

# ANIMAL HEALTH RISK ASSESSMENT TRAINING TRENDS IN CANADIAN AND INTERNATIONAL VETERINARY COLLEGES



## **Animal Health Risk Assessment Training Trends in Canadian and International Veterinary Colleges**

### **Key Findings**

As is the case in other comparable countries, undergraduate training in animal health risk assessment at Canadian institutions tends to be provided as part of courses dealing with broader topics. At the graduate level, no specific courses on animal health risk assessment are currently offered in Canada, whereas such courses are available at some schools in Australia, the United States, and the United Kingdom. A short professional course specifically focused on animal health risk assessment, however, is offered at the Atlantic Veterinary College (at the University of Prince Edward Island), and graduate courses relevant to this area are under development at several other Canadian institutions.

Veterinary colleges are key contributors to the production of knowledge and research capacity in animal health risk assessment. Training offered through these schools can provide risk assessors with access to the latest tools and methods, as well as assist in developing the next generation of practitioners. It also offers the potential to enhance the production of new knowledge and innovation, thus advancing the fields of animal health science and risk assessment.<sup>1</sup>

This review examines the course offerings in animal health risk assessment at Canadian and international veterinary colleges. The first section describes the offerings at Canada's five veterinary colleges, while the second section outlines those at veterinary schools in New Zealand, Australia, the United Kingdom, Ireland, and the United States.<sup>2</sup> The findings are based on course descriptions and interviews with faculty members. Schools in all countries listed were contacted via email; those agreeing to participate were included in the final results.<sup>3</sup>

The results show that while some Canadian institutions offer more than what is available at some institutions, and several have plans to do even more, none currently offer as much as is available at other

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<sup>1</sup> This is a supplementary document for the Expert Panel on Approaches to Animal Health Risk Assessment report *Healthy Animals, Healthy Canada*. The findings of this document are further discussed in the report, available at [www.scienceadvice.ca/animal-health.aspx](http://www.scienceadvice.ca/animal-health.aspx).

<sup>2</sup> The first section of this document and Table 1.1 also appear in the report of the Expert Panel on Approaches to Animal Health Risk Assessment.

<sup>3</sup> Thirty universities were contacted via email, of which 24 responded (Australia 4/5, Canada 5/5, Ireland 1/1, New Zealand 1/1, United Kingdom 3/6, United States 10/12). Most of the universities contacted are members of the Association of American Veterinary Medical Colleges.

international institutions with the most extensive offerings (see Table 1.1). Most undergraduate training in animal health risk assessment in Canada is provided in courses on broader topics. The Atlantic Veterinary College, however, does offer a short professional course specifically focused on animal health risk assessment, and several other Canada schools are in the process of developing graduate courses relevant to this area.

International course offerings in animal health risk assessment vary widely by institution. No schools have specific undergraduate courses on animal health risk assessment, though many touch on the subject in courses dedicated to broader subjects (mainly epidemiology). Some do, however, provide targeted and in-depth training at the undergraduate level. A good example is the Royal Veterinary College in the United Kingdom, where students are not only exposed to the concept of risk assessment but also to its practical application.

The greatest disparity among institutions is at the graduate level. Some schools offer no training at all, others offer short courses in collaboration with government institutions, and still others dedicate significant time to risk assessment or the interface between human and animal health. Colorado State University and the University of Minnesota both have short courses with some of the U.S. Department of Agriculture (USDA) agencies such as the Foreign Agricultural Service (FAS), Animal and Plant Health Inspection Service (APHIS), or the Joint Institute for Food Safety and Applied Nutrition (JIFSAN). New Zealand's Massey University offers graduate students an opportunity to gain practical experience by working on research contracts that include a risk assessment. Murdoch University, the University of Sydney, the University of Glasgow (which focuses on quantitative methods), the Royal Veterinary College, and North Carolina State University (with its soon-to-be-offered certificate program) offer very specific Master of Public Health (MPH) programs, emphasizing risk assessment/risk analysis and the interface between human and animal health. More detailed reviews of the offerings at these and other schools are listed below.

