can benefit people with OSCC. There is a large body of evidence supporting inflammation as a therapeutic target for cancer (and OSCC specifically), but despite promising results showing anti-cancer activity of anti-inflammatory drugs, potential adverse effects make long-term use of these drugs impossible for some human and veterinary patients. There is a need for more in depth study into the inflammation-related mechanisms that drive tumour progression, as a means of arriving at improved treatment strategies. Through collaborations between scientists in academia, veterinarians in private practice, concerned pet-owners, physician and veterinary pathologists and partners in industry, we have developed unique models of invasive OSCC in which we have demonstrated that a non-steroidal anti-inflammatory drug can slow feline OSCC tumour growth. An overview of model development and characterization, along with our ongoing studies of how the cyclooxygenase / prostaglandin E2 pathway contributes to the progression of invasive OSCC in humans and cats will be provided. Results of our immunohistochemical studies showing the expression of cyclooxygenase-2 and CD147 (a mediator of tumour invasiveness) in feline and human OSCC will be discussed.

**Speaker Biography:** Dr. Chelsea Martin, DVM, PhD, ACVP, joined the Atlantic Veterinary College in 2013 as an Assistant Professor in Anatomic Pathology. She is a DVM graduate from the AVC Class of 1999. Following 5 years of mixed animal practice, Dr. Martin undertook graduate studies at The Ohio State University, College of Veterinary Medicine where she completed her PhD in Experimental Pathobiology and her residency in Veterinary Anatomic Pathology in 2010. Dr. Martin went on to complete a postdoctoral fellowship at the Ohio State University's Comprehensive Cancer Center before returning to AVC. Dr. Martin's research interests include investigating new therapeutic strategies using in vitro and in vivo models of cancer, and comparative pathology of mouse models of human cancer. Her current research focuses on the role of inflammation in the progression of feline and human oral squamous cell carcinoma.

**CRVE-net: A platform for risk analysis training and research**

Javier Sanchez

Centre for Veterinary Epidemiological Research (CVER)

Risk analysis is used by government, industry, and individuals to solve problems and aid in decision-making. Regulatory agencies in animal and human health make risk-based decisions on a daily basis. Risk analysis is a structured, systematic process used to determine the likelihood of the occurrence of an event and the likely magnitude of the consequence following the exposure to a hazard. Uncertainty is an embedded feature of the risk analysis process and must be clearly addressed and documented for decision-makers in order to enhance this process. Several risk analysis frameworks are recognized by international organizations, such as the OIE and FAO, to support policy in animal health and food safety. Government agencies generally lack the expertise to conduct quantitative risk assessment due to the ongoing renewal of their staff and the lack of academic programs in Canada to train professionals in this area. Two independent events that highlighted the problem occurred in 2007 and 2011. First, in 2007, staff from the Science branch of CFIA approached members of CVER to discuss the potential development of a platform that would help the agency increases its capacity in epidemiology and risk assessment. Then, the 2011 Council of Canadian Academies report on approaches to animal health risk assessment highlighted the need to enhance Canada's research and training in risk assessment and strengthen its knowledge capacity.

As a result of the initial conversations with CFIA, a network on regulatory epidemiology, named Canadian Regulatory Veterinary Epidemiology Network (CRVE-net), was created in 2009. The goal of this network was to link academia with government across the country to develop research projects and capacity in: 1) risk analysis, 2) surveillance, and 3) disease modelling. These three areas are interrelated and are strongly supported by reliable laboratory and epidemiological information. CRVE-net has funded numerous projects and developed training courses in the areas of epidemiology, risk analysis, and disease outbreak investigation. This presentation will highlight how laboratory information has been a key component of a syndromic surveillance system, part of a disease prioritization tool and as input for disease risk models.

**Speaker Biography**: Javier Sanchez, DVM, PhD, is an Associate Professor in Epidemiology at the Centre for Veterinary Epidemiologic Research (www.upei.ca/cver). He received his Doctor of Veterinary Medicine (DMV) form the Universidad Nacional de Río Cuarto, Argentina in 1992. He obtained a PhD in quantitative epidemiology from the University of Prince Edward Island in 2003. Dr. Sánchez has more than 20 years of experience on the use of quantitative epidemiological methods in animal health and food safety. He has been involved in several multi-centre clinical trials to evaluate the efficacy of different treatment strategies against gastrointestinal parasites in lactating dairy cows. His expertise in the analysis of animal health data is recognized worldwide. He has been involved in teaching and monitoring research projects in several countries around the world. His main areas of interest are quantitative methods in epidemiology, Bayesian statistics, Bayesian belief networks, risk assessment, systematic review, meta-analysis and multi criteria decision models. After obtaining his PhD, Dr. Sánchez worked for the Public Health Agency of Canada as a senior epidemiologist and then he joined the Canadian Food Inspection Agency as a risk analyst and scientific advisor.

**The cost of delaying disease management strategies in salt water net-pen aquaculture**

Sophie St-Hilaire

Atlantic Veterinary College, University of Prince Edward Island, Charlottetown, PEI

Early diagnosis of infectious diseases is the key to effective mitigation. In aquaculture settings, where there are thousands of fish in a pen, we often rely on observation of sick or dead fish in a population to begin our infectious disease investigations. Further, a certain level of natural mortality is expected in large fish populations, so often we start investigation problems only after a threshold is met. Once an investigation is triggered, veterinarians have very little time before a small problem turns into a major mortality event. A disease diagnosis is required before initiating treatment strategies; however, sometimes the delay in diagnostic evaluation or lag times between sample submissions and test results can be detrimental to the success of treatments. Once a treatment regime is chosen, further delays can occur due to the logistics of treating fish on remote salt water sites. We will review the detection-diagnosis-treatment process and identify bottlenecks that delay treatments of bacterial diseases on salt water farms.

**Speaker Biography:** Sophie St-Hilaire – Canadian Research Chair, Associate Professor at the Atlantic Veterinary College, PEI Canada. Dr. St-Hilaire received her veterinary degree from the University of Prince Edward Island, Canada in 1994. She then completed her MSc and PhD in veterinary epidemiology at the University of Saskatchewan and the University of Guelph, respectively. She has worked in the field of aquatic animal health for over 20 years and has published over 50 peer-reviewed articles on topics ranging from fish nutrition to infectious disease control and surveillance. Prior to accepting her position at the AVC in August 2011 she worked for a number of government agencies including: the Department of Fisheries and Oceans in Canada, University of Guelph, the Centre for Environment, Fisheries & Aquaculture Science in the UK, and Idaho State University in the U.S. She has been involved in a number of fish disease outbreak investigations ranging from viral to parasitic in origin in both wild and farmed animal populations. She has also been actively involved in developing a number of surveillance programs for monitoring pathogens and assessing disease control strategies. In 2010 she spent 10 months working with SalmonChile on designing a containment plan for Infectious Salmon Anemia and infectious disease risk management for salt water salmon farms in Chile. Since her appointment at the AVC she has worked on several bivalve and invasive species projects for PEI as well as continued with projects on salmonid disease control.

CAHLN / RCTLSA 15th Annual Meeting

**General – Scientific Oral Presentation Session**

Tuesday, June 7, 2016

13:30 – 16:45

Alex H. MacKinnon Amphitheatre, Room 242, McDougall Hall

| | | |
|---|---|---|
| Moderator: | Dr. James P. Goltz | |
| | | Page |
| 13:30 | Quality Assurance in Diagnostics for *Homo sapiens*: The Other Mammals<br>**Liza Cabuang**, Scientist and Team Leader – External Quality Assessment Schemes (EQAS) or Proficiency Testing, National Reference Laboratory – Australia, Melbourne, Victoria, Australia | 47 |
| 14.00 | Pilot ring test evaluating PCR testing for selected wildlife Pathogens in 19 diagnostic and research laboratories<br>**Maria J. Forzan**, John Wood, J. Patrick Powers and Raphael V. Vanderstichel | 48 |
| 14:15 | Case definitions for Bacterial Kidney Disease (BKD) using industry data from New Brunswick, Canada<br>**Anne S. Boerlage**, Henryk Stryhn, Javier Sanchez and Larry Hammell | 49 |
| 14:30 | Cilia Associated Respiratory (CAR) Bacillus-Like Organisms in Cats with pulmonary inflammation<br>[Graduate Student Presentation]<br>**Fany Marron-Lopez**, Alfonso Lopez and Shannon Martinson | 50 |
| 14:45 | Comparison of MALDI-TOF, ELISA, Iodine Precipitation and UV Spectrometry in selection of Aleutian Disease resistant mink<br>**Arnost Cepica**, Tokinori Iwamoto, Carmencita Yason and Elizabeth Dobbin | 51 |
| 15:05 – 15:30 | **HEALTH BREAK, TRADE SHOW, POSTER VIEWING AND NETWORKING** | |
| 15:30 | Evaluation of Mid Infrared Spectroscopy for quantification of bovine serum and colostrum IgG concentration<br>[Graduate Student Presentation]<br>**Ibrahim Elsohaby**, J. Trenton McClure, Marguerite Cameron, Luke Heider and Greg Keefe | 52 |
| 15:45 | High-Throughput Automated Analysis of Virus Neutralization Assays Against Animal Viruses<br>[Graduate Student Presentation]<br>**Cristina Solis Worsfold**, Michael Eschbaumer, Rkia Dardari, Sampson Law, Frank Marshall, Frank van der Meer and Markus Czub | 53 |

| | | Page |
|---|---|---|
| 16:00 | Diagnosis of diarrhea in calves and piglets: histopathology and microbiology examination<br>**Musangu Ngeleka**, Dale Godson, Chris Wojmarowicz, Soraya Sayi and Yanyun Huang | 54 |
| 16:15 | The Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS): integrated surveillance supported by an engaged network<br>**E. Jane Parmley**, Carolee Parson, David Leger, Brent Avery, Danielle Daignault, Richard J. Reid-Smith and Rebecca J. Irwin | 55 |
| 16:30 | Recent trends in pathogenic *Escherichia coli* in pigs in Quebec: Emergence of a new ETEC: F4 *E.coli* virotype<br>**Ghyslaine Vanier**, Gabriel Desmarais, Maud de Lagarde and John Morris Fairbrother | 56 |
| 16:45 | Assuming Leadership Beyond Diagnostics: Veterinary Laboratorians Tackle Raccoon Rabies Variant in New Brunswick<br>**James P. Goltz** | 57 |
| 17:00 – 17:45 | **TOUR OF THE ATLANTIC VETERINARY COLLEGE** | |
| 18:30 – 19:15 | **RECEPTION / CASH BAR**<br>MacMillan Hall, W.A. Murphy Student Center | |
| 19:15 - 22:00 | **LOBSTER SUPPER AND KITCHEN PARTY**<br>MacMillan Hall, W.A. Murphy Student Center | |

**Quality Assurance in Diagnostics for *Homo sapiens*: The Other Mammals**

Liza M Cabuang

National Research Laboratory – Australia, Victoria, Melbourne, Australia

Quality Assurance (QA) is generally defined as demonstrating objective evidence of the quality of a product through the careful oversight of the product's design and manufacture. It is easier to understand QA when the end product is a physical item like a couch or television, whereas associating QA and a clinical result is difficult as most people would define clinical results as "data" rather than "products". However, the consequence of poor quality in the production of clinical results can have dire consequences. To promote the best possible clinical outcomes, all medical and veterinary diagnostic laboratories in Australia must be accredited to an international standard (ISO 15189 and ISO 17025, respectively) and participate in External Quality Assessment Schemes (EQAS – also known as Proficiency Testing) and Quality Control (QC) programmes. Both EQAS and QC are practised in laboratories worldwide but often without a thorough understanding of the difference between the two or their usefulness to laboratories, other than in the maintenance of laboratory accreditation.

