



Centre for Veterinary Epidemiological Research
ATLANTIC VETERINARY COLLEGE *at the* UNIVERSITY OF PRINCE EDWARD ISLAND



ANNUAL REPORT | 2009



CVER Annual Report 2009

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Message from the Director



Thanks to the hard work of our members and the support of our partners, the Centre for Veterinary Epidemiological Research (CVER) demonstrated unprecedented growth and success in 2009.

This report outlines the key activities of CVER, as well as events and success stories from the past year. I believe you will agree that the year has been an unqualified success for CVER and its many committed partners.

In 2009, CVER:

- welcomed three externally funded research chairs;
- was invited to the final round of the nation's most prestigious research chair competition;
- launched the Canadian Regulatory Veterinary Epidemiology Network (CRVE-Net) in partnership with CFIA;
- continued to bring in substantial research funding and demonstrate ongoing productivity through research publications; and
- carried out various major outreach activities ranging from Epi-on-the-Island to working on the development of an OIE Collaborating Centre.

The past year's results are very encouraging and they energize us to accomplish even more.

CVER is a highly collaborative umbrella organization that brings together researchers and research groups actively involved in population-based research. While the majority of the activities fall within AVC's Department of Health Management, membership in CVER includes professionals in other UPEI faculties (Nursing and Science) and external organizations (such as the PEI Department of Health, Canadian Food Inspection Agency, and Addictions Research Centre). The strength of CVER is in its members. We have grown to 21 Full and 25 Associate Members and we are now home to 29 graduate students. We would encourage you to visit our website (upei.ca/cver) to learn more about our members and their activities.

CVER's mission – "Healthy animal populations contributing to a healthy society" – is reflective of the Centre's core activities. Major groups within the Centre contributing to this mission include the Centre for Aquatic Health Sciences, Maritime Quality Milk, the Canadian Regulatory Veterinary Epidemiology Network, the Shellfish Research Group, and the Sir James Dunn Animal Welfare Centre. Brief reports from each of these groups follow within this document.

On behalf of CVER, I extend sincere thanks to all our members and partners. We look forward to working with you to further advance the health of our communities.

Sincerely yours,

Ian Dohoo

*Professor of Epidemiology and Director of the Centre for Veterinary Epidemiological Research,
Atlantic Veterinary College at the University of Prince Edward Island*

Partners

CENTRE FOR AQUATIC HEALTH SCIENCES (CAHS)



Salmon production facility, Bay of Fundy

For the Centre for Aquatic Health Sciences (CAHS), 2009 was an exciting year which, in addition to its prominent role in building the pool of funded chairs within CVER (see page 8), saw numerous proposed projects come to fruition. The year started with an announcement by the Atlantic Canada Opportunities Agency (ACOA) in January that CAHS would be awarded approximately \$2.5 million in funding from the Atlantic Innovation Fund (with a further \$2 million in matching funds from industry partners and regional provincial governments) over a five-year period. This funding supports the Healthy Fish, Healthy Environment, Healthy Food project. Work is well under way on this important project which aims to refine, apply, and commercialize evidence-based aquatic health medicine in aquaculture.

In May 2009, we celebrated the official opening of the new fish health laboratory in St. George, NB. With CAHS as the main driver of this initiative, the Atlantic Veterinary College at the University of Prince Edward Island partnered with the Province of New Brunswick to build a new \$2.36 million fish health laboratory. The new lab will provide the aquaculture industry with province-wide support for veterinary diagnostics, emergency response, and follow-up with respect to reportable diseases and proactive surveillance testing for potential pathogens in finfish and shellfish.

Throughout 2009, CAHS worked with provincial aquaculture veterinarians and industry participants in New Brunswick in their effort to evaluate the efficacy of available and emergency compounds for treating sea lice. Extensive field work and disease monitoring has generated critical information for industry management decisions. Internationally, Dr. Crawford Revie finalized a report on sea lice and Dr. Larry Hammell finalized a report on disease for World Wildlife Fund Salmon Aquaculture Dialogue, and Hammell was also a co-author of the *OIE Guide on Aquatic Animal Health Surveillance* released in late 2009.



