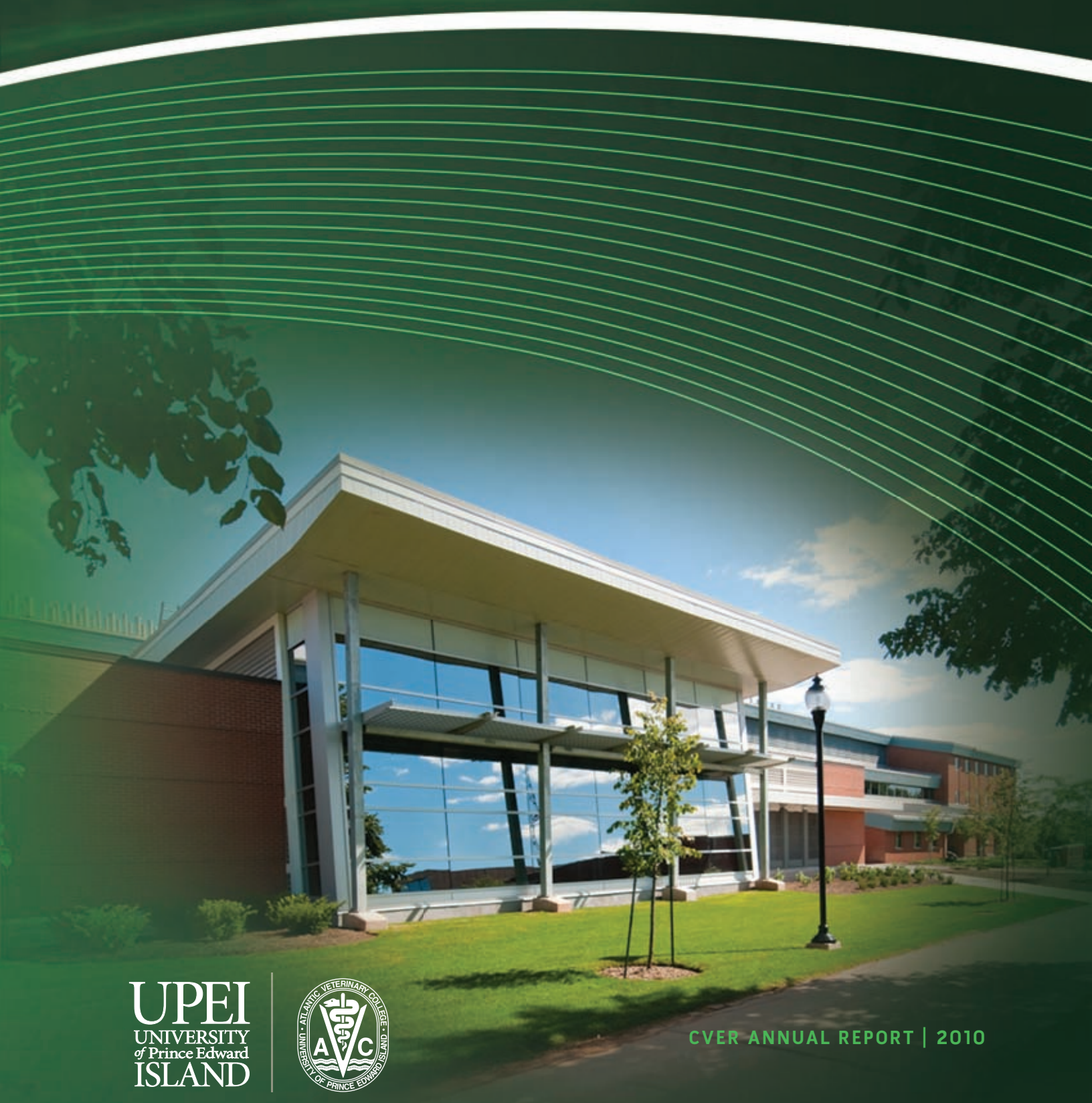




Centre for Veterinary Epidemiological Research
ATLANTIC VETERINARY COLLEGE | UNIVERSITY OF PRINCE EDWARD ISLAND



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ISLAND



CVER ANNUAL REPORT | 2010



CVER Annual Report 2010

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Message from the Director

2010 was an exceptional year for CVER. In May, we were notified that our proposal for a Canada Excellence Research Chair (CERC) had been approved. This award (details provided below), in conjunction with the designation of UPEI as an OIE Collaborating Centre for Epidemiology and Risk Assessment of Aquatic Animal Diseases (details in report from Centre for Aquatic Health Sciences) confirmed our aquatic epidemiology program as one of the top research programs in the country. We will be delighted to welcome Dr. Ian Gardner as the CERC in aquatic epidemiology in the spring of 2011.

It has also been an important year in terms of outreach activities and, in particular, in the development of a growing collaborative relationship with partners in China. A few of CVER's important outreach activities include:

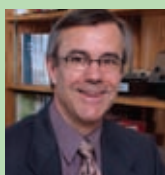
- running an intensive 4-week introductory epidemiology course for 16 veterinarians from China
- hosting epidemiologists from China for more intensive training in disease modelling
- holding Epi-on-the-Island with courses in both risk analysis and surveillance
- continuing our international teaching through the provision of targeted, high-level short courses in a variety of countries
- working with CFIA and academic partners on the expansion of Canadian Regulatory Veterinary Epidemiology Network (CRVE-Net) to include all Canadian veterinary colleges.

The past year's results are very encouraging and energize us to accomplish even more. 2011 will be a year of unprecedented growth with the addition of multiple positions through the CERC funding, and moving into additional office space within AVC. We look forward to the growth.

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 22 graduate students. We encourage you to visit cver.upei.ca to learn more about these people, and for more details of our activities.

CVER's mission—healthy animal populations contributing to a healthy society—is reflective of the core activities of CVER. 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 are provided below.

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, University of Prince Edward Island*

Canada Excellence Research Chair

In the 2009 annual report, we were pleased to report that our proposal for a Canada Excellence Research Chair (CERC) in aquatic epidemiology was the only proposal from a “small” university that had made it into the final round of the inaugural CERC competition. This year, we are even more pleased to announce that our proposal was one of only 19 (from all disciplines) funded in Canada. Dr. Ian Gardner will join the Atlantic Veterinary College, University of Prince Edward Island as the new CERC in aquatic epidemiology in the spring of 2011.



The announcement in May 2010 of this 10-million dollar award confirmed our aquatic epidemiology program as a global leader in this important research area. Congratulations to Drs. Larry Hammell, Crawford Revie, John VanLeeuwen and Ian Dohoo, who not only built the strong programs on which this success is built, but prepared the winning proposal. The Canada Excellence Research Chairs program is an initiative of the government of Canada to attract Canadian and international leaders who can positively contribute to this country’s global competitiveness, future prosperity and well-being, as well as to provide a deeper understanding of the human dimension of technological change.

Dr. Gardner’s role at the AVC will be to examine health interactions between farmed and wild fish populations, and to develop cost-effective testing strategies and surveillance programs for the prevention and control of diseases in aquatic food animals.

Partners

CENTRE FOR AQUATIC HEALTH SCIENCES

It was another busy and successful year for the Centre for Aquatic Health Sciences (CAHS). One of the Centre’s most exciting developments came in mid July when the World Organisation for Animal Health (OIE) confirmed its designation as the world’s only OIE Collaborating Centre for Epidemiology and Risk Assessment of Aquatic Animal Diseases (ERAAAD). This recognition formalizes a working partnership forged between the network of experts in the field at the Atlantic Veterinary College, University of Prince Edward Island and the National Veterinary Institute of Norway. The two institutions will join forces to play a key role in management of aquatic animal health issues and will impact the health of communities around the world. Dr. Larry Hammell, director of CAHS and the Innovation PEI Industry Research Chair in epidemiology for aquatic food production will be the co-director of the OIE Collaborating Centre. He will work with co-director Dr. Edgar Brun, head of the epidemiology section at the Norway Institute. Dr. Hammell is excited about this project as he sees a real need for more health research related to new growing technologies and new species.



CAHS technical staff were busy conducting sea lice counts on many sites throughout 2010. Some routine weekly lice counts were conducted on sites to monitor lice loads, but most counts were done in an effort to monitor sea lice treatments. This allowed for assessment of the change in lice load on the salmon, thus helping to determine the efficacy of the

treatment. Training on sea lice identification has been developed and offered by CAHS staff to industry multiple times, thus improving the ability to monitor lice by each developmental stage.

In addition to sea lice counts, the CAHS team has collected sea lice from numerous participating sites/companies for use in laboratory bioassays. Treatments that have been assessed in the lab include SLICE, Salmosan and Alphamax. Graduate student Patti Jones is developing a bioassay for hydrogen peroxide treatments. All bioassays are standardized using vigorous sea lice, counted into multiple petri dishes and exposed to varying doses of a treatment. Length of exposure depends on the type of treatment being used. After a 24-hour period, lice in every dish are observed and condition/rigour is recorded. Once analysis is complete, the efficacy of the treatment can be determined based on the number of lice that survived treatments at different doses.

Data collected through all of the Centre's research becomes part of the Decision Support System (DSS) which is a web-based application that allows users to enter, edit and review data generating summary reports/graphs designed to assist those making treatment decisions associated with sea lice management on salmon farms. It is being developed by CAHS research scientists and computer programmers. Numerous summary charts are available to participating companies (farm management staff and prescribing veterinarians) that can review their site data as well as industry-wide averages. Typical charts available by Bay Management Area (BMA) include summaries of: mean lice count per fish by lice stage; comparison of lice numbers with other sites over a given season or with respect to other production years at various levels of aggregation; counting and treatment reporting compliance reports to ensure coverage across the industry. Site-level charts are also available showing sea lice trends over time by stage and allowing for an analysis of the efficacy of various treatment types. With the DSS being web-based, we are offering the ability to assess bioassay results from sea lice treatments to colleagues and researchers in other producing regions which, in turn, could lead to AVC-CAHS becoming a global repository of this type of bioassay data.



MARITIME QUALITY MILK

Under the direction of Dr. Greg Keefe, Innovation PEI Industry Research Chair in milk-based diagnostics and information technology applications and the director of Maritime Quality Milk (MQM), has continued to make headway as a leading international research centre in the dairy industry. The program continues to focus on projects relevant to the regional and national dairy industry and has established state-of-the-art mastitis and

paratuberculosis (Johne's disease) laboratory facilities. In 2010, the MQM laboratory received proficiency certification from USDA for the 5 main modalities for diagnosing the disease.

Researchers at MQM continue to work on technologies to aid dairy farmers in making antibiotic treatment decisions. Dr. Kim MacDonald, a PhD candidate working with Dr. Keefe and Dr. Ian Dohoo, has established that the MQM mastitis treatment decision-kit provides accurate diagnostic support and can lead to a 40 per cent reduction in antibiotic use for the treatment of clinical mastitis. Dr. Maggie Cameron, graduate student and farm services resident working with Dr. Keefe and Dr. Jean-Philippe Roy at the University of Montreal, is examining similar technology to determine if antibiotic treatment is

warranted at dry-off (end of lactation). Preliminary results are very promising and indicate that targeted dry cow treatment could reduce antibiotic use by an even greater proportion in this group of animals. Results of these studies were presented at the Canadian Bovine Mastitis Research Network meeting in November in Toronto and will be featured at the Western Canadian Dairy Seminar, and the Canadian Veterinary Medical Association (CVMA) convention in Halifax in 2011.

Early in 2010, Dr. Keefe and Dr. Alejandro Ceballos began a project with COLANTA, the Columbian co-operative that processes about 30 per cent of the country's pasteurized milk products. Columbia has a rapidly growing dairy sector but is hampered by milk-quality problems. The initial surveillance-based project demonstrated that rapid progress can be made by establishing surveillance systems and adopting standard control programs. New partnerships have been established with three Universities (Antioquia, CES and Manizales). Drs. Julian Reyes and Nicholas Ramirez have funding support from the Columbian science agency (COLCIENCIAS) to come to study at MQM in 2011 and additional project support is being developed.

MQM remains strongly committed to their research on Johne's disease (JD) patterns and diagnostics. The Johne's team includes Dr. Marcelo Chaffer, MQM Microbiologist, Dr. Shawn McKenna and Dr. Keefe. Graduate students Drs. Emilie Laurin and Carrie Lavers are working on projects funded by the regional and national dairy industry, as well as the National Sciences and Engineering Research Council (NSERC) and MQM. Their research is critical in the development of control strategies for this increasingly important disease. Based on their research, the regional industry has pledged \$500,000 towards a long-term control strategy. Implementation of this strategy is pending matching funding from other partners. The research and control strategies put forth by MQM were featured at the CVMA conference (McKenna), as well as the Alberta JD training sessions for veterinarians (McKenna) and the annual Canadian Johne's Research Workers Meeting (Lavers, Keefe, McKenna).

MQM's work doesn't stop there. It continues to work on a wide range of laboratory services projects, data-management programs and to support the dairy industry in the maintenance and enhancement of milk quality.

THE CANADIAN REGULATORY VETERINARY EPIDEMIOLOGY NETWORK

Although only formally launched in the spring of 2009, the Canadian Regulatory Veterinary Epidemiology Network (CRVE-Net) has covered some major ground in its first year in both project and research development related to regulatory epidemiology. Under the direction of research chair, Dr. Javier Sanchez, CRVE-Net has established a steering committee and secured partnerships with a number of agencies.

Creating new training opportunities has been a primary focus for CRVE-Net in 2010 which saw several courses in risk analysis being developed and conducted for health officials in China, Uruguay and Chile between the months of May and November.

Twenty-two participants were part of the annual Epi-on-the-Island course which was hosted by CRVE-Net and the AVC in mid August. The course was an introduction to Animal Health Risk Modelling and was overseen by Dr. Sanchez (more under Outreach).



Under the umbrella of the ‘One-Health, One-World’ concept, an interdisciplinary team was assembled in November 2009 to create a platform for collaborative work among public health and animal health professionals working in disease-spread modelling. One of the first projects for the newly created steering committee was to develop a training course in disease modelling. This workshop was sponsored by Mathematics of Information Technology and Complex Systems (MITACS), the Public Health Agency of Canada (PHAC), Centre for Public Health and Zoonoses and the Canadian Food Inspection Agency (CFIA) and was held in Guelph, Ontario in November 2010.

In August, CRVE-Net, in partnership with CVER, delivered a one-month training course in basic epidemiology for field veterinarians from China. This training will be part of a two-year training program for field veterinarians funded by the Food and Agricultural Organization (FAO). This course was instructed primarily by Drs. Tim Burnley and Sithar Dorjee. The Chinese delegation was led by Dr. Chen Guosheng, the director of the Animal Disease Prevention and Control Division of the Veterinary Bureau in the Chinese Ministry of Agriculture. Also, four staff members from the China Animal Health and Epidemiology Centre spent two months at the AVC working with CVER in 2010 (see Outreach for more details).

CRVE-Net’s international outreach won’t be slowing down in the coming year. In partnership with Massey University in New Zealand, CRVE-Net is assisting in the development of an online Master’s program in biosecurity and health security for veterinarians and medical doctors. Dr. Tim Burnley of CRVE-Net is helping to develop and deliver course material.

A course proposal on quantitative risk analysis has been developed with a goal of inception in 2011, and is currently under review by the University of Prince Edward Island. CRVE-Net is also currently working on a two-day Systematic Review and Meta-analysis course to be conducted in Ottawa in collaboration with PHAC and CFIA in early 2011.

Research has been another active component for CRVE-Net in 2010. Under the direction of two PhD students and a post-doctoral candidate, the three research projects funded under CRVE-Net are now well under way. A simulation model of the spread of H1N1 among animals and humans has been parameterized and is currently being evaluated. An early-warning syndromic-surveillance system using laboratory submissions is being developed for the Animal Health Laboratory in Ontario. Finally, research in developing a decision-support tool for prioritizing emerging zoonotic diseases is also under way and will be presented to policy-makers in Ottawa in March 2011.

In 2011, CRVE-Net will continue to work on building strong research and training programs in disease modelling and risk assessment.

SIR JAMES DUNN ANIMAL WELFARE CENTRE

The Sir James Dunn Animal Welfare Centre (SJDAWC) provides service, research and education in the welfare of animals. Information on the breadth of activities undertaken by the SJDAWC can be found in the Centre's newsletters and at upei.ca/awc. The Centre was involved in a number of teaching and service activities including the 6th annual "Animal Welfare In Practice" conference. The theme for the conference in 2010 was exotic pets: ethical considerations, pain management, behavioural considerations and enrichment. It was co-hosted by the SJDAWC and the AVC Animal Welfare Club, with assistance from the AVC Exotics Club, Dr. Marion Desmarchelier, Safe Haven Society for Reptiles and Amphibians (Bedford, NS), and the Animal Welfare Foundation of Canada. As well, Dr. Alice Crook, coordinator of the Centre, conducted a lecture tour to the four English-speaking, Canadian veterinary schools highlighting what veterinarians need to know in recognizing, documenting and reporting animal abuse and neglect. The tour was sponsored by the CVMA with assistance from Hagen.



In 2010, the SJDAWC funded 1 research and 7 service projects at AVC through the annual competition. The research project titled 'Trichomoniasis, an emerging disease in Canadian Maritime wild finch populations and a welfare issue,' led by Dr. Scott McBurney, will use epidemiological methods to determine factors associated with transmission and maintenance of *Trichomonas* in the environment. Three previously funded research projects were completed in 2010: (1) euthanasia practices in Canadian animal shelters (Dr. Michael Cockram with Master's student Niamh Caffrey), which used epidemiological methods to survey animal shelters (Caffrey N, Mouchili A, McConkey S, Cockram MS. 2011. Survey of euthanasia practices in animal shelters in Canada, *Can Vet J* 52:55-61); (2) an investigation of a blood-borne parasite in wild red foxes and dogs with anemia on PEI (Dr. Barbara Horney); and (3) a study of dietary selenium supplementation in mares and their foals (Dr. Jeff Wichtel with PhD student Julia Montgomery). Publication information from the latter two projects is available from acrook@upei.ca.

PhD students, Niamh Caffrey and Cyril Roy, continue their programmes under the supervision of Dr. Michael Cockram, chair in Animal Welfare, and Dr. Ian Dohoo, professor of Epidemiology and director of CVER, using epidemiological methods to study the welfare implications of animal transportation. Niamh Caffrey's project includes an epidemiological study of the risk factors for mortality of broiler chickens during transport. Cyril Roy is investigating relationships between transport practices in Iceland and the behavioural, physiological and pathological responses of horses sent for slaughter. PhD student Jackie Ellis continues her programme under Dr. Cockram's supervision on environmental enrichment and stress in shelter cats.

SHELLFISH RESEARCH GROUP

After completing a PhD at the Atlantic Veterinary College's Department of Pathology and Microbiology, Dr. Sarah Stewart-Clark accepted an Innovation PEI Fellowship position at the AVC. Dr. Stewart-Clark will conduct her post-doctoral research with Dr. Jeffrey Davidson, Department of Health Management and the Shellfish research group and Dr. Spencer Greenwood, Department of Pathology and Microbiology, using a new innovative device to assess the impact of tunicate

fouling and mitigation treatments on mussel health. PEI mussels are world-renowned as a quality product and Dr. Stewart-Clark is excited that her research will help contribute to the innovative science that the AVC Shellfish Research Group conducts in support of this industry.

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



PARTNERS OUTSIDE AVC

CVER continues to serve as an umbrella organization for a wide range of people carrying out population-based research. These members come from UPEI departments (such as Nursing, Family and Nutritional Sciences) and outside university institutions. With all of these departments and institutions conducting research all year round, it would be almost impossible to list all of their highlights. One major project, in which several UPEI departments have joined forces, has been selected and is summarized below.



Dr. John VanLeeuwen, professor of ruminant health management and epidemiology at the AVC has been working extensively with both Kenyan dairy farmers and the Farmers Helping Farmers organization for some time now. He travels to Kenya semi-annually, most recently in the summer of 2010, with 2 AVC veterinary students. Their focus this summer was primarily veterinary medicine delivery, extension and research that benefit the health management of dairy cattle and other animals in Kenya.

Dr. VanLeeuwen is also co-supervisor of 2 graduate students, Colleen Walton and Carolyn Dohoo, who have focused their studies on Kenyan farm families.

Colleen, a PhD student at the AVC, is researching the impact of dairy group membership with animal health intervention on livelihoods and nutrition. Colleen has completed her data-collection and is on the analysis portion of her research and hopes to defend in 2011. Dr. Jennifer Taylor, professor in the Department of Family and Nutritional Sciences has also been a contributor to this research. She, along with Walton and 4th-year nutrition students, Kaylynne Parkes and Christina Tucker, spent their summer in Kenya as part of the first nutritional team to partner with Farmers Helping Farmers, funded by the Canadian International Development Agency (CIDA) and the Students for Development Program (SFD). They spent time working with schools, women's groups, and young mothers. The school-feeding programs at 5 different schools were evaluated and the menus analyzed to create recommendations for the staff. Sessions for mothers of children under the age of 2 were held to teach them how and why to introduce healthy solid foods to their babies at 6 months. Dr. Taylor is in the

process of applying for 3 years of CIDA/SFD funding to follow up on this important work.

Carolyn Dohoo, an MSc graduate student at Dalhousie University is researching the effects of biogas digesters on health and quality of life measures in Kenyan farm families. Carolyn has also completed her data-collection and hopes to defend her project this year.

Finally, in the spring of 2010, under the direction of UPEI Dean of Nursing, Dr. Kim Critchley, CIDA provided grants for 4 UPEI nursing students through its Students for Development Program. The students spent the summer learning and working in Kiirua, a small village east of Mount Kenya. The nursing students divided their time on Mondays, Tuesdays and Wednesdays among the outpatient, medical, surgical and maternity units at St. Teresa's Mission Hospital. The students spent every Thursday doing community outreach which involved testing for HIV and providing HIV/AIDS education to people in the surrounding communities. Fridays were dedicated to the Machaka Children's Home where they helped to feed and cuddle the infants, and played with the older children. Upon their return to PEI, students continued their involvement in the project through presentations to the community and speaking to the media.

Research Activity

The major research areas of the core membership of CVER remain the same as in 2009:

- finfish health (in particular sea lice)
- shellfish health
- dairy health (mastitis treatment, Johne's disease, milk quality)
- regulatory veterinary epidemiology (risk analysis and disease modelling)
- welfare of animal transport (horses and other domestic species): and
- diagnostic test evaluation (ISA, avian influenza).

Outreach

A number of major outreach activities took place in 2010. Some examples of these key initiatives are:

- **Epi-on-the-Island** This world-renowned 2-part course was held at the Atlantic Veterinary College August 10–13. The first part was a 5-day workshop run by Dr. Francisco Zangmutt who focused on risk analysis. The second portion was a 4-day workshop taught by Dr. Evan Sargeant who lectured on surveillance.
- **CVER and China partnerships develop** A delegation of 16 Chinese veterinarians and 2 translators completed an intensive 4-week training program in field epidemiology at the AVC. This course was organized and instructed primarily by Drs. Tim Burnley and Sithar Dorjee, and looked at a wide range of topics ranging from disease-outbreak investigation, surveillance, measures of disease frequency to population sampling strategies. Additionally, under the direction of Drs. Charles Caraguel



and Javier Sanchez, two-month training programs were provided for four Chinese veterinarians from the China Health and Epidemiology Centre in Qingdao.

- **International teaching** CVER continues to leave its international mark by providing courses in a variety of epidemiological topics in a number of countries. Drs. Ian Dohoo, Henrik Stryhn, Jeffrey Davidson and Javier Sanchez taught advanced-level training courses in China, Uruguay, Chile, Denmark, Norway and Southeast Asia.

Graduate Program

CVER's graduate program was well recognized in 2010 with some very impressive accomplishments from a number of our students. A few examples are:

- Peter Sykes, a graduate student with AVC's Centre for Veterinary Epidemiological Research, and a PhD candidate in the Department of Health Management, was recognized with a national student scholarship on May 18.
- Dr. Charles Caraguel was awarded the prestigious Governor General's Gold Medal for Graduate Studies at convocation on May 8. He completed a PhD in 2010 on Relativity of Diagnostic Accuracy: Application to Infectious Salmon Anemia Virus Assays.
- Also in May, Dr. Raphael Vanderstichel was awarded the prize for best graduate student presentation at the Canadian Association of Veterinary Epidemiology and Preventive Medicine Conference in Guelph, Ontario.
- In the fall of 2010, Innovation PEI awarded graduate student Jessica Willis funding support to research and develop molecular assays for ensuring that Island oysters remain safe for human consumption.
- Dr. Julia Montgomery of Germany completed a PhD program under the supervision of Drs. Maureen Wichtel and Jeff Wichtel. Her research centred on 'The effects of organic and inorganic dietary selenium on selenium status and immune function of horses.'



Currently, CVER has 22 graduate students, 8 enrolled in a MSc, and 14 working toward a PhD.



CENTRE FOR VETERINARY EPIDEMIOLOGICAL RESEARCH

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