



Centre for Veterinary
Epidemiological Research

2012 Annual Report



Atlantic Veterinary College
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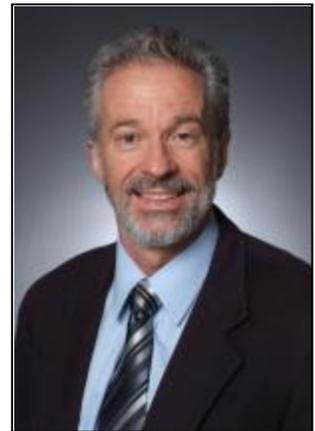
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1. MESSAGE FROM THE DIRECTOR

2012 was another successful year for CVVER, with highlights including:

- Continued productive research programs by faculty members addressing stakeholder-relevant research questions in terrestrial and aquatic animal health and welfare, including issues of veterinary public health concern;
- Sixty nine peer-reviewed publications from our team of faculty, research scientists, post-doctoral fellows, and graduate students;
- Two well-attended Epi on the Island courses on Network Analysis and Diagnostic Test Evaluation with an emphasis on Latent Class Analysis;
- Awards of recognition for Drs. Ian Dohoo, Henrik Stryhn, and Dan Hurnik;
- Dr. Sophie St. Hilaire became a faculty member at Atlantic Veterinary College (AVC) within the CVVER group. Her research focus in sustainable aquaculture;
- Numerous visiting scientists and invited guests who enhanced the educational experience of our graduate students and post-doctoral fellows.



More details on these highlights follow and I am proud to say that we continue to be among the best and most successful Veterinary Epidemiology programs worldwide.

Finally, August 2012 marked the end of the "Ian Dohoo era" after an illustrious 25-year career as a faculty member and a long legacy of achievements in veterinary epidemiology. Ian continues to be a Professor Emeritus at AVC sharing his time between his PEI home and distant sites in New Zealand and elsewhere around the globe. We all wish Ian and his wife Sue, long, joyous and healthy retirements and hope they will continue to share their global experiences with us and enrich our lives.

2. CANADA EXCELLENCE RESEARCH CHAIR (CERC) - AQUATIC EPIDEMIOLOGY



Canada Excellence
Research Chairs
Chaires d'excellence
en recherche du Canada

The goal of the CERC program is to make UPEI and Canada the global leaders in applied aquatic epidemiology research with an ecosystem health focus. The CERC team is multidisciplinary and includes epidemiologists; statisticians; finfish, and shellfish clinicians; ecosystem health and regulatory veterinary medicine specialists whose work focuses on holistic approaches to assist the Canadian and international aquaculture industries improve their productivity, sustainability, and health management.

Highlights for the year:

CERC funded *Short Term Research Placement* and *Early Career Development grants* were awarded in 2012 to support the early career development of researchers and aquatic medicine training within the context of the CERC vision: to address gaps in knowledge on the dynamics between aquatic ecosystem health and health management of farmed aquatic animals in Canada and around the world.

Short Term Research Placements: A dedicated stream of CERC funding was made available to assist CERC post-doctoral researchers and graduate students at the AVC, in the form of a Short Term Research Placement Grant. The purpose of the grant was to fund short-term research opportunities at institutions external to AVC. Grant recipients were afforded the opportunity to seek out a position to spend 1 to 3 months contributing to research projects at external academic and government institutions, or with private industry. As a result of a competitive application process, one CERC research scientist was awarded a short term research placement in 2012.

Early Career Development Grants: CERC funding was available in 2012 to assist the early career development of CERC post-doctoral researchers and graduate students, and veterinary students at the AVC, in the form of an Early Career Development Grant. Through a competitive process, candidates were selected to receive the awards to participate in a range of activities such as: 1) participation at a conference or a research workshop; 2) taking a course by correspondence or at an institution external to AVC that is not offered at AVC; 3) hosting a specialist to visit AVC to provide research training (i.e., workshop); or 4) obtaining aquatic medicine training, where the training experience is unique and not available at AVC. A call for applications was issued to both categories of students. Grants were awarded to 2 undergraduate students in the DVM program at AVC, and 4 awards were given to CERC post-doctoral researchers and graduate students.

CERC Research Seed Grants Program: A call for proposals was made in March 2012 inviting applications under the CERC Seed Grants Program, to fund scientifically-valid epidemiologic projects involving aquatic food animals that align with CERC goals and were stakeholder

relevant. Faculty Members (tenure track or with a minimum of a 2 year contract appointment) within Atlantic Veterinary College were eligible to apply as the Principal Investigator on a proposal. Phase I consisted of the submission of an abstract, or mini-proposal. A panel consisting of internal and external reviewers was assembled, with the resulting recommendations communicated to the applicants. The majority of the applicants were invited to submit full proposals for the Phase II review. A total of ten seed grants were awarded, totalling approximately \$200,000.00. Work on these projects is ongoing.