QA is not a new concept in medical diagnostics. Many of the QA processes in infectious diseases were borrowed from our biochemistry colleagues. To reiterate the importance of QA, examples will be drawn from the evolution of medical diagnostics in Australia for what is considered to be the most influential infectious disease to originate from animals: HIV. This presentation will illustrate the difference between EQAS and QC and show the value of participating in QA programmes. Full participation creates ongoing improvements and efficiencies of laboratories, such as the early identification of "out-of-control" processes, reduced repeat or unnecessary testing and targeted training of staff. The presentation will also show how QA providers, assay manufacturers and laboratories can collaborate to improve healthcare outcomes globally.

The lessons learned from HIV and other infectious disease testing in humans will hopefully highlight areas for collaborations between veterinary and medical diagnostics through a One Health process. QA programmes allow both to tackle threats to public health caused by the increasing burden of zoonotic infectious diseases through accurate testing.

**Pilot Ring-Test Evaluating PCR Testing for Selected Wildlife Pathogens in 19 Diagnostic and Research Laboratories**

María J. Forzán[1,2], John Wood[3], J. Patrick Power[3], Raphaël V. Vanderstichel[2]

[1] Canadian Wildlife Health Cooperative, [2]Atlantic Veterinary College, University of Prince Edward Island, Canada, [3] Pisces Molecular, Boulder, Colorado, USA

Research and diagnostic laboratories throughout the world run PCR tests to detect wildlife pathogens. Standardization of methodologies is difficult, and even more difficult is it for research laboratories to acquire a certification granted by organizations such as the American Association of Veterinary Laboratory Diagnosticians or ISO committees. In an effort to provide a more accessible method for quality control/quality assurance (QC/QA) that will allow participating laboratories to confidentially evaluate the quality of their own results, the Canadian Wildlife Health Cooperative (CWHC), with the support of Environment and Climate Change Canada, conducted a pilot ring test specific to the emerging amphibian pathogens *Batrachochytrium dendrobatidis* and *B. salamandrivorans*. A set of 12 blinded randomized samples was shipped to each participating laboratory. The samples, prepared by Pisces Molecular, included plasmid DNA with the PCR/qPCR target sequences for one or both pathogens at varying concentrations (1.3 to $1.3x10^6$ copies/µL), as well as blanks. All test sample randomization, labeling and mailing was done at and by the CWHC, acting as an independent agent. A formatted spreadsheet was circulated to all participating laboratories to facilitate reporting.

Results from 19 participating laboratories, from 4 different countries, were received. Tests were run as per each laboratory's routine protocols and results reported as "positive" or "negative" and, if run by qPCR, included their respective Ct (Cq) values and estimated copy numbers.

Results from each laboratory were compared against the known composition of the samples and against other laboratory's results; laboratories were informed of where their results stood in comparison to other laboratories, but the standings of individual laboratories remained confidential. All laboratories detected medium and high concentrations, 7 laboratories failed to detect the smallest concentration (1.3 copies/µL). No laboratory reported false positive results. Great variability was found in the concentrations reported, with copies/µL sometimes varying as much as 4 orders of magnitude.

We expect this pilot ring test to serve as the first step towards establishing a formal peer-based validation system for PCR tests of wildlife pathogens.

**Development of case definitions for Bacterial Kidney Disease (BKD) using industry data from New Brunswick, Canada**

Annette S. Boerlage, Henrik Stryhn, Javier Sanchez and Larry Hammell

Department of Health Management, Atlantic Veterinary College, Charlottetown, PEI

**Cilia Associated Respiratory (CAR) bacillus- like organisms in cats with pulmonary inflammation**

Fany Marron-Lopez, Alfonso Lopez and Shannon Martinson

Department of Pathology and Microbiology, Atlantic Veterinary College, University of Prince Edward Island, 550 University Avenue, Charlottetown, Prince Edward Island, C1A 4P3, Canada

**Comparison of MALDI-TOF, ELISA, Iodine precipitation and UV spectrometry in selection of Aleutian disease (AD) resistant mink.**

Arnost Cepica, Tokinori Iwamoto, Carmencita Yason, Elizabeth Dobbin.

Diagnostic Services Laboratory, Atlantic Veterinary College, University of Prince Edward Island, 550 University Avenue, Charlottetown, PE, C1A 4P3

Because of the unsustainable of the AD virus eradication, control of Aleutian disease (AD) has turned in N. America and in most of the mink producing countries to breeding for disease resistance. The success of this approach depends on the ability of the *in vivo* tests to differentiate infected animals in early stages of "the disease" from the infected animals able to maintain health. Currently, several methods are being proposed for this purpose; MALDI-TOF determination of albumin: IgG ratio, quantitative or semi-quantitative ELISA for specific AD virus antibody, iodine precipitation test, and the UV-spectrometric total plasma protein determination. They all claim to target hyper-gammaglobulinemia, the main feature of Aleutian *disease*, even though they do not assess the same parameter. MALDI-TOF indicates increase of total Ig, taking into consideration simultaneously the breakdown of homeostasis, as indicated by the corresponding reduction of albumin. ELISA measures specific antiviral antibody, the iodine precipitation test identifies crudely hyperproteinemia, and UV spectrometry measures more accurately total plasma protein. We tested plasma from AD virus infected mink by all the above methods, examined the pairs for correlations, and we offer reasoned conclusions. The main conclusions were as follows: elevated Ig in AD is only marginally due to the specific antiviral response. The primary component of hyper IgG in Aleutian disease is of autoimmune nature, which is not included in ADV-Ab ELISA measurement. This greatly reduces the value of ELISA as the early indicator of the disease. The main disadvantage of the iodine precipitation test, on the other hand, was the poor reproducibility.

MALDI-TOF based selection of breeding females and males, led to significant increase of average number of born and weaned kittens/female, as well as number of kittens reaching pelting age. By the third year of implementation, the production returned to pre-AD outbreaks.

***P.S. Where disease is used, it is to stress that what is meant is a disease vs. just an infection.***

**Evaluation of Mid Infrared Spectroscopy for Quantification of Bovine Serum and Colostrum IgG Concentration**

Ibrahim Elsohaby, J. Trenton McClure , Marguerite Cameron , Luke Heider and Greg Keefe

Department of Health Management, Atlantic Veterinary College, University of Prince Edward Island, Charlottetown, Prince Edward Island, Canada C1A 4P3

Measurement of bovine serum and colostrum immunoglobulin G (IgG) concentration is critical for assessing neonatal calf health because it is used to determine colostrum quality and/or failure of transfer of passive immunity (FTPI). FTPI is known to be strongly associated with increased morbidity and mortality rates in neonatal calves. Several qualitative and semi-quantitative assays are available but all have diagnostic limitations. Radial immunodiffusion (RID) assay is the reference method widely considered the gold standard but its use in the field is limited because it is expensive and time consuming. Consequently, there is a demand for rapid, accurate and inexpensive diagnostic assays for IgG.

Infrared (IR) spectroscopy has recently emerged as a powerful, reagent-free diagnostic tool for the quantitative characterization of biological fluids in human and veterinary medicine. Serum samples (n = 278 calves, 1 to 15 days old) and colostrum samples (n= 236 cows) were collected from 30 commercial dairy farms. Samples were tested simultaneously by the reference RID assay and IR spectroscopy. RID IgG concentrations were moderate to highly correlated with IgG levels predicted by IR assay in serum ($r$ = 0.92) and colostrum ($r$ = 0.77). The Bland Altman plot revealed no obvious systematic bias between the two methods for measuring serum and colostrum IgG concentrations. The sensitivity, specificity, and accuracy for identifying FTPI (serum IgG concentration <10 g/L) by IR assay were 0.74, 1.0 and 0.88, respectively. Corresponding values for identifying poor quality colostrum (IgG <50 g/L) were 0.96, 0.75 and 0.87, respectively. We conclude that IR spectroscopy is an effective method for rapid quantification of bovine serum and colostral IgG concentration and for assessment of FTPI and colostrum quality.

**High-throughput automated analysis of virus neutralization assays for the detection of animal viruses**

Cristina Solis Worsfold[1], Michael Eschbaumer[1], Rkia Dardari[1], Sampson Law[1], Frank Marshall[1,2] , Frank van der Meer[1], and Markus Czub[1]

[1]Faculty of Veterinary Medicine, University of Calgary, Alberta, Canada, [2]Marshall Swine Health Services, Camrose, Alberta, Canada

**Diagnosis of Diarrhea in Calves and Piglets: Histopathology and Microbiology Examination**

Musangu Ngeleka, Dale Godson, Chris Wojnarowicz, Soraya Sayi and Yanyun Huang

Prairie Diagnostic Services, 52 Campus Drive, Saskatoon, Saskatchewan

Neonatal diarrhea remains an important cause of morbidity and mortality in the livestock industry worldwide. Over the years, we have observed large numbers of undiagnosed cases of diarrhea in calves and piglets based on traditional methods of testing for bacteria, viruses and parasites associated with the syndrome. To address the issue, we collected fresh and formalin fixed intestinal tissues (ileum and colon) from 1 to 60 day-old diarrheic calves (n=100) and piglets (n=95), and similar tissues from 25 non-diarrheic animals of the same age group in each species, as controls. Fixed tissues were submitted for histopathology and fresh tissues for bacterial culture, parasitology and virology tests.