**Table 1.1**  
Comparison of Veterinary School Training on Risk Assessment

Veterinary Schools	Undergraduate level		Graduate level		Other teaching activities/information
	Specific course on risk assessment	Covered in different courses	Specific course on risk assessment	Covered in different courses	
<b>CANADA</b>					
University of Calgary	No	Yes	No	Yes	Postgraduate courses that will focus on elements of public health and risk assessment are in development. Related courses are available through other Faculties.
University of Guelph	No	Yes	No	Yes	
Université de Montréal	No	Yes	No	Yes	In the MPH program, specific courses on the topic are under development.
University of Prince Edward Island	No	Yes	No	Yes	The AVC offers short professional risk assessment courses for Canadian and international risk assessors. A full, graduate-level course on risk analysis is in development.
University of Saskatchewan	No	Yes	No	Yes	
<b>AUSTRALIA</b>					
Murdoch University	No	Yes	Yes	Yes	Half of a semester is on risk assessment and puts emphasis at the interface between human and animal health.
University of Adelaide	No	No	NA	NA	There is a Presentation Day in which students are exposed to the topic. Since it is a new school, the program has not started for DVM yet.
University of Sydney	No	Yes	Yes	Yes	
University of Queensland	No	Yes	NA	NA	A day visit to the beef abattoir and introduction to microbiological food safety, animal welfare, etc. are offered.

## Animal Health Risk Assessment Training Trends

Veterinary Schools	Undergraduate level		Graduate level		Other teaching activities/information
	Specific course on risk assessment	Covered in different courses	Specific course on risk assessment	Covered in different courses	
<b>IRELAND</b>					
University College Dublin	No	Yes	No	Yes	
<b>NEW ZEALAND</b>					
Massey University	No	Yes	No	Yes	Undergraduate – End of year research paper course is offered. Graduate level – End of year research paper course and a possibility to participate in research contracts are offered.
<b>UNITED KINGDOM</b>					
Bristol University	No	Yes	No	Yes	A One Health Initiative is in the planning phase.
Royal Veterinary College	No	Yes	Yes	Yes	Some modules of M.Sc. are offered at the graduate level.
University of Glasgow	No	Yes	Yes	Yes	A M.Sc. is almost all exclusively on the interface between animal and human health.
<b>UNITED STATES</b>					
Colorado State University	No	No	No	Yes	Two different short courses that deal with risk assessment are offered, in cooperative agreement or sponsored by USDA:APHIS and USDA:FAS.
Iowa State University	No	No	Yes	No	
Michigan State University	No	No	No	Yes	
North Carolina State University	No	No	Yes	Yes	A specific certificate is under development with three specific courses on risk assessment and related topics.
Ohio State University	No	No	No	Yes	
Purdue University	No	No	No	Yes	
University of California Davis	No	No	Yes	No	
University of Florida	No	No	No	No	
University of Minnesota	No	No	No	Yes	Short courses are offered by USDA and JIFSAN.
Washington State University	No	Yes	No	Yes	

(Council of Canadian Academies)

## 1. Canadian Veterinary Colleges – Course Offerings in Animal Health Risk Assessment

### University of Calgary – Faculty of Veterinary Medicine

The University of Calgary's Faculty of Veterinary Medicine offers several mandatory Doctor of Veterinary Medicine (DVM) courses involving discussion of basic risk assessment concepts. Such courses include *Animals, Health and Society*, and *Public Health and Risk Analysis*. The Faculty offers one-week block courses in *Outbreak Investigation and Foreign Animal Disease*, which address risk assessment in scenarios. The Faculty of Veterinary Medicine is a new faculty and is currently expanding its graduate program. Future veterinary postgraduate courses will most likely focus on elements of public health and risk assessment. Additional relevant courses in risk assessment are available through other faculties at the University.

<http://vet.ucalgary.ca/>

*Personal communication, April 2010.*

### University of Guelph – Ontario Veterinary College (OVC)

While the OVC's DVM program requires its students to participate in two courses covering general principles of health management, formal risk assessment does not feature prominently in either. Graduate students interested in risk assessment are encouraged to seek a graduate advisor with expertise in the subject, or to enrol in external, distance-based risk courses.

<http://www.ovc.uoguelph.ca/>

*Personal communication, April 2010.*

### Université de Montréal – Faculté de médecine vétérinaire

The Faculté de médecine vétérinaire at the Université de Montréal does not offer a course dedicated exclusively to risk assessment, but DVM students are exposed to the subject in one mandatory course, *Veterinary Toxicology*, and several elective courses, *Risk Management of Production Animals* and *Veterinary Public Health*. Graduate students are given the option of participating in a course focusing solely on risk analysis. There are plans for a Master of Veterinary Public Health program, which would offer further courses in risk analysis and risk management.

