

Public Veterinary Medicine: Public Health

Compendium of Animal Rabies Prevention and Control, 2001

The National Association of State Public Health Veterinarians (NASPHV) is pleased to provide the 2001 version of the *Compendium of Animal Rabies Prevention and Control* for your use and distribution to practicing veterinarians and officials in animal control, public health, wildlife management, and agriculture in each state. This preface summarizes the changes that were made in the document this year and gives some of the rationale for the changes.

Compendium Changes

New rabies vaccines have not been added to the list of vaccines licensed and marketed in the United States. Several combination vaccines that were licensed last year were removed from the list because they are not being marketed at present.

In Part I: E. Accidental Human Exposure to Vaccine, a line was added to the information on accidental human exposure to rabies vaccine regarding the need to report exposure to vaccinia-vectored vaccines to state health officials. Because vaccinia virus can infect humans and could represent an additional risk for immunocompromised individuals, all oral rabies vaccine programs that use vaccinia-vectored vaccines should include this reporting requirement in the plans for vaccine use. Of special note is that since the compendium committee met, culture-confirmed vaccinia infection has been reported at the site of a bite wound inflicted when the patient was bitten while trying to remove a vaccine laden bait from a dog's mouth.

A designation for tag color and shape has not been included for year 2004 and in Part I: F. Identification of

Vaccinated Animals, the language has been changed from standardized tag systems "should" be adopted to "may" be adopted. After much discussion, the compendium committee reached consensus that the most important tag is one that identifies an animal in such a way that its rabies vaccination status can be ascertained. Proof of rabies vaccination should be based on a written certificate (or some other documentation) from a veterinarian or animal control agency and not on a tag that can be easily exchanged between animals. In addition, there appears to be confusion about tags indicating rabies vaccination versus those used for licensing, and there is inconsistency in how to use the year-specific tags when vaccines with a three-year duration of immunity are used. Finally, the compendium committee recognizes that new methods of pet identification are rapidly coming into widespread use, which is addressed in Part III: B. 4. (a) Control Methods in Domestic and Confined Animals, Adjunct Procedures.

The statement recommending state laws prohibiting the importation, distribution, or relocation of wild animals or hybrids was moved from Part III: B. 1. (c), to Part III: A. 4.

Language was added to Part III: B. 1. Control Methods in Domestic and Confined Animals, Preexposure Vaccination and Management, to clarify how soon after a booster vaccination an animal is considered currently vaccinated, ie, immediately after a booster vaccination. In Part III: B. 1. (a), the language was changed to clarify the interpretation of vaccine status for an animal that is overdue when it receives a booster vaccination. Dogs, cats, and ferrets that have been previously vaccinated but are overdue for a booster do not have to start the series over and can be considered currently vaccinated as soon as the booster is received. This only applies to routine boosters and not to postexposure management. Refer to Part III: B. 5. (a). In Part III: B. 1. (b), language was added recommending vaccination of horses that travel interstate.

Part III: B. 3. Control Methods in Domestic and Confined Animals, Importation and Interstate Movement of Animals, was changed to include a Web site for obtaining information on rabies vaccination requirements for animals entering the United States and to clarify roles of the Division of Quarantine and of state and local officials.

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Endorsed by the American Veterinary Medical Association (AVMA) and the Council of State and Territorial Epidemiologists (CSTE).

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Part III: C. Control Methods in Wildlife, was expanded to recommend against translocation of known terrestrial reservoirs of rabies. Part III: C. 1. was expanded to include agriculture agencies among those

that should be consulted on vaccination or population reduction programs, and the words planning and evaluation were added as additional activities to be addressed.

The purpose of this Compendium is to provide rabies information to veterinarians, public health officials, and others concerned with rabies prevention and control. These recommendations serve as the basis for animal rabies-control programs throughout the United States and facilitate standardization of procedures among jurisdictions, thereby contributing to an effective national rabies-control program. This document is reviewed annually and revised as necessary. Vaccination procedure recommendations are contained in Part I; all animal rabies vaccines licensed by the United States Department of Agriculture (USDA) and marketed in the United States are listed in Part II; Part III details the principles of rabies control.