*Cryptosporidium* sp., *Salmonella* sp. and *Eimeria* sp. were isolated from diarrheic calves only; they were associated with protozoan ileitis in 18%, fibronecrotizing enterocolitis (5%) and hemorrhagic typhlocolitis (2%) of cases, respectively. *Clostridium perfringens* (CP), rota- and coronavirus (RCV) were detected in both diarrhea and control groups, but were associated with necrohemorrhagic enteritis in 12%, and atrophic enteritis with or without crypt necrosis in 45% of diarrheic calves. There were no significant intestinal changes in 17% of cases, although CP and RCV were detected in some of them. Different *E. coli* virotypes, other than F5/STa, were detected in both groups and were not associated with changes in the intestine.

Data from diarrheic piglets show that *E. coli* virotypes F4/LT/STa/STb; F18/LT/STa/STb or AIDA-I/STb/EAST-1 and *Salmonella* sp. were isolated from this group only. These agents were associated with enteritis and colitis in 22.1%, and mild neutrophilic inflammation in 4.2% of cases, respectively. CP and rotavirus (RV) were detected in both groups, but were associated with necrotic enteritis in 3.2%, and atrophic enteritis with or without colitis in 50.5% of diarrheic piglets, respectively. There were no significant intestinal changes in 20.0% of cases, despite detection of CP and RV in some of them.

In conclusion, the detection of coccidian parasites (*Cryptosporidium* sp. and *Eimeria* sp.) and *Salmonella* sp. in calves, and of certain *E. coli* virotypes and *Salmonella* sp. in piglets may be sufficient for diagnosis of diarrhea in these animals. However, diagnosis of diarrhea associated with CP and RCV should be made in relation with morphological changes in the intestine.

**The Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS): integrated surveillance supported by an engaged network**

E. Jane Parmley , Carolee Carson , David Leger, Brent Avery, Danielle Daignault, Richard J. Reid-Smith, Rebecca J. Irwin

Canadian Integrated program for Antimicrobial Resistance Surveillance (CIPARS) Division, Centre for Foodborne, Environmental and Zoonotic Infectious Diseases, Public Health Agency of Canada.
AMR Reference Laboratory Services, National Microbiology Laboratory @ St-Hyacinthe, Public Health Agency of Canada.

Antimicrobial resistance (AMR) is a growing health challenge with important implications for animals and humans. Surveillance of complex health issues like AMR poses unique challenges, but many of these can be overcome through support of strong and engaged interdisciplinary networks of individuals and organisations. The Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS) is a national integrated surveillance program supported by a network representing wide ranging fields of study and experience that offers significant benefits to understanding the ecology of complex systems.

One of the greatest values of CIPARS is its ability to detect and respond to new AMR and antimicrobial use (AMU) issues. The existing infrastructure of CIPARS is able to support targeted research initiatives undertaken in response to emerging issues. Without the CIPARS infrastructure, these research projects would be much more difficult or costly to implement. Ongoing consultation with stakeholders helps ensure the sustainability of CIPARS and that stakeholder information needs are recognized and understood, and also helps mobilize surveillance findings into action.

Maintaining relationships with individuals, organizations and agencies with diverse interests and responsibilities is fundamental to the sustainability of surveillance and research programs reliant on volunteer data providers. AMR surveillance, research and policy all require an engaged network to collect samples and data, conduct laboratory testing, analyse and interpret data, and communicate key findings to a broad audience with varying levels of understanding about AMR. With increasing movement of people, animals and animal products, changing agricultural practices, and anticipated environmental and climatic changes, the occurrence and spread of AMR is expected to increase unless we change our reliance on and consumption of antimicrobials.

CIPARS has had demonstrable success reducing resistance through communication of surveillance findings to industry stakeholders and government agencies, who subsequently implemented changes in AMU policy. We present examples from CIPARS to illustrate how data are integrated, how stakeholders are engaged, and introduce a new research project that aims to identify and engage others who have not typically been involved in the AMR conversation.

**Recent trends in pathogenic *Escherichia coli* in pigs in Québec: emergence of a new ETEC:F4 *E. coli* virotype**

Ghyslaine Vanier, Gabriel Desmarais, Maud de Lagarde, John Morris Fairbrother

EcL Laboratory, Université de Montréal, Faculté de médecine vétérinaire, St.Hyacinthe, Canada

**Assuming Leadership Beyond Diagnostics: Veterinary Laboratorians Tackle a Recent Raccoon Rabies Variant Incursion in New Brunswick**

James P. Goltz

New Brunswick Provincial Veterinary Laboratory, Animal Health Services Branch, Department of Agriculture, Aquaculture and Fisheries, Fredericton, NB

The New Brunswick Provincial Veterinary Laboratory has always played a critical role in providing support for rabies surveillance in New Brunswick, but until recently had relied upon others for leadership and coordination of the many aspects of surveillance and control. Between 1966 and 1971, Agriculture and Agri-Food Canada led actions to address the incursion of arctic fox rabies variant. More recently in 2000 and 2002, it was the New Brunswick Department of Health that coordinated and led the response to an incursion of raccoon rabies variant.

Although the concept of One Health has been the topic of considerable interest and discussion, the national response to rabies control exemplifies a dysfunctional One Health system. Those we have relied upon in the past have changed mandates and appear to have abandoned their former leadership roles. As such, in 2014 when a raccoon rabies variant incursion was detected in New Brunswick (over a much larger area than in 2000/2002), New Brunswick Provincial Veterinary Laboratory laboratorians were required to move beyond their traditional diagnostic role and assume the leadership of activities related to rabies surveillance and control. As a result we have enhanced rabies surveillance, hired a provincial rabies coordinator and implemented an oral rabies vaccination program targeting major wildlife rabies vectors. Changing national mandates and restructuring of governmental departments have required that New Brunswick's veterinary laboratorians evolve their roles to also include support at the provincial level for rabies detection and control.

CAHLN / RCTLSA 15th Annual Meeting

**General – Scientific Oral Presentation Session**

Wednesday, June 8, 2016

8:30 – 11:30 AM

Alex H. MacKinnon Amphitheatre, Room 242, McDougall Hall

| | | |
|---|---|---|
| **Moderator:** | **Dr. Paul Hanna,** Department of Pathology and Microbiology, AVC | |
| 8:30 | Exhibitors Hall Open – McDougall Hall | |
| | | Page |
| 8:30 | Design standards for experimental studies to evaluate Diagnostic accuracy of tests for infectious diseases in aquatic animals<br>**Emilie Laurin**, Paul Hick, Ian A. Gardner, Nicholas J.G. Moody, Mark St. J. Crane, Charles G.B. Caraguel and Ingo Ernst | 60 |
| 8:45 | Measuring diagnostic accuracy for Bacterial Kidney Disease (BKD) in Atlantic Salmon<br>**Diana Jamarillo**, Holly Burnley, Ian A. Gardner, Henrik Stryhn and Larry Hammell | 61 |
| 9:00 | Development of multiplex detection assay for salmonid pathogens utilizing fluidic bead-based technology<br>**Dante Mateo**, Larry Hammell, Ian A. Gardner and Carmencita Yason | 62 |
| 9:15 | Development of fully-automated microfluidic assay for Multiplex detection and subtyping of livestock pathogens<br>**Oliver Lung**, Cody Buchanan, Matt Fisher, Niroshan Thanthrige-Don, Tara Furukawa-Stoffer, John Pasick, Charles Nfon, Tomy Joseph, Dale Godson, John Gilleard, Trevor Alexander, Brent Selinger and Aruna Ambagala | 63 |
| 9:30 | Development of a multiplex nucleic acid assay for salmonid immunological assessment<br>**Sara L. Purcell** and Mark D. Fast | 64 |
| 9:45 | Increasing standardization in Real-Time PCR testing with a modular platform and its benefit to laboratory throughput<br>Martina Kahila, **Kristen Roza-Sutherland**, Wendy Witbeck, Valerie Leathers, Kathy Velek, Lori Plourde, Christian Leutenegger and Martin Angelichio | 65 |
| **10:00 – 10:30** | **HEALTH BREAKS, TRADE SHOW AND NETWORKING** | |
| 10:30 | Gene Expression in chicken lung and brain in response to infection with two recombinant H5N3 Avian Influenza viruses that possess a Polybasic $HA_o$ Cleavage Site<br>**John Pasick**, Sandra Diederich, Yohannes Berhane and Carissa Embury-Hyatt | 66 |

| | | Page |
|---|---|---|
| 10:45 | Field-deployable Reverse Trancription-Insulated Isothermal PCR (RT-iiPCR) Assay for Rapid and Sensitive Detection of Foot-and-Mouth Disease Virus<br>Aruna Ambagala, Mathiew Fisher, Melissa Goolia, Charles Nfon, Tara Furukawa-Stoffer, Rodrigo Ortega Polo and Olivia Lung | 67 |
| 11:00 | Big Data Has Arrived: Implications, Opportunities and Challenges for Collaboration<br>**Anatoliy Trokhymchuk**, Harold Kloeze, Glen Duizer, Theresa Burns and Shamir Mukhi | 68 |
| 11:15 | Graduate Student Travel Award, Graduate Student Oral Presentation Award, Graduate Student Poster Presentation Award and Laboratorian of the Year Award | |
| 11:30 | CAHLN 2017 – Dr. Grant Maxie<br>Closing Remarks – Dr. James P. Goltz | |
| 11:45 | LUNCH | |
| 12:15 – 15:00 | **CANADIAN ANIMAL HEALTH SURVEILLANCE NETWORK ANNUAL MEETING**<br>Room 286A,B,C–N AVC Learning Commons | |

-+

**Design standards for experimental studies to evaluate diagnostic accuracy of tests for infectious diseases in aquatic animals**

Emilie Laurin [1], Paul Hick [2], Ian A. Gardner [1], Nicholas J. G. Moody [3], Mark St. J. Crane [3], Charles G. B. Caraguel [4], Ingo Ernst [5]

[1] Atlantic Veterinary College, University of Prince Edward Island, 550 University Avenue, Charlottetown, Prince Edward Island C1A 4P3, Canada, [2] Faculty of Veterinary Science, University of Sydney, 425 Werombi Rd, Camden, New South Wales, 2570 Australia, [3] CSIRO Australian Animal Health Laboratory, Geelong Victoria, 3220, Australia, [4] School of Animal & Veterinary Sciences, Roseworthy Campus, University of Adelaide, Roseworthy, South Australia 5371, Australia, [5] Department of Agriculture and Water Resources, Canberra ACT 2601 Australia

Reporting and design standards for diagnostic test evaluation (DTE) studies are critical to minimize bias, variability, and inconsistencies in interpretation of estimates of diagnostic sensitivity and specificity for a designated purpose and to facilitate decision support for end-uses such as diagnosis and disease surveillance. The goal of this project is to modify current evaluation criteria for diagnostic-accuracy studies from human medicine to make them relevant to animal health, particularly aquaculture. The project participants will make recommendations for design of experimental studies that are the primary step in ongoing validation studies, to be followed by field studies, for infectious diseases of finfish, molluscs, crustaceans, and amphibians. A DTE design for experimental studies relies first on identifying the diagnostic purpose for the test. Determining this purpose depends on prior knowledge of the pathogenesis and population-level dynamics of the disease under evaluation. The purpose of the test guides the DTE design by informing choice of the target diagnosis and population, case definition, and study population. Initial determination of these key attributes of the design for experimental studies can decrease the risk of failure for diagnostic end-uses when selecting specific information for performing challenge studies, including sampling, analytical assay analysis, and output steps. The key objectives of our project are to (1) evaluate design information reported in the literature for OIE-listed aquatic diseases, (2) collate design recommendations from human and animal guidelines and from expert panel work, and (3) compile consensus-based standards for DTE studies for use by aquaculture research journals and test developers. Advocating and following design standards that inform comprehensive and transparent reporting improve the quality and reporting of evidence-based study designs by ensuring public confidence in the application of epidemiological research in aquaculture.