New Staff Members: In the fall of 2012, Dr. Kehar Singh joined the CERC team as a Research Scientist -Agricultural/Environmental Economist. The focus of Dr. Singh's position will be economic issues related to aquaculture and its sustainability. Dr. Singh joined the CERC team after working as a Post-Doctoral Research Associate (Aquaculture Economics and Marketing) at the Aquaculture/Fisheries Center of the University of Arkansas at Pine Bluff. He has a PhD degree in Agricultural Economics, and working experience (post Ph.D.) of four years as Research Associate and of six years as Assistant Professor (Aquaculture/Fisheries Economics).

Graduate Students: Throughout 2012, the CERC program continued to support three graduate students; two international, Jia Beibei from China and Gabriel Arriagada from Chile, and one domestic student, Amanda Borchardt.

Visiting Fellow: In 2012, the CERC team hosted Lori Gustafson, DVM PhD, from the United States Department of Agriculture (USDA) Animal and Plant Health Inspection Service (APHIS) Veterinary Services (VS) National Surveillance Unit (NSU) Centers for Epidemiology and Animal Health (CEAH). Dr. Gustafson spent one month at AVC as a visiting fellow working to further collaboration in aquatic animal health and surveillance issues of bilateral concern between the US and Canada.

Specific objectives for this collaboration included the completion of a joint review of Bayesian techniques to credit population context in surveillance, and initiation of a spatial analysis to evaluate hydrographic impacts on disease spread in neighboring regions. Products will help to support continued aquatic animal trade under Canada's new aquatic animal import regulations; and help to elucidate the significance of non-virulent forms of ISA virus to population health, an issue of current relevance on both coasts. This collaboration also laid the groundwork for ongoing partnerships between US and Canadian centers of animal health and surveillance in the future.

For enquiries about graduate study or visiting fellows opportunities in the CERC program, please contact Ian Gardner, phone: 902-620-5059; fax: 902-620-5053; email: iagardner@upe.ca.



3. PARTNERS

3.1 CENTRE FOR AQUATIC HEALTH SCIENCES (CAHS)

The Centre for Aquatic Health Sciences at the Atlantic Veterinary College provides expertise in finfish health research initially funded by the Atlantic Innovation Fund and research partners including several fish farming companies, provincial and federal government departments, and the supporting industries (private aquaculture veterinarians, pharmaceutical companies, vaccine companies, feed companies, etc.).

The group continues to work in New Brunswick (NB) and Newfoundland and Labrador (NL), engaged in Pan-Atlantic clinical trials for vaccines, field trials for sea lice treatments, as well as a field data study to identify risk factors associated with disease occurrence, specifically Bacterial Kidney Disease (BKD) and Infectious Salmon Anemia (ISA). The retrospective analysis of farm production and health records was initiated in the fall 2012 and will focus on surveillance, risk factors, and control of BKD and ISA across the Atlantic Canada region over the past 5-7 years.



The field trials of commercial vaccines under Newfoundland and Labrador production conditions began in early 2012. Our group implanted passive integrated transponder (PIT) tags in 6,000 Atlantic salmon in a NB hatchery and 6,000 rainbow trout (RBT) in a Prince Edward Island (PEI) hatchery, both destined for marine sites in NL. In March 2012, these study fish were randomized to 4 different vaccines (including a vaccine for BKD). These study fish were transferred to NL marine sites in spring-summer 2012 where they are monitored by our group in collaboration with NL Department of Fisheries and Aquaculture (DFA). The salmon study population was ended early by a site mortality issue (an unrelated event at the site). The RBT study population is doing well in marine conditions and currently being readied for its final season. Further populations have been identified with the NLDFA and industry partners in NL for early 2013 initiation and 2014 follow-up.

The CAHS-developed Decision Support System (DSS) used to monitor fish health and sea lice pest management programs in the Bay of Fundy reached its full deployment milestone with the completion of its implementation to the Atlantic Canada Fish Farmers Association and NB Producers. DSS Version 1 has now been fully adopted in the production setting in NB. Researchers are working on Version 2 with enhanced geographic information system (GIS) capabilities, upgrades to supporting software and the integration of aquaculture production sites in Newfoundland and Labrador. These capabilities support the CAHS mission of providing sound science to inform fish health policy decisions based on near real-



time inputs. It is anticipated that the upgraded platform will provide decision support across a spectrum of fish health management activities for the finfish aquaculture industry throughout Atlantic Canada by the end of 2014.

The Integrated Sea Lice Monitoring Project in NB has completed its 4th year of study. The assessment of sea lice (an external crustacean parasite of Atlantic salmon) trends across the New Brunswick aquaculture industry and the effectiveness of chemical bath and alternative treatment options is on-going. Monitoring the effectiveness trends for bath and in-feed treatments is an important function within the DSS platform and provides important evidence to support decisions on emergency release and eventual registration of chemo-therapeutic and pesticide products for use in the aquaculture industry. They also contribute to the detection of sub-optimal conditions leading to further sea lice burdens at a site or area level.