Part I: Recommendations for Parenteral Vaccination Procedures

- A) **VACCINE ADMINISTRATION:** All animal rabies vaccines should be restricted to use by, or under the direct supervision of, a veterinarian.
- B) **VACCINE SELECTION:** Part II lists all vaccines licensed by USDA and marketed in the United States at the time of publication. New vaccine approvals or changes in label specifications made subsequent to publication should be considered as part of this list. Vaccines used in state and local rabies control programs should have a 3-year duration of immunity. This constitutes the most effective method of increasing the proportion of immunized dogs and cats in any population.
- C) **ROUTE OF INOCULATION:** All vaccines must be administered in accordance with the specifications of the product label or package insert. Adverse reactions and vaccine failures should be reported to USDA, Animal and Plant Health Inspection Service, Center for Veterinary Biologics at (800) 752-6255 or by e-mail at CVB@usda.gov.
- D) **WILDLIFE AND HYBRID ANIMAL VACCINATION:** The efficacy of parenteral rabies vaccination of wildlife and hybrids (the offspring of wild

animals crossbred to domestic dogs and cats) has not been established, and no such vaccine is licensed for these animals. Zoos or research institutions may establish vaccination programs which attempt to protect valuable animals, but these should not replace appropriate public health activities that protect humans.

- E) **ACCIDENTAL HUMAN EXPOSURE TO VACCINE:** Human exposure to parenteral animal rabies vaccines listed in Part II does not constitute a risk for rabies infection. However, human exposure to vaccinia-vectored oral rabies vaccines should be reported to state health officials.
- F) **IDENTIFICATION OF VACCINATED ANIMALS:** Agencies and veterinarians may adopt the standard tag system to aid in the administration of animal rabies control procedures.
 - 1) **RABIES TAGS**

YEAR	COLOR	SHAPE
2001	Blue	Rosette
2002	Orange	Oval
2003	Green	Bell
 - 2) **RABIES CERTIFICATE:** All agencies and veterinarians should use the NASPHV Form #51, "Rabies Vaccination Certificate," which can be obtained from vaccine manufacturers. Computer-generated forms containing the same information are acceptable.

Part II: Rabies Vaccines Licensed and Marketed in the United States, 2001

Product Name	Produced by	Marketed by	For use in	Dosage	Age at primary vaccination ¹	Booster recommended	Route of inoculation
A) MONOVALENT (Inactivated)							
TRIMUNE	Fort Dodge Animal Health License No. 112	Fort Dodge Animal Health	Dogs	1 ml	3 months	1 year later & triennially	IM ²
			Cats	1 ml	3 months		IM
ANNUMUNE	Fort Dodge Animal Health License No. 112	Fort Dodge Animal Health	Dogs	1 ml	3 months	Annually	IM
			Cats	1 ml	3 months		IM
DEFENSOR 1	Pfizer, Incorporated License No. 189	Pfizer, Incorporated	Dogs	1 ml	3 months	Annually	IM or SC ³
			Cats	1 ml	3 months		SC
DEFENSOR 3	Pfizer, Incorporated License No. 189	Pfizer, Incorporated	Dogs	1 ml	3 months	1 year later & triennially	IM or SC
			Cats	1 ml	3 months		SC
			Sheep	2 ml	3 months	Annually	IM
			Cattle	2 ml	3 months		IM
RABDOMUN	Pfizer, Incorporated License No. 189	Schering-Plough	Dogs	1 ml	3 months	1 year later & triennially	IM or SC
			Cats	1 ml	3 months		SC
			Sheep	2 ml	3 months	Annually	IM
			Cattle	2 ml	3 months		IM
RABDOMUN 1	Pfizer, Incorporated License No. 189	Schering-Plough	Dogs	1 ml	3 months	Annually	IM or SC
			Cats	1 ml	3 months		SC

Part II: Rabies Vaccines Licensed and Marketed in the United States, 2001, continued