**Measuring diagnostic accuracy for bacterial kidney disease (BKD) in Atlantic salmon**

Diana Jaramillo, Holly Burnley, Ian A. Gardner, Henrik Stryhn and Larry Hammell

Atlantic Veterinary College, University of Prince Edward Island, Charlottetown, Canada

**Development of a multiplex detection assay for salmonid pathogens using fluidic bead-based technology.**

Dante Mateo[1], Larry Hammell[2], Ian Gardner[2], Carmencita Yason[1]

[1] Regional Diagnostic Virology Services, Atlantic Veterinary College, University of Prince Edward Island
[2] Center for Veterinary Epidemiological Research (CVER) and Department of Health Management, Atlantic Veterinary College, University of Prince Edward Island

Viral and bacterial pathogens can cause devastating loses in wild and farmed fishes. Rapid and high-throughput detection tools are essential for efficient diagnosis and mitigation of infectious disease outbreaks.

Fluidic-bead based technology (Luminex®), has been shown to be effective for simultaneous detection of human pathogens in clinical samples. Using this technology, we have developed a multiplex detection assay, capable of detecting 6 pathogens of salmonids: Infectious Hematopoietic Virus (IHNV), Infectious Pancreatic Necrosis Virus (IPNV), Infectious Salmon Anemia Virus (ISAV), Salmon Alphaviruses (SAV), and *Renibacterium salmoninarum*. This is a post-PCR detection assay, consisting of a Target Specific Primer Extension (TSPE) reaction on PCR amplified products, followed by hybridization of biotinylated TSPE products to different fluorescent microspheres representing each pathogen. The presence of any of the 6 pathogens is screened by the detection of fluorescence. With the aid of software, the fluorescence intensity of biotinylated products associated to specific microspheres is transformed into numerical values.

To develop this assay, we used AVC reference isolates (mostly from Atlantic Canada) and targeted conserved regions of genes commonly used for detection. The assay sensitivity was similar to virus isolation. The assay detected only targeted pathogens and did not detect unrelated isolates or blank samples. The diagnostic sensitivity and specificity of the assay are currently being evaluated.

The assay can be used as a low or high throughput assay with potential application to pathogen surveillance in addition to diagnosis. Moreover, there is potential to increase the number of targets to cover genotypes from other geographical areas and additional fish pathogens.

**Development of fully-automated microfluidic assays for multiplex detection and subtyping of livestock pathogens**

Oliver Lung[1], Cody Buchanan[2], Mathew Fisher[1], Niroshan Thanthrige-Don[2,5] , Tara Furukawa-Stoffer[2], John Pasick[1], Charles Nfon[1], Tomy Joseph[3], Dale Godson[4], John Gilleard[5], Trevor Alexander[6], Brent Selinger[7], Aruna Ambagala[1,5]

[1]National Centre for Foreign Animal Disease, Canadian Food Inspection Agency, Winnipeg, MB [2]National Centres for Animal Disease, Canadian Food Inspection Agency, Lethbridge, AB, [3]Animal Health Centre, Ministry of Agriculture, Abbotsford, BC, [4]Prairie Diagnostic Services Inc., Saskatoon, SK [5]Department of Comparative Biology and Experimental Medicine, Faculty of Veterinary Medicine, University of Calgary, Calgary, AB, [6]Lethbridge Research Centre, Agriculture and Agri-Food Canada, Lethbridge, AB, [7]Department of Biological Sciences, University of Lethbridge, Lethbridge, AB.

Detection technologies that fully automate and integrate complex molecular diagnostic testing can be a useful tool for disease surveillance and diagnostics. Integrated microfluidic assays that automate and integrate the entire work flow of nucleic acid extraction, PCR amplification, and capture probe detection without the need for user handling after sample introduction and assay setup can reduce the time, cost, user variability and technical skills required for diagnostic testing. The development of fully automated assays for: 1) simultaneous detection and differentiation of multiple high consequence exotic livestock pathogens, 2) avian influenza virus detection and HA-typing, and 3) detection of five bovine respiratory viruses and four bacterial pathogens will be presented.

**Development of a Multiplex Nucleic Acid Assay for Salmon Immunological Assessment**

Sara L Purcell[1] and Mark D Fast[1]

[1]Hoplite Research Group, Department of Pathology and Microbiology, Atlantic Veterinary College, University of Prince Edward Island, Charlottetown, PE, Canada

Imunological or other biological response assessment is currently limited to two levels of throughput; (1) single target platforms such as qPCR or ELISA, (2) RNA-Sequencing or microarray platforms. The Luminex® X-MAP® (X-MAP) technology allows for simultaneous quantification and monitoring of multiple biomarkers from the same sample, thereby providing a medium-range platform for rapid and sensitive testing. A suite of nucleic acid markers frequently associated with viral, bacterial or ectoparasitic infections in Atlantic salmon (*Salmo salar*), were chosen to determine their sensitivity and dynamic range for inclusion in this custom multiplex assay. The goal of this study was to provide a single test for use in research or diagnostic laboratories that could be used to assess Atlantic salmon infection status and response to vaccination as well as other important production characteristics related to health.

Head kidneys from Atlantic salmon smolts exposed to either infectious salmon anemia virus (ISAv), the parasitic copepod, *Lepeophtheirus salmonis*, or both were analyzed on qPCR and X-MAP platforms, using a suite of anti-parasitic/anti-viral gene markers along with commonly used reference genes. Analysis was completed on individual animals and showed excellent agreement with the calibrated normalized relative quantity (CNRQ) by qPCR for mean fold differences between infected and control animals; interleukin-1β showed 5.1-fold increase by qPCR and 4.9-fold increase by X-MAP; matrix metalloprotease-9 showed 1.3-fold increase by qPCR and 1.2-fold increase by X-MAP. In addition, different concentrations of template (salmon DNase-treated RNA) were compared (50-400 ng) across control and infected animals on the X-MAP platform, and the 100 ng assay was found to achieve the optimal results with respect to reproducibility and sensitivity, supporting efficiencies in work-flow, reagents and sample conservation for this technology. The Atlantic salmon custom multiplex assay is currently being expanded to include important T- and B-cell markers to analyze vaccination responsive genes. The assay's performance with respect to the different anti-viral responses will also be discussed.

**Increasing standardization in real-time PCR testing with a modular platform and its benefit to laboratory throughput**

Martina Kahila[1]; Kristen Roza-Sutherland, DVM[2]; Wendy Witbeck[2]; Valerie Leathers[2]; Kathy Velek[2]; Lori Plourde[2]; Christian Leutenegger[1]; Michael Angelichio[2]

[1]IDEXX Switzerland AG, Liebefeld, Switzerland; [2]IDEXX Laboratories, Westbrook, ME, USA; [3]IDEXX Laboratories, West Sacramento, CA, USA

Real-time PCR has revolutionized diagnostic testing over the past decade, and is now used in diagnostic applications worldwide. While real-time PCR has offered significant advantages over end-point PCR, commercial real-time PCR assays still use a set of reagents, or "kit", designed for testing a precise number of samples for a specific target(s). This approach requires a separate testing protocol for each target, often causing longer time to results and more hands-on time for laboratories.

IDEXX has developed a platform of real-time PCR reagents which offer a new level of standardization to PCR testingby using reagents in a modular format. Reagent components are shared over the entire platform, making it possible to run any target-specific primer and probe mix with a standard master mix and a single, pooled positive control. Moreover, the IDEXX RealPCR modular reagents maintain a single PCR cycling program for both DNA and RNA targets, enabling simultaneous amplification and identification of multiple targets.

The RealPCR Quality Control reagents provide additional novel tools for environmental contamination monitoring programs. The RealPCR QC Signature DNAMix specifically identifies positive control contamination in laboratories, while the RealPCR QC Pan-Bacterial DNA Mix is useful as a positive control when running environmental control samples.

The use of shared reagents and standardized testing over the platform will greatly increase efficiency, decreasing real-time PCR turnaround times for diagnostic laboratories. The ability to combine different assays in a single thermocycler run overcomes the issue of not having enough samples to justify a PCR run for the laboratory, making it efficient to offer low volume PCR testing. Smaller laboratories might also find PCR testing more feasible with the use of this system, since total sample numbers for a PCR run are not assay dependent and reagents are less likely to be wasted or expire before they can be used.