<http://www.medvet.umontreal.ca/index.html>

*Personal communication, April 2010.*

**University of Prince Edward Island – Atlantic Veterinary College (AVC)**

The AVC offers several DVM courses that touch upon risk assessment. Examples include a course entitled *Veterinary Public Health*, and a specialized course that covers various topics in health management. At the graduate level, elements of quantitative and qualitative risk assessment are touched upon as selected topics within courses on biostatistics and epidemiology. In addition, the AVC has conducted risk assessment short courses for Canadian and international risk assessors and scientists, and in 2010 delivered on-site risk assessment courses in South America. Plans for a full graduate course in risk analysis are currently in preparation at the AVC.

*<http://www.upei.ca/avc/>*

*Personal communication, April 2010.*

**University of Saskatchewan – Western College of Veterinary Medicine (WCVM)**

WCVM offers several DVM and graduate courses that involve risk analysis/assessment. DVM students study risk in *Veterinary Public Health* and *Wildlife Health and Disease* courses, while graduate students are offered a course on *Zoonoses and Food Safety*. There are, however, no DVM or graduate courses that focus exclusively on animal health risk assessment.

*<http://www.usask.ca/wcvm/>*

*Personal communication, April 2010.*

**2. International Institutions – Course Offerings in Animal Health Risk Assessment****Australia****Murdoch University**

At Murdoch University School of Veterinary and Biomedical Sciences, there is no specific course at the undergraduate level on risk assessment/analysis. Some discussion of risk assessment is given in the *Veterinary Public Health* course, in which zoonoses are covered in considerable detail.

In the Master of Veterinary Studies in Veterinary Surveillance program, approximately half of one semester is allocated to risk analysis/assessment and covers animal health, zoonoses, and import/export risk assessment. Throughout this unit, strong emphasis is placed on the interface between human and animal health.

<http://www.vetbiomed.murdoch.edu.au/>

*Personal communication, June and July 2010.*

**University of Adelaide**

The University of Adelaide School of Animal and Veterinary Sciences has just launched its B.Sc. and DVM programs. Students are currently half-way through their third year of the B.Sc. (pre-vet) degree. The DVM program starts next year and will consist of three years of postgraduate study.

There are no specific courses offered in risk assessment. In *Veterinary Public Health*, however, students are given the opportunity to make a presentation on the topic of zoonosis. The purpose is to sensitize students to the issues arising from the interface between human and animal health. In the *Pathology* course, the subjects of *Veterinary Epidemiology and Public Health* were also taught for the first time this year (2010).

<http://www.adelaide.edu.au/vetsci/>

*Personal communication, July 2010.*

**University of Sydney**

The University of Sydney Faculty of Veterinary Science offers, at the undergraduate level, a *Veterinary Public Health* course in which the purpose, structure, and components of an import risk analysis are outlined in a single lecture. In the same course, an applied approach to risk assessment and risk management is discussed and demonstrated in a case study. The aim is to enable students to assess and manage risk in relation to zoonotic exposure for themselves, their staff, and their clients.

At the postgraduate level, the Faculty offers a coursework Masters program in *Veterinary Public Health/Veterinary Public Health Management*. One of the electives in this program is *Risk Analysis*. The learning objectives of this course are to apply the terminology and major concepts, principles, tools, and techniques used in risk management in the context of animal health, science and production; analyze and evaluate the main approach to risk management in animal health and trade; evaluate the strengths and weaknesses of some of the tools used in risk management; synthesize the tasks and issues associated with risk management with knowledge of animal and public health; and approach risk communication with an understanding of the different methods of good risk communication and the relationship between risk perception and risk communication. Risk assessment is also covered as a component in the course on *Hazards to Human and Animal Health and Food Safety*.