RABVAC 1	Fort Dodge Animal Health License No. 112	Fort Dodge Animal Health	Dogs Cats	1 ml 1 ml	3 months 3 months	Annually Annually	IM or SC IM or SC
RABVAC 3	Fort Dodge Animal Health License No. 112	Fort Dodge Animal Health	Dogs Cats Horses	1 ml 1 ml 2 ml	3 months 3 months 3 months	1 year later & triennially 1 year later & triennially Annually	IM or SC IM or SC IM
PRORAB-1	Intervet, Incorporated License No. 286	Intervet, Incorporated	Dogs Cats Sheep	1 ml 1 ml 2 ml	3 months 3 months 3 months	Annually Annually Annually	IM or SC IM or SC IM
PRORAB-3F	Intervet, Incorporated License No. 286	Intervet, Incorporated	Cats	1 ml	3 months	1 year later & triennially	IM or SC
IMRAB 3	Merial, Incorporated License No. 298	Merial, Incorporated	Dogs Cats Sheep Cattle Horses Ferrets	1 ml 1 ml 2 ml 2 ml 2 ml 1 ml	3 months 3 months 3 months 3 months 3 months 3 months	1 year later & triennially 1 year later & triennially 1 year later & triennially Annually Annually Annually	IM or SC IM or SC IM or SC IM or SC IM or SC SC
IMRAB BOVINE PLUS	Merial, Incorporated License No. 298	Merial, Incorporated	Cattle Horses Sheep	2 ml 2 ml 2 ml	3 months 3 months 3 months	Annually Annually 1 year later & triennially	IM or SC IM or SC IM or SC
IMRAB 1	Merial, Incorporated License No. 298	Merial, Incorporated	Dogs Cats	1 ml 1 ml	3 months 3 months	Annually Annually	IM or SC IM or SC
B) MONOVALENT (Rabies glycoprotein, live canary pox vector)							
PUREVAX Feline Rabies	Merial, Incorporated License No. 298	Merial, Incorporated	Cats	1ml	8 weeks	Annually	SC
C) COMBINATION (Inactivated rabies)							
ECLIPSE 3 + FeLV/R	Fort Dodge Animal Health License No. 112	Schering-Plough	Cats	1 ml	3 months	Annually	IM or SC
ECLIPSE 4 + FeLV/R	Fort Dodge Animal Health License No. 112	Schering-Plough	Cats	1 ml	3 months	Annually	IM or SC
Fel-O-Guard 3 + FeLV/R	Fort Dodge Animal Health License No. 112	Fort Dodge Animal Health	Cats	1 ml	3 months	Annually	IM or SC
Fel-O-Guard 4 + FeLV/R	Fort Dodge Animal Health License No. 112	Fort Dodge Animal Health	Cats	1 ml	3 months	Annually	IM or SC
Fel-O-Vax PCT-R	Fort Dodge Animal Health License No. 112	Fort Dodge Animal Health	Cats	1 ml	3 months	1 year later & triennially	IM
Feline 3 + IMRAB	Merial, Incorporated License No. 298	Merial, Incorporated	Cats	1 ml	3 months	1 year later & triennially	SC
Feline 4 + IMRAB	Merial, Incorporated License No. 298	Merial, Incorporated	Cats	1 ml	3 months	1 year later & triennially	SC
MYSTIQUE II POTOMAVAC +	Bayer Corporation License No. 52	Bayer Corporation	Horses	1 ml	3 months	Annually	IM
EQUINE POTOMAVAC + IMRAB	Merial, Incorporated License No. 298	Merial, Incorporated	Horses	1 ml	3 months	Annually	IM
D) COMBINATION (Rabies glycoprotein, live canary pox vector)							
PUREVAX Feline 3/ Rabies	Merial, Incorporated License No. 298	Merial, Incorporated	Cats	1ml	8 weeks	Annually	SC
PUREVAX Feline 3/ Rabies + LEUCAT	Merial, Incorporated License No. 298	Merial, Incorporated	Cats	1ml	8 weeks	Annually	SC
PUREVAX Feline 4/ Rabies + LEUCAT	Merial, Incorporated License No. 298	Merial, Incorporated	Cats	1ml	8 weeks	Annually	SC
E) ORAL (Rabies glycoprotein, live vaccinia vector) - RESTRICTED TO USE IN STATE AND FEDERAL RABIES CONTROL PROGRAMS							
RABORAL V-RG	Merial, Incorporated License No. 298	Merial, Incorporated	Raccoons	N/A	N/A	As determined by local authorities	Oral

¹Minimum age (or older) and revaccinated one year later. ²Intramuscularly. ³Subcutaneously.