CAHS continued its program of audits of sea lice prevalence at active finfish production sites for the Government of NB in 2012. Results were similar to the 2011 findings, with producers continuing to demonstrate significant commitment to self-management and accurate sea lice reporting. Expansion of the program to NL is being planned based on an initial assessment of auditing needs performed in late 2012.

World Organisation for Animal Health (OIE) Collaborating Centre in Aquatic Epidemiology and Risk Assessment of Aquatic Animal Diseases (ERAAAD)

Drs. Hammell and Gardner participated in the Asia-Pacific Emergency Regional Consultation on Shrimp Early Mortality Syndrome (EMS) in Bangkok, Thailand, in August 2012. This was an important scientific meeting to outline the diagnostic and control plans for an economically impactful condition affecting multiple shrimp producing countries in Asia. EMS was used as a primary example when ERAAAD organized and presented an epidemiology workshop for the OIE National Focal Points Meeting for Aquatic Animals also held in Bangkok in October 2012. ERAAAD continues to develop scientific collaboration with Thailand and Vietnam to provide epidemiology expertise and training.

Dr. Gardner visited China to discuss aquatic epidemiology training programs for veterinarians and extension specialists. As well, our group is formulating proposals with our Norwegian Veterinary Institute partners to further our collaboration and the possibility of a twinning project with Rhodes University in South Africa. Extensive work continues between AVC epidemiologists and Chilean salmon industry. Lastly, Dr. Gardner participated in a meeting of the OIE *ad hoc* group on Validation of Diagnostic Tests, while Dr. Hammell participated in meetings for each of the OIE *ad hoc* groups on Aquatic Animal Health Surveillance and Aquatic Pathogen Differentiation.

3.2 MARITIME QUALITY MILK (MQM)



Maritime Quality Milk (MQM) is a research and service program at the Atlantic Veterinary College, located at the University of Prince Edward Island in Charlottetown. MQM focuses on milk quality and Johne's disease research, the primary health priorities of the Dairy Farmers of Canada. By integrating research and service capacity, MQM has become one of the leading dairy health centers in Canada.

In addition to farm-focused research activity, MQM develops and evaluates new animal health technologies and offers productivity and disease surveillance services to the industry. Access to these services improves raw milk quality at the farm gate and decreases health costs. In 2012, the group continued to work in two primary areas: Johne's disease, and mastitis and milk quality.

Dr. Carrie Lavers is working on herd level diagnosis for diagnostics for Johne's disease. Dr. Emilie Lauren is working on cow level diagnosis. Dr. Karen MacDonald-Phillips is evaluating the Atlantic Johne's Disease Initiative (ADJI), with 650 herds in Atlantic Canada.

On mastitis and milk quality, Dr. Marguerite Cameron is finishing her work on selective dry cow therapy programs. Dr. Kim MacDonald has worked on evaluating milk iodine levels and associated risk factors, as well as mapping milk iodine levels across Canada (13,000 herds), with Dr. Javier Sanchez. Dr. Julian Reyes is working on *Streptococcus agalactiae* programs in Colombia. Dr. Ahmed Elmoslemany has completed work on redesigning regulatory programs for milk quality, and that is being looked at as a model across Canada.

MQM has a project being conducted by Dr. Ibrahim Elsohaby in infrared evaluation of immunoglobulins. Dr. Omid Nekouei is working on a project in bovine leucosis, using previously gathered data, and will begin work in the new year on a prospective study on bovine leucosis.



There are four major projects on the horizon for MQM that they will partner in as per their involvement in the Dairy Cluster 2, a national program from Dairy Farmers of Canada. They will engage in several mastitis-associated projects, including one that they will lead here on coagulase negative staph diagnostics. They are involved with a Johne's project in Calgary with Dr. Herman Barkema, a cow comfort project with Agriculture and Agri-food Canada in British Columbia, and a national disease bench-marking study (similar to the USDA NAHMS program) being led out of Guelph.

3.3 THE CANADIAN REGULATORY VETERINARY EPIDEMIOLOGY NETWORK (CRVE-NET)



The Canadian Regulatory Veterinary Epidemiology Network (CRVE-Net) links Canada's five veterinary schools and contributes to the development of research and training programs at the universities. It is led by the Centre for Veterinary Epidemiological Research at the Atlantic Veterinary College, which is considered one of the leading centres for animal health epidemiological research in the world.

CRVE-Net has received funding for a one year extension (April 1, 2012 to March 31, 2013). The network implemented an Expert Advisory Committee in Aquatic Animal Health (EACAAH) and an Expert Advisory Committee in Terrestrial Animal Health (EACTAH), at the request of our funder, The Canadian Food Inspection Agency (CFIA). Both groups are developing terms of reference documents for approval by CFIA.

Last year, three candidates were selected by the Chinese Agricultural University (CAU) to participate in epidemiological training at AVC. Two of the candidates did not pass the Test Of English as a Foreign Language (TOEFL) exam; the third accepted a position at another Canadian university. It is possible that CAU will fund one of the candidates next year. CRVE-Net will continue to work on the development of this partnership.