<http://www.vetsci.usyd.edu.au/>

*Personal communication, July 2010.*

### **University of Queensland (UQ)**

The University of Queensland School of Veterinary Science offers, in the fifth year of its undergraduate Veterinary degree (B.V.Sc.), a *Veterinary Public Health and Pathology* course, which covers risk analysis. With specific reference to risk analysis, students are provided with an instructive lecture on food safety, which includes general principles of risk analysis. Examples include Appropriate Level of Protection (ALOPs), Food Safety Objectives (FSO), Hazard Analysis and Critical Control Point (HACCP), and Good Manufacturing Practices (GMPs)/Standard Operating Procedures (SOPs), etc. The students then get to apply these principles during small group tutorial activities. The same course includes a practical lecture dedicated to risk assessment. It comprises a short lecture on the theoretical details of risk assessment, followed by an exercise whereby students undertake risk assessment of a range of foodborne disease scenarios using a computer-based program to estimate risk from parameters input by the students. Then students are asked to apply their understanding of risk assessment to another (non-foodborne) veterinary scenario in which they describe how risk assessment would be conducted and used to make clinical decisions.

Moreover, a series of “integration” lectures, which involves experts from outside of UQ (usually in the government and research sectors), further instructs the students about specific pathogens of Veterinary Public Health issues. Discussions around risk assessment and a risk assessment-based approach are implicit in many of these. Through the program and under the epidemiology theme, students are exposed to concepts relating to risk assessment. They also receive two lectures on “the role of veterinarians in

public health” in the *Veterinary Professional Studies* course, participate in a day visit to the beef abattoir in which they are introduced to microbiological food safety and animal welfare, and are exposed to zoonotic aspects/risk of the relevant pathogens to humans in the *Infectious Diseases* course.

<http://www.uq.edu.au/vetschool/>

*Personal communication, August 2010.*

## **Ireland**

### **University College Dublin**

In the Veterinary Medicine degree at the University College Dublin, some aspects of risk assessment are covered in courses such as *Veterinary Microbiology* and *Herd Health and Population Medicine*. Students consider risks at the interface between animal and human health in some detail, primarily in the course on *Veterinary Public Health*.

At the graduate level, a course was recently established on *Veterinary Public Health*. This course gathers input from University College Dublin (in Ireland) and the University of Ulster (in Northern Ireland). A Graduate Certificate in Dairy Herd Health will soon begin, and some parts of it will focus on risk assessment or risk analysis in animal health.

<http://www.ucd.ie/vetmed/>

*Personal communication, June 2010.*

## **New Zealand**

### **Massey University**

Massey University College of Veterinary Medicine offers papers (i.e., elective “research project” classes) in each academic year for both undergraduate and graduate students. At least two of these papers address public health and zoonosis (e.g., *Principles of Epidemiology in Human Populations and Veterinary Public Health, Food Safety and Quality Management*). At the graduate level, one of the papers addresses the application of veterinary science to the promotion of human health and zoonoses. The Institute of Veterinary, Animal and Biomedical Sciences also runs several research contracts that include the objectives of risk assessment in animal health, public health, and food safety with a strong portfolio on the human-animal interface. These contracts involve graduate students as part of their diploma, Masters or PhD training, and provide practical experience in the field.

<http://vet-school.massey.ac.nz/>

*Personal communication, June 2010.*

## United Kingdom

### **Bristol University**

At Bristol University School of Veterinary Science, formal risk analysis (i.e., the process of risk identification, risk management, and risk communication) is explicitly addressed on few occasions. The *Veterinary Public Health* course introduces students to risk analysis and its application within the food industry, particularly abattoirs, in the form of HACCP. Students are also lectured on some of the organizations involved in risk analysis concerning animals (e.g., the Animal Health and Veterinary Laboratories Agency of the UK government, World Organisation for Animal Health (OIE), World Health Organization (WHO), and Food and Agriculture Organization (FAO)). At the postgraduate level, the process of establishing a One Health initiative is underway.

<http://www.vetschool.bris.ac.uk/>

*Personal communication, July 2010.*

### **The Royal Veterinary College**

The Royal Veterinary College (RVC) offers undergraduate programs in Veterinary Medicine (BVetMed) and Bioveterinary Sciences (BScBiovetSci). The BVetMed contains a strand on population medicine and veterinary public health, in which the students are exposed to the basic concepts and practical application of risk assessment. They are confronted with scenarios in which they need to assess risks related to animal health or zoonotic pathogens. In addition to these core elements of the teaching, the final year research project may involve practical risk assessment. In the BScBiovetSci program (a three-year non-clinical course) students are introduced to the basic concepts of epidemiology in their first year. The third year of this course is composed of optional modules and a research project. Risk assessment is covered as part of one of these optional modules or projects. As with BVetMed students, the final year project may involve practical risk assessment.