Part III: Rabies Control

A) PRINCIPLES OF RABIES CONTROL

- 1) **RABIES EXPOSURE:** Rabies is transmitted only when the virus is introduced into bite wounds or open cuts in skin or onto mucous membranes.
- 2) **HUMAN RABIES PREVENTION:** Rabies in humans can be prevented either by eliminating

exposures to rabid animals or by providing exposed persons with prompt local treatment of wounds combined with human rabies immune globulin and vaccine. The rationale for recommending preexposure and postexposure rabies prophylaxis and details of their administration can be found in the current recommendations of the Advisory Committee on Immunization

Practices (ACIP).¹ These recommendations, along with information concerning the current local and regional status of animal rabies and the availability of human rabies biologics, are available from state health departments.

- 3) **DOMESTIC ANIMALS:** Local governments should initiate and maintain effective programs to ensure vaccination of all dogs, cats, and ferrets and to remove strays and unwanted animals. Such procedures in the United States have reduced laboratory-confirmed cases of rabies in dogs from 6,949 in 1947 to 111 in 1999. Because more rabies cases are reported annually involving cats (278 in 1999) than dogs, vaccination of cats should be required. The recommended vaccination procedures and the licensed animal vaccines are specified in Parts I and II of the Compendium.
- 4) **RABIES IN WILDLIFE:** The control of rabies among wildlife reservoirs is difficult. Vaccination of free-ranging wildlife or selective population reduction might be useful in some situations, but the success of such procedures depends on the circumstances surrounding each rabies outbreak. (See Part C. Control Methods in Wildlife.) Because of the risk of rabies in wild animals (especially raccoons, skunks, coyotes, foxes, and bats), the AVMA, the NASPHV, and the CSTE strongly recommend the enactment of state laws prohibiting their importation, distribution, and relocation.
- 5) **RABIES SEROLOGY:** Evidence of circulating rabies virus neutralizing antibodies should not be used as a substitute for current vaccination in managing rabies exposures or determining the need for booster vaccinations.

B. CONTROL METHODS IN DOMESTIC AND CONFINED ANIMALS

1) PREEXPOSURE VACCINATION AND MANAGEMENT

Parenteral animal rabies vaccines should be administered only by, or under the direct supervision of, a veterinarian. This ensures that a qualified and responsible person can be held accountable to assure the public that the animal has been properly vaccinated. Within 1 month after primary vaccination, a peak rabies antibody titer is reached and the animal can be considered immunized. An animal is currently vaccinated and is considered immunized if the primary vaccination was administered at least 30 days previously and vaccinations have been administered in accordance with this Compendium. Regardless of the age of the animal at initial vaccination, a booster vaccination should be administered 1 year later. (See Parts I and II for vaccines and procedures) Because a rapid anamnestic response is expected, an animal is considered currently vaccinated immediately after a booster vaccination.

a) DOGS, CATS, AND FERRETS

All dogs, cats, and ferrets should be vacci-

nated against rabies and revaccinated in accordance with Part II of this Compendium. If a previously vaccinated animal is overdue for a booster, it should be revaccinated with a single dose of vaccine. Immediately following the booster, the animal is considered currently vaccinated and should be placed on an annual or triennial schedule depending on the type of vaccine used.

b) LIVESTOCK

Vaccinating all livestock against rabies is neither economically feasible nor justified from a public health standpoint. However, consideration should be given to vaccinating livestock that are particularly valuable or that might have frequent contact with humans. Horses traveling interstate should be currently vaccinated against rabies.

c) CONFINED ANIMALS

1) WILD

No parenteral rabies vaccine is licensed for use in wild animals. Wild animals or hybrids should not be kept as pets.

2) MAINTAINED IN EXHIBITS AND IN ZOOLOGICAL PARKS

Captive animals that are not completely excluded from all contact with rabies vectors can become infected. Moreover, wild animals might be incubating rabies when initially captured; therefore, wild-caught animals susceptible to rabies should be quarantined for a minimum of 6 months before being exhibited. Employees who work with animals at such facilities should receive preexposure rabies vaccination. The use of pre- or postexposure rabies vaccinations for employees who work with animals at such facilities might reduce the need for euthanasia of captive animals. Carnivores and bats should be housed in a manner that precludes direct contact with the public.

2) STRAY ANIMALS

Stray dogs, cats, and ferrets should be removed from the community. Local health departments and animal control officials can enforce the removal of strays more effectively if owned animals are confined or kept on leash. Strays should be impounded for at least 3 days to determine if human exposure has occurred and to give owners sufficient time to reclaim animals.

3) IMPORTATION AND INTERSTATE MOVEMENT OF ANIMALS

a) INTERNATIONAL

The CDC regulates the importation of dogs and cats into the United States. Imported dogs must satisfy rabies vaccination requirements (42 CFR, Part 71.51[c], www.cdc.gov/ncidod/dq/lawsand/htm). The appropriate health official of the state of des-

tinuation should be notified within 72 hours of the arrival into his or her jurisdiction of any imported dog required to be placed in confinement under the CDC regulation. Failure to comply with these requirements should be promptly reported to the Division of Quarantine, CDC, (404) 639-8107.

The CDC regulations alone are insufficient to prevent the introduction of rabid animals into the country. All imported dogs and cats are subject to state and local laws governing rabies and should be currently vaccinated against rabies in accordance with the Compendium. Failure to comply with state or local requirements should be referred to the appropriate state or local official.

b) **INTERSTATE**

Before interstate movement, dogs, cats, and ferrets should be currently vaccinated against rabies in accordance with the Compendium's recommendations (See Part III, B.1. Preexposure Vaccination and Management). Animals in transit should be accompanied by a currently valid NASPHV Form #51, Rabies Vaccination Certificate. When an interstate health certificate or certificate of veterinary inspection is required, it should contain the same rabies vaccination information as Form #51.

4. ADJUNCT PROCEDURES

Methods or procedures which enhance rabies control include the following:

- a) **IDENTIFICATION.** Dogs, cats and ferrets should be identified (eg, metal or plastic tags, microchips, etc.) to allow for verification of rabies vaccination status.
- b) **LICENSURE.** Registration or licensure of all dogs, cats, and ferrets may be used to aid in rabies control. A fee is frequently charged for such licensure and revenues collected are used to maintain rabies- or animal-control programs. Vaccination is an essential prerequisite to licensure.
- c) **CANVASSING OF AREA.** House-to-house canvassing by animal control personnel facilitates enforcement of vaccination and licensure requirements.
- d) **CITATIONS.** Citations are legal summonses issued to owners for violations, including the failure to vaccinate or license their animals. The authority for officers to issue citations should be an integral part of each animal-control program.
- e) **ANIMAL CONTROL.** All communities should incorporate stray animal control, leash laws, and training of personnel in their programs.

5) POSTEXPOSURE MANAGEMENT

ANY ANIMAL POTENTIALLY EXPOSED TO RABIES VIRUS (See Part III, A. 1. Rabies Exposure) BY A WILD, CARNIVOROUS MAM-

MAL OR A BAT THAT IS NOT AVAILABLE FOR TESTING SHOULD BE REGARDED AS HAVING BEEN EXPOSED TO RABIES.

a) **DOGS, CATS, AND FERRETS**

Unvaccinated dogs, cats, and ferrets exposed to a rabid animal should be euthanized immediately. If the owner is unwilling to have this done, the animal should be placed in strict isolation for 6 months and vaccinated 1 month before being released. Animals with expired vaccinations need to be evaluated on a case-by-case basis. Dogs, cats, and ferrets that are currently vaccinated should be revaccinated immediately, kept under the owner's control, and observed for 45 days.

b) **LIVESTOCK**

All species of livestock are susceptible to rabies; cattle and horses are among the most frequently infected. Livestock exposed to a rabid animal and currently vaccinated with a vaccine approved by USDA for that species should be revaccinated immediately and observed for 45 days. Unvaccinated livestock should be slaughtered immediately. If the owner is unwilling to have this done, the animal should be kept under close observation for 6 months.

The following are recommendations for owners of unvaccinated livestock exposed to rabid animals:

- 1) If the animal is slaughtered within 7 days of being bitten, its tissues may be eaten without risk of infection, provided that liberal portions of the exposed area are discarded. Federal meat inspectors must reject for slaughter any animal known to have been exposed to rabies within 8 months.
- 2) Neither tissues nor milk from a rabid animal should be used for human or animal consumption. Pasteurization temperatures will inactivate rabies virus, therefore, drinking pasteurized milk or eating cooked meat does not constitute a rabies exposure.
- 3) Having more than one rabid animal in a herd or having herbivore-to-herbivore transmission is rare; therefore, restricting the rest of the herd if a single animal has been exposed to or infected by rabies might not be necessary.

c) **OTHER ANIMALS**

Other mammals bitten by a rabid animal should be euthanized immediately. Animals maintained in USDA licensed research facilities or accredited zoological parks should be evaluated on a case-by-case basis.

6) MANAGEMENT OF ANIMALS THAT BITE HUMANS

- a) A healthy dog, cat, or ferret that bites a person should be confined and observed daily

for 10 days; administration of rabies vaccine is not recommended during the observation period. Such animals should be evaluated by a veterinarian at the first sign of illness during confinement. Any illness in the animal should be reported immediately to the local health department. If signs suggestive of rabies develop, the animal should be euthanized, its head removed, and the head shipped under refrigeration (not frozen) for examination of the brain by a qualified laboratory designated by the local or state health department. Any stray or unwanted dog, cat, or ferret that bites a person may be euthanized immediately and the head submitted as described above for rabies examination.

- b) Other biting animals which might have exposed a person to rabies should be reported immediately to the local health department. Prior vaccination of an animal may not preclude the necessity for euthanasia and testing if the period of virus shedding is unknown for that species. Management of animals other than dogs, cats, and ferrets depends on the species, the circumstances of the bite, the epidemiology of rabies in the area, and the biting animal's history, current health status, and potential for exposure to rabies.

C) CONTROL METHODS IN WILDLIFE

The public should be warned not to handle wildlife. Wild mammals and hybrids that bite or otherwise expose persons, pets or livestock should be considered for euthanasia and rabies examination. A person bitten by any wild mammal should immediately report the incident to a physician who can evaluate the need for antirabies treatment (See current rabies prophylaxis recommendations of the ACIP¹). State regulated wildlife rehabilitators may play a role in a comprehensive rabies

control program. Minimum standards for persons who rehabilitate wild mammals should include rabies vaccination, appropriate training and continuing education. Translocation of infected wildlife has contributed to the spread of rabies; therefore, the translocation of known terrestrial rabies reservoir species should be prohibited.

1) TERRESTRIAL MAMMALS

The use of licensed oral vaccines for the mass vaccination of free-ranging wildlife should be considered in selected situations, with the approval of the state agency responsible for animal rabies control. Continuous and persistent government-funded programs for trapping or poisoning wildlife are not cost effective in reducing wildlife rabies reservoirs on a statewide basis. However, limited control in high-contact areas (e.g., picnic grounds, camps, suburban areas) may be indicated for the removal of selected high-risk species of wildlife. State agriculture, public health and wildlife agencies should be consulted for planning, coordination and evaluation of vaccination or population-reduction programs.

2) BATS

Indigenous rabid bats have been reported from every state except Hawaii, and have caused rabies in at least 33 humans in the United States. Bats should be excluded from houses and adjacent structures to prevent direct association with humans. Such structures should then be made bat-proof by sealing entrances used by bats. Controlling rabies in bats by programs designed to reduce bat populations is neither feasible nor desirable.

Reference

1. Centers for Disease Control and Prevention: Human rabies prevention—United States, 1999. Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR Morb Mortal Wkly Rep* 1999;48:RR-1.