**Gene Expression in Chicken Lung and Brain in Response to Infection with Two Recombinant H5N3 Avian Influenza Viruses that Possess a Polybasic $HA_0$ Cleavage Site**

John Pasick[1], Sandra Diederich[2], Yohannes Berhane[1], Carissa Embury-Hyatt[1]

[1]Canadian Food Inspection Agency, National Centre for Foreign Animal Disease, Winnipeg, Canada
[2]Friedrich-Loeffler-Institut, Federal Research Institute for Animal Health, Greifswald-Insel Riems, Germany

The major genetic determinant associated with high pathogenicity (HP) of H5 and H7 avian influenza viruses is the presence of multiple basic amino acids in the connecting peptide that separates $HA_1$ and $HA_2$ subunits. However, some viruses that bear a polybasic $HA_0$ cleavage site (PBCS) are phenotypically low pathogenic (LP). We described one such virus (Journal of Virology 89: 10724-10734) produced using reverse genetics. Despite having the PBCS GERRRKKR/GLF, this recombinant H5N3 virus was phenotypically LP. Following 6 passages in chickens, this virus became phenotypically HP. This phenotype shift was assocated with the fixation of 12 non-synonymous mutations. One of these mutations (R293K) involved the catalytic site of the neuraminidase that resulted in decreased neuraminidase activity and resistance to oseltamivir. Introducing R293K into the original LP rH5N3 (rH5N3 P0) increased its virulence but not transmissibility. In order to further probe the differences in virus-host interactions between rH5N3 P0 and rH5N3 P6, we carried out a microarray experiment which examined the global gene expression profiles in the brains and lungs of chickens at 24 and 72 hrs following rH5N3 P0 and rH5N3 P6 inoculation. At 24 hrs post-inoculation, the lungs of rH5N3 P6 infected chickens showed 93 and 70 fold enrichment in Gene Ontology (GO) terms associated with IFNα production and negative regulation of viral genome replication respectively while the lungs of rH5N3 P0 infected chickens did not. By 72 hrs post-inoculation, significant up-regulation in GO terms associated with the innate immune response, IFNα/β production, cytokine production, and defense response to viruses were observed in the brains of rH5N3 P0 and rH5N3 P6 infected chickens. However, the number of genes associated with these processes as well as the magnitude of expression was larger in rH5N3 P6 versus rH5N3 P0 brains. Implications of these differences in relation to pathogenesis will be discussed.

**Field-deployable Reverse Transcription-Insulated Isothermal PCR (RT-iiPCR) Assay for Rapid and Sensitive Detection of Foot-and-Mouth Disease Virus**

Aruna Ambagala[1], Mathiew Fisher[1], Melissa Goolia [2], Charles Nfon[2], Tara Furukawa-Stoffer[1], Rodrigo Ortega Polo[1] and Olivia Lung[1]

[1]Canadian Food Inspection Agency, National Centres for Animal Disease, Lethbridge Laboratory, Lethbridge, AB, Canada, [2]Canadian Food Inspection Agency, National Centre for Foreign Animal Diseases, Canadian Science Centre for Human and Animal Health, Winnipeg, MB, Canada.

Foot-and-mouth disease (FMD) is a highly contagious viral disease of cloven-hoofed animals, and it can decimate the livestock industry and economy of countries previously free of this disease. Rapid detection of foot-and-mouth disease virus (FMDV) is critical to prevent and contain an FMD outbreak. Availability of a rapid, highly sensitive and specific, yet simple and field-deployable assay would support local decision making and reduce the diagnostic burden on central laboratories during an FMDV outbreak.

Here we report validation of a novel reverse transcription-insulated isothermal PCR (RT-iiPCR) assay that can be performed on a commercially available, compact and portable POCKIT™ analyser that automatically analyze data and display "+" or "-" results. The FMDV RT-iiPCR assay targets the 3D region of the FMDV genome and was capable of detecting 9 copies of in vitro transcribed RNA standard with 95% confidence. It accurately identified 63 FMDV strains belonging to all seven serotypes, and showed no cross-reactivity with viruses causing similar clinical diseases in cloven-hoofed animals. The assay was able to identify FMDV RNA in multiple sample types including oral, nasal and lesion swabs, epithelial tissue suspensions, vesicular and oral fluid samples, even before the appearance of clinical signs. Clinical sensitivity of the assay was comparable or slightly higher than the laboratory-based real-time RT-PCR assay in use. The assay was able to detect FMDV RNA in vesicular fluid samples without nucleic acid extraction. For RNA extraction from more complex sample types, a commercially available taco™ mini transportable magnetic bead-based, automated extraction system was used.

This assay provides a potentially useful field-deployable diagnostic tool for rapid detection of FMDV in an outbreak in FMD-free countries or for routine diagnostics in endemic countries with less structured laboratory systems.

**Big Data has arrived: implications, opportunities and challenges for collaboration in animal health**

Anatoliy Trokhymchuk[1], Theresa Burns[2], Nancy de With[3], Glen Duizer[4], Harold Kloeze[5], Shamir Mukhi[6]

[1] Prairie Diagnostic Services, Saskatoon, SK, [2] Centre for Coastal Health, Chilliwack, BC, [3] British Columbia Ministry of Agriculture, Livestock Health Management and Regulatory Unit, Abbotsford, BC, [4] Manitoba Ministry of Agriculture, Food and Rural Development, Winnipeg, MB, [5] Canadian Food Inspection Agency, Thunder Bay, ON, [6] Canadian Network for Public Health Intelligence, National Microbiology Laboratory, Winnipeg, MB

The explosive growth of digital technology in diagnostic animal health laboratories has created unprecedented opportunities for new and improved levels of collaboration in animal health surveillance between provinces, regionally and nationally. The experience of the Canadian Animal Health Surveillance Network (CAHSN) technical workgroup has demonstrated the feasibility and utility of aggregating de-personalized data within a centralized data base. We used the Canadian Network for Public Health Intelligence (CNPHI) platform to apply syndromic surveillance tools to aggregated routine animal health diagnostic data which were uploaded in close-to-real time. This mode of passive surveillance is both timely and cost efficient. It is also a much needed resource for national animal agriculture as it can be used to support disease control programs, laboratory capacity planning, and access to international markets. The initial pilot project covered aggregated data from Western Canada and included three Western public animal health diagnostic laboratories (Animal Health Laboratory (Manitoba), Prairie Diagnostic Services (Saskatchewan), and the Animal Health Centre (British Columbia)). This framework was developed in accordance with the national legislative guidelines (Personal Information Protection and Electronic Documents Act (PIPEDA)) to provide a complete and functional technical solution for data aggregation and analysis.

Future goals of our work include: aggregation of diagnostic data on the national level, developing analytic capacity for disease freedom demonstration, improving syndromic surveillance tools and enhancing collaboration within One Health framework. The current diversity in Laboratory Information Management System (LIMS) solutions utilized by diagnostic animal health laboratories across the country and the absence of national animal health data standards are the key challenges that need to be addressed in future collaborative work.

## Poster Presentations

| Poster No. | Authors | Title | Presenter |
|---|---|---|---|
| 1 | Babafela Awosile, Matt Saab, J. Trenton McClure and Luke Heider | Antimicrobial resistance in selected pathogens isolated from dogs at a referral diagnostic laboratory in Atlantic Canada: 1994-2013 | Babafela Awosile [Graduate Student Presentation] |
| 2 | Chantale Provost, Phillipe Garneau, Davor Ojkic, Josee Harel and Carl Gagnon | Development of a new molecular method for discriminating infectious versus non-infectious viral particles in food additives derived from swine | Chantale Provost |
| 3 | Mhamdi Zeineb, Christian Savard, Chantale Provost and Carl Gagnon | Detection of Influenza A virus strains resistant to antiviral drugs, including | Mahmdi Zeineb [Graduate Student Presentation] |
| 4 | Niorn Ratanapob, John VanLeeuwen, Shawn McKenna, Maureen Wichtel, Juan C. Rodriguez-Lecompte, Paula Menzies and Jeff Wichtel | A retrospective postmortem study of young calves in lambs in PEI (2005-2014) | Niorn Ratanpob [Graduate Student Presentation] |
| 5 | Ines Walther, Andrei Soutyrine, Antanas Staskevicius, Patricia Shaffer and Gordon Mitchell | Transmissibility of CWD to domestic sheep and goats | Ines Walther |
| 6 | Iman Mehdizadh Gohari, Andrew M. Kropinski, Scott J. Weese, Valeria R. Parreira, Ashley E. Whitehead, Patrick Boerlin, John F. Prescott | Comparative genomic and cgMLST analysis of netF-positive *Clostridium perfringens* isolates from foal and canine necrotizing enteritis | Iman Mehdizadeh Gohari [Graduate Student Presentation] |

The presenters will be available in the poster area during Health Breaks on Monday and Tuesday.

Poster no 1: **Antimicrobial resistance in selected pathogens isolated from dogs at a referral diagnostic laboratory in Atlantic Canada: 1994-2013**

Babafela Awosile, Matt Saab, J. Trenton McClure, Luke Heider

Atlantic Veterinary College, University of Prince Edward Island Charlottetown, Canada

Antimicrobial resistance (AMR) is an important problem in companion animals. The extent of AMR in companion animals is poorly understood. Knowledge of antimicrobial resistance patterns and trends provides insight into resistance trends and aid in empirical treatment decisions.

This study was conducted to determine the antimicrobial resistance patterns and trends of common pathogens from dogs using data from the Atlantic Veterinary College Diagnostic Laboratory over a 20-year period. Ordinary logistic regression was used to determine the antimicrobial resistance trend over time, while susceptibilities were presented as proportional rates, and only pathogens with acquired resistance were considered.

*Staphylococcus spp, Escherichia coli* and *Streptococcus spp were* the predominant pathogens isolated over the study period. Recovery of antimicrobial resistant pathogens over the study period was relatively low. However, higher rates of resistance were observed to enrofloxacin in *Enterococcus spp, Pseudomonas aeruginosa* and *Streptococcus spp.*

Enrofloxacin resistance increased in all the pathogens except in *Pasteurella spp* and methicillin-resistant coagulase positive *Staphylococcus spp.* Increased resistance to amoxicillin-clavulanate was also observed in *Enterococcus spp, Escherichia coli* and coagulase positive *Staphylococcus spp*. Resistance to trimethoprim-sulfamethoxazole and aminoglycosides decreased in most pathogens except gentamicin resistance in methicillin-susceptible coagulase positive *Staphylococcus spp.* Multi-drug resistance (MDR) was observed in 20% of the pathogens with ampicillin, penicillin, trimethoprim-sulfamethoxazole co-resistance being most common in coagulase positive *Staphylococcus spp*.

Reporting and monitoring antimicrobial susceptibilities and trends of resistance among bacterial pathogens together with sound clinical judgment could be used to design empirical therapeutic plans. This study can also serve as a guide to the expected susceptibility patterns in dog pathogens. In conclusion, this study demonstrates that AMR and AMR trends in important canine bacterial pathogens are relatively low and stable over the 20 year period. Monitoring of AMR among canine pathogens and prudent use of all antimicrobials by veterinarians should preserve the efficacy of these drugs in both veterinary and human medicine.

Poster no. 2: **Development of a new molecular method for discriminating infectious versus non-infectious viral particles in food additives derived from swine.**

Chantale Provost[1]*, Philippe Garneau[1], Davor Ojkic[2], Josée Harel[1], Carl A. Gagnon[1].

