



Rabies revaccination for companion animals: Canadian data

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Introduction

Rabies is widespread in Canada, although, traditionally, the majority of reported cases have occurred in Ontario (85%) and, to a lesser extent, in Saskatchewan (10%). Since 1958, over 60 000 rabies cases have been recorded, with approximately 75% of them occurring in wildlife and the remainder in livestock and companion animals. Between 1965 and 1986, annual diagnoses of rabies varied between 1400 and 2500 across Canada, peaking at 4131 cases in 1986 (1; R. Rogers, Canadian Food Inspection Agency, personal communication). Since that time, there has been a dramatic decline in the number of reported rabies cases in all species; in 1997, 238 cases were reported of which 100 were in Ontario, 56 in Manitoba, 39 in Quebec, and 16 in Saskatchewan. Although all mammals can be infected with rabies virus, strains of rabies virus have been identified that have predilections for certain species. The control of the fox strain in Ontario in the last 10 years through oral baiting is primarily responsible for the significant decline in reported rabies cases. Unfortunately, a raccoon strain of rabies moving up from the United States threatens this method of control, and there are still significant numbers of bats and skunks diagnosed with rabies.

Although prior to 1945, dogs accounted for the majority of the cases of rabies in Canada, vaccination, animal control, and regulatory measures have reduced the incidence of rabies in dogs. Vaccines against rabies for dogs are currently available with 1-, 2-, and 3-year label recommendations, while for cats, 1- and 3-year vaccines are available. Despite the availability of vaccines providing longer term duration of immunity, many veterinarians in Canada continue to use rabies vaccine on an annual basis, even when using triennial products. In some cases, there appears to be significant confusion as to regulatory requirements; in others, there may be a lack of confidence in using triennial products according to label recommendations.

Vaccine use across Canada

The provinces

In a telephone survey of the use of rabies vaccines across Canada, significant variability existed with regard to revaccination policies or procedures (provincial medical associations, personal communication). In

Newfoundland, small animal practitioners currently recommend triennial vaccination; some practitioners have even discontinued rabies vaccination for indoor cats and those that do not travel outside the island. Dogs and cats in areas of Labrador with minimal private veterinary care receive vaccination from lay vaccinators, usually public health nurses. Although a triennial schedule is recommended for these pets, the nature of the vaccination times prevents strict adherence to this policy; pets are often vaccinated only when vaccinations are available in the community. Emphasis is given to vaccinating in the months prior to an anticipated outbreak.

Although the city of Halifax, with 35% of the population of Nova Scotia, previously required annual revaccination in order for pet owners to receive a discount on pet licenses, the majority of practitioners in the province revaccinate triennially against rabies. Pets that are travelling may receive annual revaccination if proceeding to areas where vaccination against rabies is required annually by law.

Like practitioners in Nova Scotia and Newfoundland, practitioners on Prince Edward Island recommend triennial vaccination, unless pets are travelling. The New Brunswick Veterinary Medical Association recommends annual revaccination against rabies, with some New Brunswick municipalities requiring proof of annual vaccination in order to obtain a pet license. The decision to vaccinate annually may be due, in part, to recommendations in Ontario to do the same. In Quebec, most veterinarians administer rabies vaccines annually, although some veterinarians in Montreal vaccinate biennially.

Ontario has widespread use of annual revaccination protocols, primarily due to confusion over legal requirements and due to the historically high incidence of rabies in the province. In a review of vaccination policies in 1996, the small animal committee of the Ontario Veterinary Medical Association recommended annual revaccination, although the Association has not endorsed the recommendation (2).

Practitioners in Manitoba vaccinate annually to triennially. In one practice, for example, dogs are vaccinated every 2 y, cats every 3 y. In Saskatchewan, practitioners apply the triennial protocol to low risk animals, presumably they vaccinate higher risk pets more frequently. Alberta has no standard policy; the majority of pets are vaccinated against rabies biennially or triennially. In British Columbia, veterinarians give the vaccine every 3 y.

Despite the variation in protocols for revaccinating against rabies around the country, all vaccination

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protocols require an initial vaccination after 3 mo of age and a booster at 1 y of age.

The veterinary colleges

Recommended protocols for vaccination against rabies also vary with each veterinary college. Both the Ontario Veterinary College and the Faculté de médecine vétérinaire recommend using rabies vaccines according to the label recommendations and encourage the use of triennial products. The Atlantic Veterinary College recommends annual use for pets travelling to Ontario, on the presumption that there are legal requirements in Ontario for annual vaccination against rabies. The Western College of Veterinary Medicine recommends annual vaccination for those pets travelling or for pets that may have exposure to wildlife.

In response to concerns over the efficacy of using triennial rabies vaccines, the following describes the regulatory requirements and the biologic manufacturers' trials and experience with the vaccines.