In September 2010 CRVE-Net, under the leadership of Dr. Javier Sanchez, designed a graduate course in quantitative risk analysis. A course proposal was developed and accepted by the Department of Health Management at the Atlantic Veterinary College (AVC), University of Prince Edward Island (UPEI), Charlottetown, PE. The initial offering of the course was offered in the winter of 2012 as a semester-long course (6hrs/week) for 14 weeks. It covered the basic models and approaches to develop a quantitative risk model applied to animal and human health risks. It will also introduce the participants to more advanced methodologies such as Bayesian analysis and Multi-Criteria decision support tools. This course is being converted into an online course, most of the material has been put in that format and it is expected to offer this course in the fall of 2013.

The following projects funded through CRVE-Net and partners have been completed or are underway:

- Syndromic surveillance using laboratory submission request – Dr. Fernanda Dorea
- Risk prioritization of zoonotic diseases due to climate change – Dr. Ruth Cox, PostDoc
- Zoonotic disease modelling – Dr. Sithar Dorjee, PhD student
- Disease transmission of PRRS – Dr. Krishna Thakur, PhD student
- Risk pathway analysis – Bioweapons - Dr. Lauren Howard – MSc student

3.4 SIR JAMES DUNN ANIMAL WELFARE CENTRE (SJDAWC)



The Sir James Dunn Animal Welfare Centre (SJDAWC) at the Atlantic Veterinary College promotes animal welfare through research, service, and education.

SJDAWC animal welfare meetings at AVC:

- (with AVC Animal Welfare Club) Co-hosted the 8th annual Animal Welfare in Practice conference, on Poultry Welfare in September. Topics included welfare issues affecting laying hens and broiler chickens, challenges of alternative housing, and what science can tell us about feelings and emotions in chickens (keynote speaker Dr. Ian Duncan, Professor Emeritus and Emeritus Chair of Animal Welfare, University of Guelph).
- (with CVER, AVC Animal Welfare Club, and PEIHS) Co-hosted a presentation “Problems and Solutions for Free-roaming Cats” in March by Dr. Margaret Slater, Senior Director of Veterinary Epidemiology at the American Society for the Prevention of Cruelty to Animals.
- (with AVC Animal Welfare Club) Co-hosted presentations by members of the National Farm Animal Care Council (NFACC) Sheep Code Development Committee on sheep and animal welfare in October.

Educational highlights:

- AVC student team placed second in the veterinary division of the 12th annual intercollegiate Animal Welfare Judging and Assessment Contest, in Guelph, Ontario.
- A new first year course in animal welfare and a new fourth year course in animal welfare assessment and regulation were offered.

Graduate student highlights: Ketan Dulal MSc started his graduate program funded by the SJDAWC and the Canadian Poultry Research Council on “Identification of risk factors during broiler transportation that influence injury and mortality” with Drs. Cockram and Revie. Cyril Roy gave presentations on his graduate work on horse transportation at the Animal Transportation Association Conference, Vancouver. Niamh Caffrey gave presentations on her graduate work on animal transportation at the Animal Welfare in Practice conference on Poultry Welfare and at the Dairy Cattle Welfare Symposium, Guelph, Ontario. Jackie Ellis gave a presentation on her graduate work on the welfare of cats at the International Society for Applied Ethology, Vienna, Austria and won the Gold Award for Animal Health Research for her presentation at the AVC Annual Graduate Studies and Research Day.



Other activities: Dr. Cockram presented the Bangladesh Society for Veterinary Education and Research Annual Lecture to the BSVER Annual Scientific Conference, Mymensingh, Bangladesh on approaches to animal welfare, chaired the NFACC Sheep

Welfare Code Scientists Committee, and participated in the NFACC Code Development Committees for sheep and equines.

Three research projects were funded through the SJDAWC in 2012, and funding was renewed for four existing service projects. Please see www.upei.ca/awc for more information about these projects and other SJDAWC initiatives, including our semi-annual newsletter.

3.5 SHELLFISH RESEARCH GROUP

In 2012, the Shellfish Research Group initiated a number of new research projects. CERC provided funding for the following projects; 'evaluation of relay stations for reducing Norovirus and male-specific coliphage in oysters grown in Prince Edward Island' led by Dr. Sophie St-Hilaire, 'characterization of shellfish movements in Prince Edward Island for risk simulation models' led by Dr. Javier Sanchez and 'animals, water and public health in Vietnam' led by Dr. David Hall, University of Calgary and Dr. Jeff Davidson. Innovation PEI funded a pilot project on the control of the invasive green crab with Drs. Sophie St-Hilaire, Mary McNiven, Pedro Quijon and Jeffrey Davidson, and the PEI Aquaculture and Fisheries Research Initiative funded a project on evaluating oyster production in the Hillsborough River with the PEI Shellfish Association and AVC.