[1] Centre de recherche en infectiologie porcine et avicole (CRIPA) et Groupe de recherche sur les maladies infectieuses en production animale (GREMIP), Faculté de médecine vétérinaire, Université de Montréal, St-Hyacinthe, Québec, Canada. [2] Animal Health Laboratory (AHL), University of Guelph, Guelph, Ontario, Canada.

Poster no 3: **Detection of influenza A virus strains resistant to antiviral drugs, including neuraminidase inhibitors, in Quebec swine herds.**

Mhamdi Zeineb, Savard Christian, Provost Chantale, Gagnon Carl.A.

Centre de recherche en infectiologie porcine et avicole, Faculté de médecine vétérinaire, Université de Montréal Saint-Hyacinthe, Québec

Resistance of human influenza A virus strains against antiviral drugs is a common unfortunate event. The objective of the present study was to establish the occurrence of antiviral drug- resistance in swine influenza A virus (SIV) in Québec. Eighteen SIV strains were isolated, from clinically affected herds, in MDCK cells or in embryonated eggs. Those SIV strains were isolated from samples that were submitted from 2010 until 2015. The entire viral genome of those SIV strains was sequenced and analyses revealed the presence of 6 H1N1 cluster pdmH1N109 and 12 trH3N2 subtypes SIV strains. The antiviral drugs resistance against Oseltamivir carboxylate, Zanamivir and Amantadine hydrochloride (SIGMA) was tested. Using the influenza MUNANA (2' 2′-(4-Methylumbelliferyl)-α-D-N-acetylneuraminic acid sodium salt hydrate) neuraminidase activity and inhibition assay, one H1N1 (1/6 = 16.6%) and one trH3N2 (1/12 = 8.3%) strains were found to be resistant against Oseltamivir. In addition, three H1N1 (3/6 = 50%) and one trH3N2 (1/12 = 8.3%) were resistant against Zanamivir. All antiviral resistant strains were from 2014 and 2015. Interestingly, SIV strains resistant against Oseltamivir were different compared to the ones resistant against Zanamivir. Overall, the SIV resistance against antiviral neuraminidase inhibitors was 33.3%. The most common mutation conferring resistance to amantadine is an aa of the transmembrane domain of the M2 protein. Sequences alignment analyses have shown that 100% Québec SIV do have the S31N, V27I, and R77Q mutations in the M2 protein suggesting that all isolates can be expected to offer resistance to Amantadine. Moreover, in vitro characterization of amantadine-resistance is currently underway. The results indicate that influenza A virus antiviral resistant strains are circulating in Québec herds. Influenza A virus reassortment, from which antiviral drugs resistance can be transferred between viral strains, raising concerns for public health.

Poster no 4: **A retrospective post-mortem study of young lambs in PEI (2005-2014)**

Niorn Ratanapob[1], John VanLeeuwen[1], Shawn McKenna[1], Maureen Wichtel[1], Juan C. Rodriguez-Lecompte[2], Paula Menzies[3], Jeff Wichtel[3]

[1]Department of Health Management, Atlantic Veterinary College, Charlottetown, PEI, [2]Department of Pathology and Microbiology, Atlantic Veterinary College, Charlottetown, PEI, [3]Department of Population Medicine, Ontario Veterinary College, Guelph, ON

We wished to identify causes of mortality in live-born lambs ≤ 90 days of age, submitted for post-mortem examination to AVC Diagnostic Services between 2005 and 2014. Age at death was categorized into five categories: < 1 day, 1-2 days, 3-7 days, 8-30 days and > 30 days. Abnormal gross and histopathological findings from 367 submissions were categorized by body system. Lesions in the respiratory system were present in almost 70% of the submissions, but lesions of the gastrointestinal system were most commonly associated with the cause of death. The primary cause of death was classified into one of eight categories: infection, trauma, congenital defects, dystocia, milk aspiration, starvation, nutritionally-related diseases and others. Cause of death could not be identified in 28% of the submissions. The proportion of open diagnoses was high in lambs up to 2 days of age. The most frequent primary cause of death was infectious diseases. A bacterial infection was identified as contributing to death in 62% of cases where death was attributed to infection. The likelihood of infection being identified as the primary cause of death increased with age. The next most frequent cause of death was nutritionally-related diseases. Deaths attributed to this cause were not found in lambs younger than 2 days of age. This study presents the first data on cause of lamb mortality in PEI. It highlights the importance of infection as a cause of death in young lambs, and provides valuable initial information to guide further prospective investigations.

Poster No. 5: **Transmissibility of CWD to domestic sheep and goats.**

Ines Walther, Andrei Soutyrine, Antanas Staskevicius, Patricia Shaffer, Gordon Mitchell

National & OIE Reference Laboratory for Scrapie and CWD, Canadian Food Inspection Agency, Ottawa, Ontario, Canada

Chronic Wasting Disease (CWD) a disease of both captive and free-ranging cervids continues its range expansion within western Canada as well as the western USA. The first European case was recently reported in Norway. Natural transmission of CWD to other domestic livestock or sympatric wildlife species has not yet been detected. Current research using transgenic mouse models and *in vitro* conversion assays suggest that a species barrier may inhibit the facile transmission of CWD to cattle and small ruminants. However, the possible factors that might influence the characteristics of this barrier are not fully understood. Host genetics have been shown to be important determinants associated with susceptibility to transmissible spongiform encephalopathies (TSEs). The host prion protein gene is highly conserved between domestic sheep and wild small ruminants (ex. *Ovis canadensis*). Recently, we have shown that it is possible to transmit CWD to domestic sheep by intracranial inoculation of CWD infected elk tissues. Furthermore, tissue from these experimentally infected sheep can be used to transmit CWD (experimental oral and intracranial transmission) to other domestic sheep and goats. Continued work is necessary to broaden our understanding of the potential risk for possible transmission of CWD between susceptible cervids and small ruminants, both domestic and wild. This is due to the genetic similarities between domestic and wild small ruminants, the overlapping geographical ranges of wild small ruminants with CWD-infected cervids and their infectious bodily fluids (including urine, feces, saliva and blood), as well as the environmental persistence of prions. This poster will discuss the findings pertaining to experimental CWD transmission to sheep as well as secondary passage of CWD infected sheep tissue to other domestic sheep and goats.

Poster No 6: **Comparative genomic and cgMLST analysis of *netF*-positive *Clostridium perfringens* isolates from foal and canine necrotizing enteritis**

Iman Mehdizadeh Gohari[1], Andrew M. Kropinski[1], Scott J. Weese[1], Valeria R. Parreira[1], Ashley E. Whitehead[2], Patrick Boerlin[1], John F. Prescott[1*]

[1]Department of Pathobiology, University of Guelph, Guelph, Ontario N1G 2W1, Canada
[2]Department of Veterinary Clinical and Diagnostic Sciences, University of Calgary, Calgary, Alberta, CSB 101E, Canada

*Clostridium perfringens* type A-associated diarrheal and enteric disease in foals and dogs is not well characterized, and its understanding is complicated by the common presence of these bacteria in the intestinal tract and feces of healthy animals. However, recently, our group described three novel putative toxin genes encoding proteins related to the spore-forming Leukocidin/Hemolysin Superfamily; these were designated *netE*, *netF*, and *netG*. NetF has been implicated as the primary virulence factor of foal necrotizing enteritis and canine haemorrhagic gastroenteritis. This study presents the complete genome sequence of two *netF*-positive strains, JFP55 and JFP838, which were recovered from cases of foal necrotizing enteritis and canine haemorrhagic gastroenteritis, respectively. In addition, 30 more *netF*-positive strains were sequenced for epidemiological analysis.

The genomic DNA of the samples was extracted using a modified version of the Qiagen bacterial DNA extraction protocol. Single Molecule, Real-Time (SMRT) technology-PacBio and Illumina Hiseq2000 PE100 were used for both samples. *De novo* assembly was done using DNASTAR's SeqMan NGen12 software. Subsequently, the complete chromosome sequences were annotated by the prokaryotic genome annotation pipeline. In addition, complete plasmid sequences were annotated by MyRAST software, the next generation of Rapid Annotation using Subsystem Technology. The clonal relationships among the NetF-producing strains were evaluated by core genome multilocus sequence typing (cgMLST) (1349 target genes).

The JFP55 and JFP838 genomes include a single 3.34 Mb and 3.53 Mb chromosome, respectively, and both genomes include five circular plasmids. Comparison of these two chromosomes with three available reference *C. perfringens* chromosome sequences identified 48 (~ 247 kb) and 81(~ 430 kb) regions unique to JFP55 and JFP838, respectively. Sixteen of these unique chromosomal regions (~69 kb) were shared between the two isolates. In addition, plasmid annotation revealed that both *netF*-positive *C. perfringens* strains, JFP55 and JFP838, harbour three plasmids in common, including a NetF/NetE toxins-encoding plasmid, a CPE/CPB2 toxins-encoding plasmid and a putative bacteriocin-encoding plasmid. The common plasmid profiles are potentially valuable epidemiological markers for *netF*-positive *C. perfringens* strains. cgMLST analysis showed that the NetF-producing *C. perfringens* strains belong to two phylogenetically distinct clonal complexes.

# Industry Partners Directory

## Illumina

"Our goal is to apply innovative technologies to the analysis of genetic variation and function, making studies possible that were not even imaginable just a few years ago. It is mission critical for us to deliver innovative, flexible, and scalable solutions to meet the needs of our customers. As a global company that places high value on collaborative interactions, rapid delivery of solutions, and providing the highest level of quality, we strive to meet this challenge. Illumina innovative sequencing and array technologies are fueling groundbreaking advancements in life science research, translational and consumer genomics, and molecular diagnostics."

http://www.illumina.com/

## Qiagen

QIAGEN provides complete solutions for molecular and serological veterinary testing, as well as animal pathogen research – from sample to insight. Our products help you to reliably identify poultry and livestock diseases to protect human and animal health, the environment and the food chain.
Rely on QIAGEN for validated and proven technologies:
Sample extraction kits and reagents for a more efficient purification of viral RNA and DNA and bacterial DNA from a broad variety of animal sample types

- Instruments for high and low throughput testing
- A broad range of pathogen-specific, ready-to-use PCR assays
- Novel NGS solutions and Bioinformatics software

www.qiagen.com

## Fisher Scientific

Thermo Fisher Scientific is the world leader in serving science. Our mission is to enable our customers to make the world healthier, cleaner and safer. Through our Applied Biosystems, Invitrogen, and Ion Torrent brands, we help customers accelerate innovation and enhance productivity.

www.thermofisher.com

## VWR

With more than 2 million products, VWR International, provides our customers the broadest range of choice in quality products, from specimen collection to specimen analysis for research, clinical and industrial applications.
From traditional histology to advanced molecular research and diagnostics
From furniture to beakers, microscopes to ULT freezers, biochemicals, reagents and sera to custom chemical blends, and everything in between, we provide what our customers need to enable science.