Regulations

Federal

Vaccines against rabies are licensed according to challenge studies for the term that the license is granted. In Canada, the Veterinary Biologics and Biotechnology Section of the Animal Health and Production Division, Canadian Food Inspection Agency (CFIA), regulates and licenses rabies vaccines for either 1, 2, or 3 y. All vaccines against rabies currently licensed in Canada for use in companion animals and livestock are manufactured in the United States. Minimum standards for the acceptance of vaccination challenge studies are described in the Code of Federal Regulations (3). Challenge is by injection of live rabies virus into the masseter muscle of animals that have received a single dose of a rabies vaccine. At the end of the challenge study, 22 out of 25 (88%) or 26 out of 30 (87%) of the vaccinated animals must have resisted challenge to virus, lethal enough to kill 80% of the controls. It must be recognized that all vaccines currently on the market exceed the requirement. In addition, manufacturers must satisfy regulatory concerns over the safety, purity, and potency of their vaccine to allow sale of that vaccine in Canada.

Until recently, manufacturers of vaccines against rabies provided a caveat to biennial and triennial revaccination, suggesting that animals in high risk areas may benefit from more frequent revaccination than recommended on the label. Presently, vaccines licensed for triennial use no longer carry this caveat, recommending only that the vaccine be used according to label recommendations. Prorab (Intervet Canada, Whitby, Ontario) has just received government approval for a similar statement to be removed and its label is due to be changed very soon. The removal of the caveat is due to the lack of scientific data to support such a caveat.

The Federal Rabies Control Program, managed by the CFIA, regulates rabies in Canada for investigation, submissions, and quarantine. The period of quarantine for a rabies contact domestic pet is determined by the revaccination schedule recommended by the Compendium of Animal Rabies Control (4). A dog or cat vaccinated against rabies with a 2- or a 3-year product

that was exposed to rabies would have to be quarantined from 30 d to 3 mo, the same as for a pet vaccinated with a 1-year product, provided that the licensed terms for the vaccinations had not expired. However, should the pet be unvaccinated or have an expired vaccination at the time of rabies exposure, the quarantine is at least 6 mo.

The CFIA also regulates the importation of dogs and cats into Canada. Dogs and cats entering Canada must have proof of having been vaccinated against rabies within 3 y and more than 30 d from the date of travel.

Provincial

Contrary to widespread belief, there is no provincial legal requirement for *annual* revaccination for rabies in Ontario or in any other Canadian province. In Ontario, where annual revaccination against rabies is common, the legal requirements for revaccination are often misunderstood (4). Ontario Regulation (OR) 567/90 governs the compulsory vaccination against rabies in Ontario, requiring that cats and dogs receive vaccination against rabies in those areas where risk is considered high (5). Section 3 of the regulation states, "every animal...shall be re-immunized in accordance with the date prescribed in the certificate of immunization issued with respect to the animal," and Section 4(b) states, "immunization against rabies shall be...by inoculation with a rabies vaccine that is licensed for use in Canada and that is administered in accordance with the instructions of the manufacturer who produced the vaccine."

According to Dr. Chuck Leber of the Ontario Ministry of Health, "if a health unit determines that a pet was vaccinated against rabies more than 12 mo but less than 36 mo from the previous one and the vaccine has a 3-year duration, the animal is immunized and the owner cannot be charged for violation of OR567. However, if the vaccine has a 1-year duration, the owner can be charged. In any event, neither health units nor the Ontario Ministry of Health is in a position to indicate what duration of vaccine is to be used." Currently, 31 health units in Ontario require compulsory vaccination against rabies. In contacting the health units, all confirmed that the decision to revaccinate is governed by the above regulation and determined by the local veterinarians; however, a small number have recommended annual revaccination after consultation with local veterinary groups.

United States of America

In the USA, the use of rabies vaccines is guided by recommendations from the National Association of State Public Health Veterinarians, which are published in the annual Compendium of Animal Rabies Control (6). "In comprehensive rabies control programs, only vaccines with a 3-year duration of immunity should be used" (6) and animals should be vaccinated in accordance with the label recommendations for the vaccines. Although some veterinarians and some states continue to endorse or require the use of rabies vaccines more frequently, most follow the label recommendations for triennial vaccines. In 9 of 22 US veterinary colleges, annual vaccination against rabies is still required by state law; the rest recommend triennial vaccination (7). Efforts are currently underway to remove state regulatory

requirements for annual rabies revaccination where it still exists.

For pets entering the USA from Canada, the Center for Disease Control of the Department of Health and Human Services regulates importation and also requires proof of vaccination against rabies in dogs, recognizing the date of vaccination expiry depending on the type of vaccine used (8). If the appropriate date of vaccination expiry is not mentioned, the requirement for revaccination defaults to annual. Interestingly, cats entering the USA are exempt from requiring proof of having been vaccinated against rabies. Despite this, it appears that pet owners crossing into the USA may, on occasion, be asked for proof of rabies vaccination within the year, due to confusion over the regulation by U.S. Customs officials. Furthermore, 14 members of the International Air Transport Association have published a Travel Information Manual, which incorrectly advises travellers that proof of vaccination for rabies more than 30 d and less than 12 mo is required for travel into the USA from Canada. Clarification of the U.S. Customs import requirements can be obtained from its Web site (9).