Dr. Davidson continues to participate in a research project in partnership with health management officials in South and Southeast Asia with a goal of building the capacity for research and practice in ecosystem approaches to health in Southeast Asia. The hypothesis for this project is that bringing individuals together from different countries and institutions with an array of experience and expertise in the prevention of emerging infectious diseases (EIDs), public health, and health promotion will enable participants to investigate and respond more effectively to complex ecosystem health issues, with a particular focus on EIDs.



Dr. St-Hilaire is involved in several salmonid disease projects in Chile and in Canada. She is working with with Drs. Gabriel Arriagada, Eva Jakob, and Erin Rees, investigating the control of sea lice and Piscirickettsiosis. Both these project are evaluating the effect of area management plans for infectious diseases in salt water net-pen sites. In 2012, Dr. St-Hilaire also contributed to the Department of Fisheries and Oceans Sea lice monitoring and non-chemical measures CSAS review process. Further, she is working on a CERC funded project with Dr. LeeAnn Pack to evaluate the use of ultrasound to detect "soft flesh" in Atlantic salmon in British Columbia.

3.6 PARTNERS OUTSIDE AVC



VETERINARIANS
WITHOUT BORDERS



VÉTÉRINAIRES
SANS FRONTIÈRES

Dr. John VanLeeuwen, Professor of Ruminant Health Management and Epidemiology at the AVC, has been working extensively with Kenyan dairy farmers, Veterinarians without Borders/Vétérinaires sans Frontières – Canada (VWB/VSF), and Farmers Helping Farmers (FHF)—a PEI-based non-governmental organization—for some time now, and 2012 was another busy and active year for the Kenyan Smallholder Dairy Program.

In January, John and three AVC students—Marissa Steinberg (Arizona, Ontario, PEI), Melanie Mallet (New Brunswick), and Russ Campbell (PEI)—worked with Kenyan veterinarians, animal health technicians, and smallholder dairy farmers. In partnership with Farmers Helping Farmers and the Faculty of Veterinary Medicine at the University of Nairobi (FVM-UoN)—5 Kenyan veterinary students joined them—they provided veterinary medicine services and extension to improve the health and productivity of dairy cattle on poor subsistence dairy farms. This was the 9th year that this course in International Dairy Health Management was offered. Support for this project came from the American Association of Bovine Practitioners, FHF, AVC, FVMUoN, and private donations from Atlantic Canadian vets and businesses, and Canadian pharmaceutical companies including Boehringer-Ingelheim, Merck, Merial, Pfizer, and Vetoquinol.



In May-August, Dr. VanLeeuwen, Dr. Kim Critchley (UPEI Dean of Nursing), Dr. Jennifer Taylor (Applied Human Sciences) and Colleen Walton (Department of Health Management PhD candidate) participated in a multidisciplinary team (veterinary, nursing and nutrition) of UPEI faculty and undergraduate students to assist Kenyan universities and smallholder farmers in understanding the intertwined factors



associated with various levels of health and nutrition of cattle and humans. Specifically, John's cattle nutrition pilot project got underway, with field data collection by Dr. Jeff Wichtel (co-investigator) and 2 veterinary students (Jen Huizen of AVC, and Morgan Findlay of Western College of Veterinary Medicine in Saskatoon). Support for this project was from Veterinarians without Borders-Canada, FHF and AVC.

In June and July, John and Charlene VanLeeuwen (Applied Human Sciences) hosted a professor in family sciences from Kenyatta University (KU) for continuing education, and to develop a proposal to enhance the family science program at KU through faculty development, which will then embark on the piloting of senior student attachments that will give the undergraduate students applied

field training to gain experience providing support for farm families in various forms of financial, emotional or psychological crisis.

In December, another one of John's graduate students, Colleen Walton, successfully defended her PhD thesis, investigating sustainable livelihoods and food and nutrition security of Kenyan smallholder dairy farm women. Support for this project was from the FHF, AVC, Vets without Borders-Canada, and the XIII World Veterinary Congress Foundation. This leaves 3 graduate students working on research projects in Kenya, looking at dairy cow feeding (Shauna Richards), dairy calf nutrition (Sylvia Nafule), and prevalence and risk factors of pregnancy loss in dairy cows (Abuom Tequero).

John continues to publish peer-reviewed journal articles on his research in Kenya, including investigations into the prevalence, diagnosis, risk factors and treatment of mastitis and gastrointestinal parasites in Kenyan smallholder dairy farms, the impacts of biogas digesters on the sustainable livelihoods and health of Kenya farm women, and sustainable livelihoods and food and nutrition security of Kenyan smallholder dairy farm women. He also "formalized" the work put into the many information factsheets that he has developed that are distributed to farmers and animal health workers in Kenya. This formalization took the form of a book of factsheets, organized within themes (health management, disease recognition, treatment, and prevention), with standardized format and structure. This book will be distributed to farmers attending seminars during his upcoming trip to Kenya in January 2013.



4. RESEARCH ACTIVITY

4.1 NEW FACULTY



In 2012, Dr. Sophie St-Hilaire joined UPEI as the Canada Research Chair in Integrated Health Research for Sustainable Aquaculture. Dr. St-Hilaire moves her research to the AVC from Idaho State University. Her research has taken her across the world, having studied aquaculture in Chile, Europe, and both coasts of North America. The Canada Research Chair in Integrated Health Research for Sustainable Aquaculture is funded by the Natural Sciences and Engineering Research Council (NSERC).

4.2 PUBLICATIONS

MICHAEL COCKRAM

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JETTE CHRISTENSEN

Christensen, J. A practical framework for conducting Foreign Animal Disease surveillance. *Preventive Veterinary Medicine* . volume 105, issue 4, 271-279.

JEFFREY DAVIDSON

Paetzold, S. C., Hill, J., & Davidson, J. (2012). Efficacy of high-pressure seawater spray against colonial tunicate fouling in mussel aquaculture: Inter-annual variation. *Aquatic Invasions*, 7(4), 555-566.

IAN DOHOO

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Ceballos-Márquez, A., Barkema, H. W., Stryhn, H., Dohoo, I. R., Keefe, G. P., & Wichtel, J. J. (2012). Bulk tank milk selenium and its association with milk production parameters in Canadian dairy herds. *Canadian Veterinary Journal*, 53(1), 51-56.

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Reyher, K. K., Dohoo, I. R., Scholl, D. T., & Keefe, G. P. (2012). Evaluation of minor pathogen intramammary infection, susceptibility parameters, and somatic cell counts on the development of new intramammary infections with major mastitis pathogens. *Journal of Dairy Science*, 95(7), 3766-3780.

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LARRY HAMMELL

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5. AWARDS AND RECOGNITION

In May 2012, **Dr. Ian Dohoo** was named *Professor Emeritus* of Epidemiology. As immediate past-Director of the Centre for Veterinary Epidemiological Research, Dr. Dohoo retired in August 2012 after an illustrious 25-year career in AVC's Department of Health Management. A highly respected teacher and researcher, Dr. Dohoo joined the College in 1985 as one of five founding faculty members.



In 2012, **Dr. Ian Dohoo** was honored with an honorary Doctor of Science by the University of Guelph, his alma mater. He was also presented with the Calvin W. Schwabe Award for Lifetime Achievement by the Association for Veterinary Epidemiology and Preventive Medicine. Dr. Dohoo was also the 2012 recipient of the Prince Edward Island Veterinary Medical Association Leadership Award.

Drs. Ian Dohoo, Henrik Stryhn (Associate Professor of Biostatistics at AVC) **and Wayne Martin** (Professor Emeritus of Epidemiology, University of Guelph), were successful in publishing a new textbook in 2012. *Methods in Epidemiologic Research* is essentially the same as *Veterinary Epidemiologic Research* but deals with epidemiology—the study of disease within a population—from a human rather than a veterinary perspective. The authors also saw a Chinese edition of their leading graduate level text in the field *Veterinary Epidemiologic Research*, released.



In August, **Drs. Sophie St-Hilaire, Jeff Davidson, Mary McNiven and Pedro Quijon** were awarded funding by Innovation P.E.I. to support the early stage academic and industry research that will lead to the commercialization of new products or services in the sectors of bioscience, information technology, renewable energy or aerospace. Their project will explore the European green crab as a feed ingredient for the aquaculture industry so a fishery can be proposed for this nuisance species.

Dr. Dan Hurnik, chair of the Department of Health Management at the Atlantic Veterinary College, was named the 2012 recipient of the Carl Block Award, an important national award from the Canadian Animal Health Coalition (CAHC). A key founder of the Canadian Swine Health Board (CSHB), and the Atlantic Swine Research Partnership (ASRP) Dr. Hurnik has, through his hard work and dedication, made many significant contributions to the Canadian swine industry and to veterinary medicine around the world.



6. GRADUATE PROGRAM HIGHLIGHTS

A new graduate student award, *The Dr. Ian R. Dohoo Award at AVC*, was established in 2012, to honor Dr. Dohoo as he retired. The award, valued at \$2,000, will be given to a graduate student registered at AVC in the specialization of epidemiology/health management, to support travel for presentation of the recipient's own scholarly work at a national or international conference. The first presentation of the award will be in the spring of 2013.

PhD Student **Julian Reyes** received a 2012 Innovation PEI PhD scholarship. His project is entitled "*Molecular epidemiology of Streptococcus agalactiae strains isolated from dairy herds in 7 municipalities of Antioquia, Columbia*".

MSc student **Omid Nekouei** is the 2012 recipient of the Dr. Regis Duffy Graduate Scholarships in Science. His project is entitled "*Study of risk factors and impact of infection with bovine Leukemia virus in Canadian dairy herds*".

CVER has 25 graduate students; 9 enrolled in MSc Programs and 16 working towards their PhDs. Additionally, CVER has 7 active post doctoral fellows and 2 research scientists.

In 2012, five graduate students successfully defended their PhDs, and one completed her MSc:

Dr. E. Annie Tasony-Wagener completed her PhD under the supervision of Dr. Ian Dohoo. Her thesis was titled "Evaluation of Antigen Detection Assays for the Avian Influenza Virus."

Dr. Kristen Reyher completed her PhD under the supervision of Dr. Ian Dohoo. Her thesis title was "Factors Affecting Incidence Of New Intramammary Infections At The Quarter And Cow Levels In Canadian Dairy Cows."

Dr. Colleen Walton completed her thesis work under the supervision of Dr. John VanLeeuwen. Her thesis project was entitled "Evaluation of the impact of dairy group membership, with animal health interventions and nutrition seminars, on Kenyan farm family quality of life & diet."

Dr. Peter Sykes completed his PhD, co-supervised by Drs. Larry Hammell and Carol McClure. His thesis title was "Health and Productivity Monitoring of Cage-Cultured Atlantic Halibut *Hippoglossus hippoglossus*"

Dr. Nicole O'Brien completed her PhD under the supervision of Drs. Larry Hammell and Henrik Stryhn. Her thesis title was "Evidence-Based Veterinary Medicine in Finfish Aquaculture in Newfoundland and Labrador."

Dr. Patti Jones completed her MSc, under the supervision of Drs. Larry Hammell and Crawford Revie. Her thesis title was Monitoring Effectiveness of Emamectin Benzoate for the Treatment of Sea Lice *Lepeophtheirus salmonis* on Farmed Atlantic Salmon *Salmo salar*.

7. OUTREACH

EPI ON THE ISLAND

CVER hosted its annual 2-part ***Epi on the Island*** course at the AVC in June 2012. This ever-popular, annual, 2-part course provides instruction in advanced methods in veterinary epidemiology.

Module 1, a *Network Analysis* course, was held June 20–22, 2012. Course instructors were Caroline Dubé, DMV MS, PhD, Veterinary Epidemiologist and Scientific Advisor, Animal Health Risk Assessment Unit, Canadian Food Inspection Agency, Montreal, Canada, and Caryl Lockhart, DMV, MSc, PhD, FAO/GLEWS, Veterinary Epidemiologist (Spatial and Network analyses) Animal Production and Health Division, Food and Agriculture Organization of the United Nations (FAO), Rome, Italy. Local assistance was provided by Javier Sanchez, DVM, PhD, CFIA Research Chair - Risk Analysis, Canadian Regulatory Veterinary Epidemiology Network, Atlantic Veterinary College.



The 3-day course was designed to provide participants with a practical guide to conducting basic of Social Network analyses in Veterinary Medicine using UCINET. The goal of the course was to have participants develop a set of skills to design/conduct Network analyses studies, and to manipulate and describe the data gathered. Participants were provided with basic concepts of Network theory, examples of networks and descriptive measures of networks and interpretation.

The course focused on the practical aspects of network data management, and network data visualization using UCINET, and R.

Module 2, *Diagnostic Test Evaluation*, with Emphasis on Latent Class Analysis, was instructed by Nils Toft, MSc, PhD, Professor in Quantitative Epidemiological Decision Support, Department of Large Animal Sciences, University of Copenhagen, from June 25–28, 2012.

The course covered the epidemiological aspects of diagnostic test evaluation studies – from the technical aspects of planning, conducting and subsequently analyzing data from such studies, to the underlying assumptions regarding disease definitions, test characteristics and the implications of using a perfect reference tests vs. a latent class approach. The design and analysis of latent class models for test evaluation without a perfect reference test (i.e. a 'gold' standard) was the main focus of the course. The participants were introduced to Latent Class Analysis (LCA) in a Bayesian framework using OpenBUGS. Through a mixture of lectures/discussion of the theory and biological implications and exercises/tutorial based on published examples, the course participants were exposed to the necessary concepts and ideas of LCA, and gained working skills in using OpenBUGS

and the presented examples to explore the possibilities of diagnostic test evaluation using LCA methods. The course presented models at population and individual based levels, including models that include covariates affecting the test characteristics. Also models where the primary purpose is not test evaluation were presented and discussed.

The courses attracted participants from the Canadian Veterinary Schools, Australia and the Netherlands.

ISVEE XIII

A group of 13 CVER members travelled to the **13th Conference of the International Society for Veterinary Epidemiology and Economics** (ISVEE XIII), in the city of Maastricht. Drs. Ian Dohoo and Henrik Stryhn delivered pre-ISVEE courses in Introductory and Advanced Multilevel Modelling. CVER Members delivered Oral and Poster Presentations during the conference.

CVER PhD Students Drs. Sithar Dorjee & Thitiwan "Poo" Patanasatienkul, were selected as two of the 20 candidates who received an ISVEE bursary. Dr. Dorjee delivered three poster presentations, and Dr. Patanasatienkul delivered one oral presentation during the conference.