VWR connects with over 4,000 core laboratory product manufacturers to bring our customers choice with a range of complexity and sophistication. Even with the broadest offering,
VWR can make sense of the choices available by tailoring options. At the same time, we ensure we're offering the highest quality, best value and the most objective product offering available in the market today.

Whether our customers are in a lab or scaling up for production, they face the challenge of balancing the need to stretch your dollars with the need for quality and innovation.
Our brands provide the right products, at the right price, and a suite of customized solutions – all with a name they trust.

https://ca.vwr.com/store/

## VMRD

VMRD was founded in 1981 by D. Scott Adams, DVM, PhD. From its site in Pullman, WA VMRD develops and manufactures diagnostic test kits and related reagents for distribution in more than 55 countries. It's mission is to provide high quality products, services and support for customers. VMRD has a strong market reputation for delivering best in class products with a uniquely personal touch.

VMRD develops and manufactures USDA-licensed diagnostic test kits for infectious disease agents Anaplasma, Babesia caballi, Babesia equi, Bovine Leukemia Virus, Bluetongue Virus, Caprine Arthritis Encephalitis Virus, Equine Infectious Anemia Virus and Neospora; research reagents such as FA conjugates, IFA substrate and control slides, as well as a wide selection of monoclonal and polyclonal antibodies, immunoglobulins.

www.vmrd.com

## Zoetis

"Zoetis is the leading animal health company, dedicated to supporting its customers and their businesses. Building on more than 60 years of experience in animal health, Zoetis discovers, develops, manufactures and markets veterinary vaccines and medicines, complemented by diagnostic products and genetic tests and supported by a range of services. Zoetis serves veterinarians, livestock producers and people who raise and care for farm and companion animals with sales of its products in more than 100 countries. In 2015, the company generated annual revenue of US$4.8 billion with approximately 9,000 employees."

www.zoetis.com

## Canadian Wildlife Health Cooperative

The Canadian Wildlife Health Cooperative (CWHC) is a cross-Canada network of health specialists dedicated to wildlife health surveillance. It is a partnership linking Canada's five veterinary colleges and the British Columbia Animal Health Centre. Its goal is to generate knowledge needed to assess and manage wildlife health. Branching from the CWHC is a network stretching into the public and private sectors that allows us to access critical expertise needed to detect and assess wildlife health issues and make sure our results find their way to people who need to make decisions on wildlife management, wildlife use, public health and agriculture.

www.cwhc-rcsf.ca

## Elanco Canada Limited

As a leading aqua health company, Elanco Aqua has a broad portfolio of products on the market including vaccines and treatments to combat the most damaging diseases and parasites in fish.

Aquaculture is a priority at Elanco Aqua and we are committed to enabling fish farmers meet the need for productivity through healthier fish now and in the future. Our focus on innovation combined with state-of-the-art research facilities means that we are often first to license new products and technologies such as the first Nucleic Acid Vaccine.

With our ongoing dedication to Aquaculture and a healthy pipeline of new products in development, we are uniquely qualified to support sustainable fish production while helping to conserve many endangered fisheries and fish stocks.

www.elanco.com

## Integrated Diagnostic Technologies (IDT)

IDT is the largest manufacturer of custom oligo products. We became the industry leader in this competitive field by maintaining the highest standards of quality, service, and technical know-how.

Some common uses for oligos include diagnostic tests for genetic diseases, diagnostic tests for infectious diseases, research to discover new drugs and producing safer and more plentiful agricultural products.

We manufacture custom DNA oligos and custom RNA oligos. From these molecules we extend to synthetic Biology, CRISPR-Cas9, Gene Silencing, miRNA Inhibitors, genotyping, predesigned qPCR assays, custom qPCR Probes, Target Enrichment Solutions for NGS and much more.

www.idtdna.com

## Luminex

Luminex® Corporation (NASDAQ: LMNX) develops, manufactures and markets proprietary biological testing technologies, with applications throughout the life-sciences industry. This industry depends on a broad range of tests, known as "bioassays," to discover new drugs, identify new genes or simply monitor blood cholesterol levels. The in-house experts at Luminex have developed an innovative approach to bioassays, known as xMAP® technology. This groundbreaking technology enables companies and laboratories to perform bioassays more quickly and cost-effectively than with other systems, without sacrificing accuracy.
Luminex has been marketing the current generation of xMAP technology (formerly known as mabMAP®) worldwide since 1999. Thanks to its open-architecture platform, xMAP technology can be applied across a wide range of markets. In fact, xMAP technology-based systems are already in use by leading research laboratories as well as major pharmaceutical, diagnostic and biotechnology companies. Veterinary diagnostics has also benefited from use of xMAP technology.

https://www.luminexcorp.com/

## Abaxis

Abaxis Global Diagnostics is your total laboratory partner, offering the comprehensive and innovative VetScan line of on-site diagnostic instruments. The VetScan name has become synonymous with convenience, ease of use and cost-effectiveness, delivering on our promise of speed, accuracy and reliability. It’s not just better diagnostics, it’s a better way.

www.abaxis.com

## Agilent

Agilent is a leader in life sciences, diagnostics and applied chemical markets. The company provides laboratories worldwide with instruments, services, consumables, applications and expertise, enabling customers to gain the insights they seek. Agilent’s expertise and trusted collaboration give them the highest confidence in our solutions. Agilent focuses its expertise on six key markets, where we help our customers achieve their goals: Food, Environmental Forensics, Pharmaceutical, Diagnostics, Chemical and Energy and Research. Agilent was created when it spun off from Hewlett-Packard Company in 1999. Since then the company has won hundreds of awards for innovations and has earned even more patents for its inventions.

www.Agilent.com

## Idexx

Livestock and poultry producers, laboratories, veterinarians and dairy processors depend on IDEXX diagnostic technologies to make confident decisions about disease management, reproductive efficiency and milk quality and safety. Reproducibility, reliability and accuracy are three of the reasons why over 1 billion IDEXX tests have been run around the world since 1985.

www.idexx.ca

## Omnitech

Omnitech Innovations is dedicated to the design and development of advanced optimization, compliance management and standardization software. The Omni-Assistant software is the most complete laboratory optimization and compliance management solution available.

The Omni-Assistant provides the following benefits:

- Save time spent on managing requirements
  Inspections and audits preparation finally made easy
- Improve your best practices
  The Omni-Assistant ensures the distribution of your Standard Operating Procedures.
- Establish traceability
  Allows easy report production demonstrating the efficient monitoring of control points, tasks performed or incidents encountered
- Increase operational performance
  Ensure strict adherence to current professional standards.

www.omnitechinnovations.net

## Roche Diagnostic

Roche Diagnostics, a division of the Swiss company Hoffmann-La Roche Ltd., is the world leader in in vitro diagnostics. In Canada, Roche Diagnostics is the leader of its sector. Roche Diagnostics offers a uniquely broad product portfolio and innovative solutions to researchers, physicians, patients, hospitals and laboratories in the fields of diabetes care and anticoagulation therapy, molecular biology, diagnostic in-situ, clinical chemistry, immunology and life science. Roche Canada has its Diagnostics head office in Laval and its Pharmaceutical head office in Mississauga, Ontario

http://www.rochecanada.com/

**CAHLN 2016 Annual Meeting**

Preregistered Delegates (as of May 26, 2016)

| Name | Association | Email |
|---|---|---|
| Alex Robertson | Illumina | arobertson@illumina.com |
| Alexandra Ashley Simard | Roche Diagnostics | simard@roche.com |
| Ali Matloub | Zoetis | ali.matloub@zoetis.com |
| Anatoliy Trokhymchuk | Prairie Diagnostic Services, University of Saskatoon | anatoliy.trokhymchuk@pds.usask.ca |
| Andrea Battison | CrustiPath | andrea@crustipath.com |
| Andrea Bourque | Diagnostic Services, Atlantic Veterinary College | Abourque@upei.ca |
| Andrew Tasker | Department of Biomedical Sciences, Atlantic Veterinary College | tasker@groupwise.upei.ca |
| Anne Muckle | Diagnostic Services and Department of Pathology and Microbiology, Atlantic Veterinary College | cmuckle@groupwise.upei.ca |
| Anne Veniot | Fisheries and Oceans Canada, Moncton, New Brunswick | Anne.veniot@dfo-mpo.gc.ca |
| Annette Boerlage | Center for Veterinary Epidemiological Research, Atlantic Veterinary College | aboerlage@upei.ca |
| Arnost Cepica | Diagnostic Services, Atlantic Veterinary College | acepica@groupwise.upei.ca |
| Arun Balachandran | Thermo Fisher Scientific | arun.balachandran@lifetech.com |
| Babafela Awosile | Department of Health Management, Atlantic Veterinary College | bawosile@upei.ca |
| Brian Evans | World Organisation for Animal Health (OIE) | b.evans@oie.int |
| Brian Matheson | Agriculture Policy and Regulatory Division , PEI Department of Agriculture and Fisheries | bgmatheson@gov.pe.ca |
| Carmencita Yason | RDVS-AVC DS, Atlantic Veterinary College | yason@upei.ca |
| Carolyn Sanford | Agriculture Policy and Regulatory Division, PEI Department of Agriculture and Fisheries | csanford@gov.pe.ca |
| Catherine Graham | Veterinary Pathology Laboratory, Nova Scotia Department of Agriculture, Fisheries and Aquaculture | Catherine.Graham@novascotia.ca |
| Chandi Bandara | VMRD, Inc | chandb@vmrd.com |
| Chantale Provost | Faculté de médecine vétérinaire, Université de Montréal | Chantale.provost@umontreal.ca |