Graduate students and staff collecting research data

MARITIME QUALITY MILK (MQM)



Maritime Quality Milk (MQM) had a banner year in 2009. In addition to receiving an externally funded research chair for Program Director Dr. Greg Keefe (see page 8), two of our graduate students, Drs. Kimberley MacDonald and Marguerite Cameron, received provincial graduate student fellowships to continue their work on farm-based diagnostics to target antimicrobial usage.

MQM scientists continue to be successful in research funding competitions. Among the recently successful projects is a study of milk quality in Colombia

targeting the contagious pathogen *Streptococcus agalactiae* and a Dairy Farmers of Canada/NSERC study on Johne's disease shedding patterns and diagnostics. MQM researchers and graduate students were featured speakers at national and international meetings such as the Canadian Dairy Network (Dr. Shawn McKenna: Johne's diagnostics), the Quebec Dairy Producers Federation (Dr. Kimberley MacDonald: on-farm diagnostics), and the National Mastitis Council meeting in Charlotte, North Carolina (Dr. Greg Keefe: measuring milk quality).

MQM continues to provide leadership and service for the regional industry and beyond. MQM's Graphical Analysis Program (found at milkquality.ca) for herd-level quality monitoring is in wide use in all three Maritime provinces. In December 2009, approximately 50 participants (producers, veterinarians, and industry service personnel) at an MQM-hosted workshop unanimously supported the efforts of MQM to work on the development of a Johne's disease control program for this region.

On the commercialization front, MQM (through a recently formed not-for-profit company) has developed and begun the marketing of a Mastitis Treatment Decision Kit. This kit, which enables dairy farmers to reduce antibiotic use by up to 40 per cent for mastitis treatment by targeting certain pathogens, is the first commercial product to come from the research of MQM for the Canadian Bovine Mastitis Research Network.

THE CANADIAN REGULATORY VETERINARY EPIDEMIOLOGY NETWORK (CRVE-NET)

CRVE-Net was launched in March 2009 with CVER taking the lead in its establishment. Working with colleagues in the Canadian Food Inspection Agency (CFIA), a Steering Committee (to oversee overall development) and a Network Committee (to oversee expansion of the Network to all Canadian veterinary colleges) have been established. The first order of business was to recruit and hire a CFIA-funded Chair in Regulatory Veterinary Epidemiology. Dr. Javier Sanchez joined AVC in this capacity in April of this year.



*Drs. Javier Sanchez and Don Reynolds
explore opportunities for research
linkages in China*

CRVE-Net activities over the past eight months have focused on:

- establishing the Network;
- making it known to the regulatory community across Canada;
- expanding it to incorporate all of Canada's veterinary colleges; and
- launching some initial projects to demonstrate the value of having a network such as this in place.

There is no doubt that there is a pressing need for research activities in the field of regulatory veterinary epidemiology. In a few short months, CRVE-Net has established partnerships with, and received funding from, the Society for Risk Analysis; the Public Health Agency of Canada (PHAC); the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA); the CFIA; and Agriteam Canada to initiate a variety of projects. These projects include evaluating the risk of re-emergence of infectious diseases associated with climate change, modelling of H1N1 transmission in both human and animal populations, and research placements for staff from the China Animal Health and Epidemiology Centre. Outlines of these projects can be found at upei.ca/cver/research.

SIR JAMES DUNN ANIMAL WELFARE CENTRE (SJDAWC)



The Sir James Dunn Animal Welfare Centre (SJDAWC) had a very successful year in 2009, including having their proposal to the Sir James Dunn Foundation accepted for continued financial support through to 2015. Dr. Alice Crook (SJDAWC Co-ordinator, pictured left) received the President's Award at the Canadian Veterinary Medical Association's (CVMA) AGM.