The RVC also offers two M.Sc. courses, in which risk assessment/risk analysis is an important element: the *M.Sc. Veterinary Epidemiology* and *M.Sc. Control of Infectious Diseases in Animals* courses. Early in the courses, students are exposed to probabilities and quantitative risk modelling as part of a module on animal disease surveillance. Later in the courses, a full module is devoted to risk assessment and risk management. In this module, besides practicals on quantitative risk assessment, students carry out a qualitative risk assessment. In addition to these two M.Sc. courses, there are also lectures on risk assessment and analysis in the *M.Sc. Wild Animal Biology* (WAB) and *M.Sc. Wild Animal Health* (WAH) courses. Students can choose to carry out a risk assessment as their M.Sc. research project. In the M.Sc.

WAB and WAH courses, these are usually associated with the movement of endangered species for reintroduction.

<http://www.rvc.ac.uk/Index.cfm>

*Personal communication, July 2010.*

### **University of Glasgow**

At the University of Glasgow School of Veterinary Medicine, some courses of the five-year Bachelor of Veterinary Medicine and Surgery (BVMS) degree program address aspects of risk assessment and risk analysis: the *Biomolecular Science* course contains a section on Biostatistics, which covers the basics of probability that underpin risk assessment; the *Veterinary Microbiology* course contains a *Veterinary Public Health* section, which covers risk pertaining to the interface between animal and human health, the principles of risk analysis, and HACCP; the *Production Animal and Public Health* course covers meat hygiene in detail (including coverage of HACCP and the underpinning principles of risk analysis); and the *Large Animal Clinical Studies* course covers risks pertaining to the interface between animal and human health as well as epidemiology and risk assessment in relation to trade in animals.

At the postgraduate level, two accredited short courses per year (of three weeks each) are offered to Official Veterinarians (i.e., those who wish to work in slaughterhouses, for whom this training is mandatory). In these courses, basic epidemiology, statistics, and risk assessment are taught as a prelude to using HACCP effectively. Also offered is a Master of Veterinary Public Health (MVPH) degree program that emphasizes the importance of risk analysis in veterinary public health. One module is entirely focused on quantitative methods and risk assessment; another focuses heavily on risk communication. The whole program is almost exclusively concerned with risks pertaining to the interface between animal and human health.

<http://www.gla.ac.uk/vet/>

*Personal communication, June 2010.*

### **United States**

#### **Colorado State University**

The Colorado State University College of Veterinary Medicine does not offer specific courses in risk assessment/risk analysis for animal health. This topic is covered as part of the basic veterinary epidemiology teaching materials in different courses. A one-week graduate course, however, is offered in international animal health risk assessment through a cooperative agreement with USDA:APHIS and

USADA:FAS. In addition, a regular annual two-week course in international veterinary epidemiology, sponsored by USDA:FAS, includes two days of lectures and demonstration on this topic.

<http://www.cvmb.colostate.edu/ns/>

*Personal communication, July 2010.*

### **Iowa State University**

The Iowa State University College of Veterinary Medicine offers, in the Veterinary Diagnostic and Production Animal Medicine Department, a graduate course on *Risk Assessment for Food, Agriculture and Veterinary Medicine*. This course covers risk assessment principles as applied to biological systems; exposure and effects characterization in human and animal health and ecological risk assessment; risk analysis frameworks and regulatory decision-making; and an introduction to quantitative methods for risk assessment (using epidemiological and distributional analysis).

<http://vetmed.iastate.edu/>

*Personal communication, July 2010.*

### **Michigan State University**

Michigan State University College of Veterinary Medicine does not offer specific courses on risk assessment, but the *Veterinary Epidemiology* course includes two lectures on risk assessment. This course is offered to second-year veterinary students.

<http://cvm.msu.edu/>

*Personal communication, July 2010.*

### **North Carolina State University**

North Carolina State University College of Veterinary Medicine offers an *Agricultural Health and Trade* course for graduate students. In this course, risk assessment is examined mainly from the point of view of the WTO and how risk assessment affects agriculture, including developing nations.

The College is putting together a certificate program that will include risk assessment. Courses within this program will include *Introduction to Risk Assessment*, a mostly qualitative overview of models used for qualitative risk assessment; *Participatory Methods*, including rural appraisal; and *Design of Public Health Programs for Zoonotic Diseases*, a review of major national and international programs for disease control and program development.

<http://www.cvm.ncsu.edu/>

*Personal communication, July 2010.*

**Ohio State University**

Ohio State University College of Veterinary Medicine does not cover risk assessment at the undergraduate level, but it does offer some courses at the graduate level: *Zoonotic Diseases, Food-borne Diseases, Food Animal Production Systems and Food Safety* and, *Biosecurity, Environmental Health, and Other Veterinary Public Health Topics*. These courses are core courses in the Veterinary Public Health specialization in the Master of Public Health program and are electives in some PhD and M.Sc. programs. Another elective course, *Communicable Diseases*, is also available to graduate students.

<http://www.vet.ohio-state.edu/>

*Personal communication, July 2010.*

**Purdue University**

At Purdue University School of Veterinary Medicine, there are no specific courses on risk assessment. Risk assessment is addressed in the context of quantifying risk factors in epidemiological studies at the graduate level. It is incorporated into different lectures, but there is no risk assessment lecture *per se*. Previously, an elective graduate course, *Risk Assessment Models and Applications*, was offered. This course focused on environmental epidemiology and risks associated with known or suspected environmental toxins.

<http://www.vet.purdue.edu/>

*Personal communication, July 2010.*

**University of California, Davis**

University of California Davis School of Veterinary Medicine offers a course on *Health and Ecological Risk Analysis* at the graduate level. The course is described as “a methodological approach to risk analysis for human and animal-related health and ecological issues.” It covers “basic principles of risk analysis, including perception, communication, assessment, and management, with emphasis on the assessment of risk.” The course contributes and is an elective to two graduate programs: Master of Preventive Veterinary Medicine degree program and the MS/PhD in Epidemiology degree program.

<http://www.vetmed.ucdavis.edu/>

*Personal communications, July 2010*

**University of Florida**

This College of Veterinary Medicine does not offer any courses in animal health risk assessment.

<http://www.vetmed.ufl.edu/>

*Personal communication, July 2010.*

### University of Minnesota

University of Minnesota Veterinary School does not offer risk assessment courses; however, graduate students can attend short courses offered by USDA and JIFSAN. At the graduate level, some courses cover risk assessment, but most of these are in the School of Public Health.

<http://www.cvm.umn.edu/>

*Personal communication, July 2010.*

### Washington State University

Although the College of Veterinary Medicine and School for Global Animal Health does not offer specific risk assessment courses, it does have several courses that touch on the fundamentals of risk assessment or application of such fundamentals (i.e., *Emerging and Exotic Diseases of Animals*, *Herd Production Medicine*, and *Population Medicine*).

<http://www.vetmed.wsu.edu/>

*Personal communication, July and August 2010.*

### 3. Summary of Findings

International veterinary programs offer a benchmark against which to compare animal health risk assessment training in Canada. Such a comparison shows that Canadian veterinary colleges have university-level course offerings comparable to those of many international peer institutions. As is the case in many other countries, veterinary schools in Canada offer at least some training in risk assessment through undergraduate courses on broader topics in DVM programs. As outlined in the report of the Expert Panel on Approaches to Animal Health Risk Assessment, however, no program currently offers a curriculum that fully reflects the importance of integrated animal-human health risk assessment. By contrast, animal health risk assessment training at the graduate level of some veterinary colleges in other countries, such as the United States and the United Kingdom, appears to be more specialized and extensive.

An overall trend toward expanding course offerings is noted. This likely reflects the increasing awareness of the importance of animal health, as well as the heightened perception of risks to animal and human health due to increased global trade and migration, climate change, and other factors. Further expanding the animal health risk assessment training offered in DVM programs and graduate programs across Canada could enhance expertise and help ensure knowledge capacity is available to respond to these needs. For further discussion and analysis of these and other trends relating to animal health risk assessment, see the report of the Expert Panel on Approaches to Animal Health Risk Assessment on the website of the Council of Canadian Academies at: [www.scienceadvice.ca/animal-health.aspx](http://www.scienceadvice.ca/animal-health.aspx).

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