Oral Presentations:

- ❖ "A Mathematical Model for Evaluating Mitigation Strategies of Biofouling *Ciona intestinalis* in Prince Edward Island, Canada" – Thitiwan Patanasatienkul
- ❖ "The use of the bibliometric H-index to quantify pathogen impact in North America" - Ruth Cox
- ❖ "Risk factors for culling and death in New Zealand dairy cows, 2000-2011" – Arata Hidano
- ❖ "Syndromic Surveillance based on laboratory test requests in the province of Ontario, Canada" - Fernanda Dorea

Poster Presentations:

- ❖ "Prevalence and control of Bovine Viral Diarrhea in two large industrial dairies around Tehran-Iran" – Omid Nekouei
- ❖ "One-Health Modeling of Pandemic Influenza in Human and Swine Populations" – Sithar Dorjee
- ❖ "Characteristics of swine shipments in southwestern Ontario, Canada" – Sithar Dorjee
- ❖ "Analysis and characterization of swine movement in four Canadian provinces" - Krishna Thakur

- ❖ "Modelling the effectiveness of cleaner fish for the biological control of sea lice in farmed salmon" - Ruth Cox
- ❖ "How do we set the probability of introduction in a scenario tree model to demonstrate freedom from disease?" - Jette Christensen¹, Henrik Stryhn², Raphael Vanderstichel²; ¹ Canadian Food Inspection Agency, Charlottetown, Prince Edward Island, Canada; ² Centre for Veterinary Epidemiological Research, University of Prince Edward Island, Canada
- ❖ "Capture-recapture methods to estimate commercial turkey farm population in Canada" - Farouk El Allaki^{1a}, Jette Christensen^{1b}, and André Vallières^{1a}; ¹Canadian Food Inspection Agency, ^aSt-Hyacinthe, ^bCharlottetown, Canada
- ❖ "Standards for reporting surveillance information in freedom from infection modeling by example of *T. spiralis* in Canadian swine" - Raphael Vanderstichel, Jette Christensen, Henrik Stryhn, Daniel Hurnik
- ❖ "A nomogram to calculate output estimates from surveillance models used to confirm freedom from infection" - Raphael Vanderstichel, Charles Caraguel
- ❖ "Fractional polynomial for modeling continuous predictors" - Ian Dohoo, Raphael Vanderstichel, Liza Nielsen, Henrik Stryhn

8. SPECIAL GUESTS

In March, the CVER group was pleased to host **Dr. Margaret Slater**, Senior Director of Veterinary Epidemiology, ASPCA. as she offered a presentation entitled "Doing research in the real world on cat socialization, people and shelters: some methodological issues". Dr. Slater joined the ASPCA in 2008 and currently provides epidemiological and statistical support for staff across the ASPCA, with emphasis on animal shelter focused research.



In March 2012, CVER members hosted a coffee social with special guest **Dr. Alaa Abd-El-Aziz** President and Vice-Chancellor, University of Prince Edward Island. A number of CVER members delivered brief presentations on the various international research and capacity building activities that they are actively engaged in. Presentations were made by Dr. John VanLeeuwen (Kenya); Dr. Greg Keefe (Columbia); Dr. Javier Sanchez (South America); Dr. Ian Dohoo

(China); Dr. Larry Hammell (ERAAAD, Vietnam, South America); Dr. Sophie St. Hilaire (Chile); Dr. Jeff Davidson (Thailand, SE Asia). A number of these presentations were recorded and available for viewing on the UPEI website.

In April, the CVER group hosted **Dr. Roy P. E. Yanong**, VMD, Associate Professor, Extension Veterinarian, Tropical Aquaculture Laboratory University of Florida, for a presentation at AVC. Dr. Yanong provided an overview of Florida's industry, highlighting some of the fascinating challenges in production and health, in his presentation entitled: "Florida's Aquarium Fish Industry: A Steamy Look at Production and Health in the South".



Dr. Theresa Bernardo, AVC's first graduate student, was presented with a 2012 UPEI Distinguished Alumni Award at a ceremony on March 28, 2012. The Distinguished Alumni Awards are the highest honour presented by the Alumni Association and are presented annually to graduates who have made an outstanding contribution to knowledge, the arts, the community, to the University, or have made a special contribution to an area of service to humanity.



An epidemiologist and veterinarian, Dr. Bernardo also gave a presentation entitled "Collaborating to Confront Complex Challenges". Under the leadership of her supervisor, Dr. Ian Dohoo, past Director of AVC's Centre for Veterinary Epidemiological Research, Theresa gained a solid foundation in epidemiology and an introduction to the international network of veterinary epidemiologists. "AVC had a pivotal impact on my career," says Dr. Bernardo

whose graduate work at AVC has enabled her to make a difference in global health. Dr. Bernardo is currently Associate Professor of Epidemiology and Health Informatics at Michigan State University's College of Veterinary Medicine. She was the founding Director of the Information Technology Center at MSU's College of Veterinary Medicine and recently started One Health Knowledge Initiatives.