Three graduate students started their PhD programs at the SJDAWC. Two of these students, Rayappan Cyril Roy (a veterinarian from India) and Niamh Caffrey (a research scientist from Ireland), recently completed their MSc in Applied Animal Behaviour and Animal Welfare at the University of Edinburgh and have started research projects on animal transportation. These graduate projects, supervised by Drs. Michael Cockram (Sir James Dunn Chair in Animal Welfare) and Ian Dohoo, have animal welfare and epidemiological components.

Niamh Caffrey completed her MSc project at AVC in 2008 with supervision from the SJDAWC and CVER, and a publication from this work, entitled "Survey of euthanasia practices in animal shelters in Canada," has been accepted by the *Canadian Veterinary Journal*. Michael Cockram contributed a chapter on the relationships between animal health and animal welfare to the second edition of the textbook, *Animal Welfare*. He gave presentations on "Animal Welfare Regulation in Canada and the UK" at the ACVIM/CVMA conference in Montreal and on "Welfare implications of different culling methods for shooting red deer" at the ISAE Congress, in Cairns, Australia.

The SJDAWC hosted presentations by Dr. Temple Grandin on "Welfare Issues in Livestock Handling, Transport, and Slaughter" and by Ms. Erika Ritter on human-animal relationships. In addition, the Centre held its fifth annual Animal Welfare in Practice Conference entitled "Issues and Dilemmas." In 2009, under the leadership of Dr. Alice Crook, the SJDAWC and CVMA produced a poster on cosmetic surgery in dogs which is being distributed nationwide to small-animal and mixed practices, as well as the Canadian Federation of Humane Societies.

SHELLFISH RESEARCH GROUP

Under the leadership of Dr. Jeff Davidson (pictured right), the Shellfish Research Group's 2009 work focused on mitigation of invasive tunicate fouling on aquaculture gear. Studies included the efficacy of new treatments such as ultrasound and perforation against invasive tunicates, optimization of timing and frequency of pressure washing treatments against colonial tunicates, survival of tunicate colony fragments created during pressure washing treatment, and histopathological changes in tunicates caused by chemical treatments. In addition to detection and treatment of tunicates, the Shellfish Research Group also studies basic tunicate biology, ecology, life history, and ecosystem interactions, including potential predator-prey relationships.



Four graduate students are part of the Shellfish Research Group. Sarah Clark's PhD work focused on developing molecular assays to aid in the monitoring of invasive tunicates in our estuaries. These assays will be able to identify tunicates by species and life stage, and determine viability. As part of his MSc work, Louis Ferguson is evaluating the potential spread of an invasive tunicate in British Columbia via oyster aquaculture activities and how such spread could be prevented using air and freshwater exposure treatments. Denise Methe is studying farm management strategies to decrease the expression of disease in oysters. Thitiwan Patanasatienkul is beginning her PhD studying modelling methods in aquatic animal health.

PARTNERS OUTSIDE AVC

CVER serves as an umbrella organization for a wide range of people carrying out population-based research. These members come from other UPEI Departments (such as Nursing and Science) and non-UPEI institutions (including the PEI Department of Health, Addictions Research Foundation, and the Canadian Food Inspection Agency). It is difficult to summarize the full spectrum of research carried out by these partners; however, two examples are outlined below.



Professor Jo-Ann MacDonald (pictured left) is a faculty member in the UPEI School of Nursing. She is a public health specialist who teaches community health nursing and nursing fundamentals. As part of her PhD program, Professor MacDonald has taken bio-statistics and epidemiology courses offered by CVER faculty. Her program of research focuses on the prevention of sexually transmitted infections in vulnerable populations. Professor MacDonald is a co-investigator with a pan-Canadian team of researchers, supported by the CIHR Centres for Population Health and Health Services Research Development in HIV/AIDS Initiative. The team is developing a Centre for REACH (Research Evidence into Action for Community Health) in HIV/AIDS. Professor MacDonald is also a

member of the Atlantic Interdisciplinary Network (AIRN): Social and Behavioural Issues in Hepatitis C and HIV/AIDS and a board member of the NB/PEI chapter of the Canadian Public Health Association.

Dr. Pedro A. Quijon, UPEI Faculty of Science, researches estuarine and marine benthic habitats with a focus on predator-prey interactions, animal-sediment relationships, marine biodiversity, and invasive species. When faced with the need to provide training in geographic information systems (GIS) for some of his graduate students, he looked to CVER. Dr. Raphael Vanderstichel (pictured right), a PhD candidate (Department of Health Management) in CVER with experience in GIS, put together a two-day workshop focusing on processing and analyzing spatial data.



Chairs

CVER's strength and relevance in terms of animal health and the production of safe, high-quality food in an environmentally sustainable manner is reflected in the willingness of partners to invest in the ongoing development of CVER. Building on the strengths brought about by the filling of the Sir James Dunn Chair in Animal Welfare in 2007 (Dr. Michael Cockram) and the addition of a Canada Research Chair in Epi-informatics in 2008 (Dr. Crawford Revie), three new externally funded Chairs were added to CVER in 2009. Drs. Larry Hammell and Greg Keefe were both selected as Prince Edward Island's first-ever Innovation PEI Industry Research Chairs, while Dr. Javier Sanchez was appointed as the CFIA Chair in Regulatory Veterinary Epidemiology.



Dr. Crawford Revie Dr. Michael Cockram



Dr. Larry Hammell (pictured left) is a professor of epidemiology at UPEI's Atlantic Veterinary College. He is an aquatic species health expert who leads the Centre for Aquatic Health Sciences – one of the world's premier institutions for applied research on health management in aquatic food animals. Dr. Hammell is a member of the OIE World Health Organization for Animals aquatic disease surveillance group; leader of the Disease Technical Working Group for Salmon Aquaculture Dialogue with the World Wildlife Fund; and member of the National Aquatic Animal Health Program Management Committee. Dr. Hammell now holds the Innovation PEI Industry Research Chair in Epidemiology for Global Aquatic Food Animal Production.

Dr. Greg Keefe (pictured right) is a professor of dairy production medicine at UPEI's Atlantic Veterinary College. He is an internationally recognized leader in milk-quality research and the application of new information and diagnostic technologies to advance disease surveillance and food quality. Dr. Keefe is director of the Atlantic Veterinary College's Maritime Quality Milk – a centre with an integrated research and service capacity that is unparalleled within the Canadian dairy industry. Dr. Keefe now holds the Innovation PEI Industry Research Chair in Milk-Based Diagnostics and Information Technology Applications.



Dr. Javier Sanchez (pictured left) received his Doctor of Veterinary Medicine in Argentina in 1992. In 2004, he received his PhD in epidemiology from UPEI and was awarded the Governor General's Gold Medal for Academic Excellence. From 2003 to 2007, Dr. Sanchez worked as a Research Associate at the Atlantic Veterinary College. In 2007, he was appointed as a Risk Analyst in the Animal Health Risk Assessment Unit of CFIA. Dr. Sanchez has authored or co-authored 25 peer-reviewed publications and is internationally recognized as an instructor in epidemiological methodologies, having taught in Canada, New Zealand, Australia, Brazil, Costa Rica, Grenada, and China over the past five years. Dr. Sanchez now holds the CFIA Chair in Regulatory Veterinary Epidemiology.

In the fall of 2008, CVER was selected to represent UPEI in research expertise through submission of an application to Canada's most prestigious research chair program – the Canada Excellence Research Chair (CERC). Working with the Centre for Aquatic Health Sciences, a proposal for a \$10 million chair in Aquatic Epidemiology was subsequently put forward. From the pool of 137 CERC applications, the top 40 were selected to move on to the second (and final) round of the competition. CVER was the only group from a small university in Canada to make it through to this final round. To be selected as having one of the 40 most promising research programs in the country was a huge success. Final proposals were submitted in November 2009 and results will be announced in spring 2010.

Research Activity

The major thematic research areas of the core membership of CVER are:

- finfish health (in particular, sea lice, infectious salmon anemia [ISA], and randomized control trials of vaccines);
- shellfish health (the impact of invasive species);
- dairy health (udder health, Johne's disease, milk quality, and milk-based diagnostics);
- regulatory veterinary epidemiology (risk analysis and disease modelling);
- welfare of animal transport (horses and other domestic species); and
- diagnostic test evaluation (ISA, avian influenza).

Details of many of these research programs can be found at upei.ca/cver. New funding commitments in excess of \$5 million were received by members of CVER during 2009, ensuring a high ongoing level of research activity within the group.

The group carries on its strong track record of publications, both in peer-reviewed journals and conference proceedings. A complete list of recent publications can be found on our website. In keeping with our tradition of involving graduate students in all facets of our work, graduate students were involved in most of these publications.



*On-farm mastitis testing kit
produced by Maritime Quality Milk*

Outreach

A number of major outreach activities took place in 2009. Some of these key initiatives included:

- **Epi-on-the-Island** – This successful program, which has been running for a number of years, brings researchers and graduate students from across Canada and around the world to UPEI for intensive course work in epidemiologic methods. In 2008, this event was held in conjunction with the annual meeting of the Canadian Association of Veterinary Epidemiology and Preventive Medicine, which we hosted. In 2009, participants from across Canada, Portugal, Denmark, Belgium, and Norway attended a course in multilevel modelling led by Drs. Stryhn and Dohoo.
- **World Organization for Animal Health (OIE)** – With leadership from Dr. Larry Hammell, progress continues to be made on the designation of UPEI as a collaborating centre in aquatic epidemiology. We expect completion of this process in 2010.
- **Scenario Tree Modelling Course** – In October, CAHS sponsored a course by Dr. Angus Cameron of Ausvet in Scenario Tree Modelling. The week-long course was oversubscribed. Material from this course will be incorporated into next year's Epi-on-the-Island.
- **Johne's Forum** – In December, Maritime Quality Milk sponsored an Atlantic forum involving dairy producers, veterinary practitioners, and researchers (particularly Drs. Greg Keefe and Shawn McKenna) to discuss plans for an Atlantic Johne's disease control program.
- **Epidemiology in China** – Following successful courses put on in China by Drs. Ian Dohoo (2007) and Javier Sanchez (2009), two staff from the China Animal Health and Epidemiology Centre came to PEI for two months of training in animal disease modelling.
- **International Teaching** – CVER continues to carry on its tradition of international teaching with courses on survival analysis (Drs. Stryhn and Dohoo) and advanced epidemiologic methods (Dr. Dohoo) being offered in South Africa (in conjunction with ISVEE) and Sweden, respectively.



VETERINARY EPIDEMIOLOGIC RESEARCH, 2ND EDITION



The 2nd Edition of the graduate level text *Veterinary Epidemiologic Research* was released in October of 2009. Written by CVER members Drs. Ian Dohoo and Henrik Stryhn along with Dr. Wayne Martin of the University of Guelph, it has become the standard textbook for graduate programs in veterinary epidemiology around the world (upei.ca/ver).

Graduate Program



Peter Sykes, aquatic epidemiology graduate student, working on halibut health and production

CVER's graduate program continues to grow. Over the past few years, the Centre has averaged 16 to 20 graduate students. In September 2009, the numbers grew to 29 (11 MSc and 16 PhD). Our programs are traditional, thesis-based MSc (two-year) and PhD (four-year) programs that are carried out with students here, or, in some cases involve research in the student's home location (such as Dr. Nicole O'Brien, the only graduate student in Canada trained in cod health, from Newfoundland, and Dr. Glen Duizer, from Manitoba). The core of the program is built around a pair of epidemiology methods courses (Drs. VanLeeuwen and Dohoo) and a pair of biostatistics courses (Dr. Stryhn), with supplemental courses in specific topic areas as needed. Graduate students are involved in all aspects of the

research endeavours and often take primary responsibility for all field work inherent in these epidemiologic projects. This combination of theoretical background and hands-on experience results in the training of researchers of the highest quality for the benefit of animal industries and affiliated groups.

Partners





CENTRE FOR VETERINARY EPIDEMIOLOGICAL RESEARCH

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