Pets residing in the United States will be under further regulation by the state of residence. Owners should inquire as to the specific requirements for vaccination against rabies in each area. Information on specific state requirements can be obtained through the U.S. Department of Agriculture (USDA) Web site (10). Because proof of vaccination within 12 mo and more than 30 d from the date of travel is required for travel to some other countries, veterinarians and pet owners are advised to check appropriate regulations prior to travel.

Concerns with revaccination protocols

Impetus to reconsider rabies revaccination protocols follows an increased veterinary and public awareness of potentially serious side-effects with respect to vaccination. Rabies vaccines have been implicated in the development of life-threatening fibrosarcomas in cats; vaccines have also been associated with other adverse disorders, such as immune-mediated thrombocytopenia and anemia (11). As a result, some veterinary groups and veterinary schools have begun advocating less frequent use of vaccines, and only to animals considered to be at significant risk.

In February 1998, the Canadian Veterinary Medical Association (CVMA) met with representatives of the Canadian Animal Health Institute, representing the manufacturers of biologics, and the Veterinary Biologics and Biotechnology Section of the CFIA, and their counterparts in the USDA (12). After hearing presentations from Dr. Stephen Kruth of the University of Guelph and Dr. John Ellis of the University of Saskatchewan, the CVMA published a statement on vaccine protocols, recommending that, at this time, veterinarians use biologics according to label recommendations. As many veterinarians in Ontario and Quebec and some in other parts of Canada continue to use rabies vaccines more frequently than is recommended by the label, the potential exists for the public to question the use of the vaccine, unless more frequent use is justifiable. This can seriously

erode veterinarians' credibility with regard to their current recommendations for all vaccines.

Efficacy of 3-year vaccines

Proof of efficacy of a triennial vaccine is provided not only through regulatory testing but by trials conducted by manufacturers themselves. According to all 3 manufacturers of 3-year rabies products, their vaccines provided anywhere from 90% to 100% efficacy from challenge with rabies virus after only one vaccine dose, in both dogs and cats (Pfizer, Ayerst, Merial, personal communication). Results for 1-year products were not significantly better. Furthermore, there are many reports in the literature of challenge studies to rabies vaccines, 3 y postvaccination, showing effective immunity (13).

Efficacy of triennial vaccines used in the field is demonstrated from 2 sources. Bech-Nielsen (14) concluded that, in Illinois, the transition from 1-year to 3-year licensed products "did not significantly affect the number of reported dog rabies cases in the 6 years following the change. This is an example of the typical experience associated with change in legislated vaccination schedule." Also, New York State has experienced a huge increase in the incidence of rabies over the last 10 y, going from an average of less than 40 to over 1000 cases annually, including wildlife, farm animals, and companion animals. Two thousand seven hundred and forty-six cases were reported in 1993 alone. Despite the increase, blamed primarily on the influx of the raccoon strain of rabies into the state, there has been no significant increase in the incidence of rabies in vaccinated dogs and cats. Dr. Chuck Trimarchi of the New York State Department of Health confirmed that there is widespread use of triennial products in New York State by veterinarians.

Previous studies have found up to 14% of dogs or cats diagnosed with rabies as having previously received rabies vaccines (15–17). The 1988 study found that out of 119 cases of rabies in dogs and cats for that year, 18 animals had previously received rabies vaccination (16). However, upon further analysis, 14 of the 18 had expired vaccinations, with either 1-year or 3-year vaccines. Two cats and 2 dogs diagnosed with rabies that had current vaccinations for rabies had received only the first vaccination and no booster a year later, and one of them had received the rabies vaccine within a month of illness and may have been infected prior to vaccination.

The CFIA has informal data to suggest up to 10% of dogs and 3% of cats diagnosed with rabies between 1993 and 1995 had previously received rabies vaccines (R. Rogers, CFIA, personal communication). Unfortunately, at this time, details of the vaccination status of the animals, age of animals, number of previous vaccines, and types of vaccines used are not known. With regard to 3-year products, Dr. Suzanne Jenkins, staff epidemiologist and chairperson for the U.S. National Association of State Public Health Veterinarians, is not aware of any cases of rabies in dogs or cats in the United States where the pets had received the first rabies vaccine followed by the first booster 1 y later, as is recommended by the manufacturer's label; reports do exist of pets having received only the initial vaccination developing rabies after contact with a carrier animal.

Conclusion

There is a need to reexamine the widespread annual revaccination against rabies in companion animals in parts of Canada, particularly where triennially licensed products are used. Contrary to widely held beliefs, legal requirements for annual rabies revaccination exist in only a few local jurisdictions, mostly in New Brunswick. The decision of which type of rabies vaccine to use and the frequency of vaccination are determined solely by the veterinarian in most places.

While significant data support the efficacy of triennial vaccines used according to label recommendations, more studies are needed to assess field efficacy. Beginning in 1999, the Center for Disease Control in the United States will be conducting a prospective study on rabies in the United States, collecting further information on vaccination status and types of vaccines used for dogs and cats that contract rabies.

Given concerns with adverse reactions to vaccines, in particular the association between rabies vaccines and feline fibrosarcomas, revaccination protocols should be designed to maximize protection of the pet and public, while minimizing unnecessary boosters.

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