| Name | Association | Email |
|---|---|---|
| Charles Nfon | Canadian Food Inspection Agency, Winnipeg, Manitoba | Charles.nfon@inspection.gc.ca |
| Chelsea Martin | Department of Pathology and Microbiology, Atlantic Veterinary College | Ckmartin@upei.ca> |
| Cheryl James | Canadian Food Inspection Agency, Ottawa | cheryl.james@inspection.gc.ca |
| Chris Mulholland | VWR | Chris_Mulholland@VWR.com |
| Craig Stephen | Canadian Wildlife Health Cooperative | cstephen@ccwhc.ca |
| Cristina Solis Worsfold | Faculty of Veterinary Medicine, University of Calgary | csolis@ucalgary.ca |
| Dale Godson | Prairie Diagnostic Services Inc, University of Saskatoon | Dale.godson@pds.usask.ca |
| Daniel Hurnik | Department of Health Management, Atlantic Veterinary College | hurnik@groupwise.upei.ca |
| Dante Mateo | RDVS-AVC DS, Atlantic Veterinary College | dmateo@g.upei.ca |
| David Speare | Department of Pathology and Microbiology, Atlantic Veterinary College | speare@upei.ca |
| Deidre Ridd | Canadian Food Inspection Agency, Winnipeg, Manitoba | Deidre.ridd@inspection.gc.ca |
| Dennis Scott Adams | VMRD, Inc | scott@vmrd.com |
| Diana Jamarillo | Center for Veterinary Epidemiological Research, Atlantic Veterinary College | djaramillo@upei.ca |
| Diane Morrison | Marine Harvest, Campbell River, BC | Diane.Morrison@marineharvest.com |
| Doug Schurman | Canadian Food Inspection Agency, Charlottetown, PEI | Doug.Schurman@inspection.gc.ca |
| Duane Barker | Huntsman Marine Science Center, St. Andrews, New Brunswick | Duane.barker@huntsmanmarine.ca |
| Durda Slavic | Animal Health Laboratory, University of Guelph | dslavic@uoguelph.ca |
| Elizabeth Dobbin | Diagnostic Services, Atlantic Veterinary College | edobbin@upei.ca |
| Emilie Laurin | Center for Veterinary Epidemiological Research, Atlantic Veterinary College | elaurin@upei.ca |
| Enrique Aburto | Department of Pathology and Microbiology, Atlantic Veterinary College | eaburto@upei.ca |
| Estela Cornaglia | Faculté de médecine vétérinaire, Université de Montréal | Estela.cornaglia@umontreal.ca |
| Fany Marron-Lopez | Department of Pathology and Microbiology, Atlantic Veterinary College | famarron@groupwise.upei.ca |

| Name | Association | Email |
|---|---|---|
| François Elvinger | Animal Health Diagnostic Center, NYS College of Veterinary Medicine, Cornell University | feb@cornell.edu |
| François Franceur | Integrated DNA Technologies | ffrancoeur@idtdna.com |
| Ghyslaine Vanier | University of Montreal Faculté de médecine vétérinaire, Université de Montréal | ghyslaine.vanier@umontreal.ca |
| Grant Maxie | Animal Health Laboratory , University of Guelph | gmaxie@uoguelph.ca |
| Greg Keefe | Dean, Atlantic Veterinary College | gkeefe@upei.ca |
| Helen Kocmarek | Animal Health Laboratory, University of Guelph | hkocmare@uoguelph.ca |
| Helen Oliver | Animal Health Laboratory, University of Guelph | holiver@uoguelph.ca |
| Ian Alexander | Canadian Food Inspection Agency, Ottawa | ian.alexander@inspection.gc.ca |
| Ian Gardner | Canada Excellence Research Chair (CERC) and CVER, Atlantic Veterinary College | iagardner@upei.ca |
| Ibrahim Elsohaby | Department of Health Management, Atlantic Veterinary College | ielsohaby@upei.ca |
| Iman Mehdizadeh Gohari | Department of Pathobiology, University of Guelph | imehdiza@uoguelph.ca |
| Ines Walther | Canadian Food Inspection Agency, Ottawa Fallowfield Laboratory | ines.walther@inspection.gc.ca |
| Jackie Rose | Department of Fisheries and Aquaculture, Newfoundland and Labrador | jackierose@gov.nl.ca |
| James P. Goltz | Provincial Veterinary Laboratory, New Brunswick Department of Agriculture, Fisheries and Aquaculture | jim.goltz@gnb.ca |
| Jane Parmley | CIPARS, Public Health Agency of Canada (PHAC) | jane.parmley@phac-aspc.gc.ca |
| Janet Bystrom | College of Veterinary Medicine, University of Calgary | Jan.bystrom@ucalgary .ca |
| Javier Sanchez | Department of Health Management, Atlantic Veterinary College | jsanchez@upei.ca |
| John Copps | Canadian Food Inspection Agency, Winnipeg, Manitoba | john.copps@inspection.gc.ca |
| Jose Lopez | Canadian Food Inspection Agency, Ottawa | jose.Lopez@inspection.gc.ca |
| Jose Rodriguez | ELANCO Canada | Jose_f.rodriguez@elanco.com |

| Name | Association | Email |
|---|---|---|
| Julie-Hélène Fairbrother | MAPAQ, St-Hyacinthe, Quebec | JulieHelene.Fairbrother@mapaq.gouv.qc.ca |
| Katherine Cromwell | Provincial Veterinary Laboratory, New Brunswick Department of Agriculture, Fisheries and Aquaculture | kathy.cromwell@gnb.ca |
| Kathy Rae | Zoetis | Kathy.rae@zoetis.com |
| Kenn Laurie | Omnitech Assistant | k.laurie@oi-inc.net |
| Kim Johnstone | UPEI-Synapse | kim@synapsepei.com |
| Kristen-Roza-Sutherland | IDEXX | Kristen-Roza-Sutherland@idexx.com |
| Kristina Ruotsalo | Animal Health Laboratory, University of Guelph | kruotsal@uoguelph.ca |
| Larry Hammell | Associate Dean, Graduate Studies and Research, Atlantic Veterinary College | lhammell@upei.ca |
| Laura Rogers | Animal Health Division, Newfoundland and Labrador | Laurarogers@gov.nl.ca |
| Laura Ross | Veterinary Pathology Laboratory, Nova Scotia Department of Agriculture, Fisheries and Aquaculture | Laura.ross@novascotia.ca |
| Leah Hoskins | Department of Fisheries and Aquaculture, Newfoundland and Labrador | LeahHoskins@gov.nl.ca |
| Lisa Miller | Department of Pathology and Microbiology, Atlantic Veterinary College | lmiller@groupwise.upei.ca |
| Lisa Tremblay | Illumina | ltremblay@illumina.com |
| Liza Cabuang | National Reference Laboratory-Australia | liza@nrl.gov.au |
| Margaret Morrison | Canadian Food Inspection Agency, Charlottetown, PEI | Margaret.Morrison@inspection.gc.ca |
| Maria Forzan | Department of Pathology and Microbiology, Atlantic Veterinary College | mforzan@upei.ca |
| Maria Perrone | Canadian Food Inspection Agency, Ottawa | maria.perrone@inspection.gc.ca |
| Maria Spinato | Animal Health Laboratory, University of Guelph | mspinato@uoguelph.ca |
| Mark Hicks | Government of Alberta, Agriculture and Forestry | Mark.hicks@gov.ab.ca |
| Melanie Barham | University of Guelph | mbarham@uoguelph.ca |
| Mhamdi Zeineb | University of Montreal Faculté de médecine vétérinaire, Université de Montréal | zeineb.mhamdi@umontreal.ca |

| Name | Association | Email |
|---|---|---|
| Mike Drebot | National Microbiology Laboratory, Public Health Agency Canada (PHAC), Winnipeg, Manitoba | mike.drebot@phac-aspc.gc.ca |
| Musangu Ngeleka | Prairie Diagnostic Services Inc, University of Saskatoon | Musangu.ngeleka@pds.usask.ca |
| Neil Pople | Manitoba Veterinary Diagnostic Services. Manitoba Agriculture | neil.pople@gov.mb.ca |
| Niorn Ratanapob | Department of Health Management, Atlantic Veterinary College | nratanapob@upei.ca |
| Oliver Lung | Canadian Food Inspection Agency, Winnipeg, Manitoba | oliver.lung@inspection.gc.ca |
| Olivia Labrèque | MAPAQ, St- Hyacinthe, Quebec | Olivia.labreque@mapaq.gouv.qc.ca |
| Patrick Bronson-Doherty | Qiagen, Inc | Patrick.Bronson-Doherty@qiagen.com |
| Paul Hanna | Department of Pathology and Microbiology, Atlantic Veterinary College | hanna@groupwise.upei.ca |
| PEI Delegate - 2 | Department of Agriculture and Fisheries, PEI | |
| Phillip Byrne | Fisheries and Oceans Canada - Moncton, New Brunswick | Philip.Byrne@dfo-mpo.gc.ca |
| Raphaël Vanderstichel | Department of Health Management, Atlantic Veterinary College | rvanderstichel@gmail.com |
| Reini Bowman | ABAXIS | reinibowman@abaxis.com |
| Rhoda Speare | Office of Research and Development, UPEI | rspeare@upei.ca |
| Richard Green | RDVS-AVC DS, Atlantic Veterinary College | rgreen@g.upei.ca |
| Robyn MacPhee | RDVS-AVC DS, Atlantic Veterinary College | rimacphee@upei.ca |
| Sara Purcell | Department of Pathology and Microbiology, Atlantic Veterinary College | spurcellmacd@groupwise.upei.ca |
| Scott Burrows | Thermo Fisher Scientific | scott.burrows@thermofisher.com |
| Serge Duguay | Agilent Technologies | serge_duguay@agilent.com |
| Shanon Martinson | Department of Pathology and Microbiology, Atlantic Veterinary College | smartinson@upei.ca |
| Sheri Fitzpatrick-Poulain | Biomedica Diagnostics, Nova Scotia | spoulaine@biomedicadiagnostics.com |
| Sophie St-Hilaire | Canada Research Chair, Department of Health Management, Atlantic Veterinary College | ssthilaire@groupwise.upei.ca |
| Tina Polstra | RDVS-AVC DS, Atlantic Veterinary College | tpolstra@upei.ca |
| Tokinori Iwamoto | RDVS-AVC DS, Atlantic Veterinary College | TIwamoto@groupwise.upei.ca |

| Name | Association | Email |
|---|---|---|
| Valerie Stone | Luminex Inc | vstone@luminexcorp.com |
| Vicky Birt | Provincial Veterinary Laboratory, New Brunswick Department of Agriculture, Fisheries and Aquaculture | Vicky.birt@gnb.ca |
| Vladislav Lobanov | Canadian Food Inspection Agency, Saskatoon, Saskatchewan | vladislav.lobanov@inspection.gc.ca |
| Janet Bystrom | College of Veterinary Medicine, University of Calgary | Jan.bystrom@ucalgary .ca |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |