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Compendium of Animal Rabies Prevention and Control, 2003

National Association of State Public Health Veterinarians, Inc. (NASPHV)

DEPARTMENT OF HEALTH AND HUMAN SERVICES
CENTERS FOR DISEASE CONTROL AND PREVENTION

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Compendium of Animal Rabies Prevention and Control, 2003*

National Association of State Public Health Veterinarians, Inc. (NASPHV)

Rabies is a fatal viral zoonosis and a serious public health problem (*1*). The purpose of this compendium is to provide 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. Parenteral vaccination procedure recommendations are contained in Part I; Part II details the principles of rabies control; all animal rabies vaccines licensed by the United States Department of Agriculture (USDA) and marketed in the United States are listed in Part III.

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 (*2*). All vaccines must be administered in accordance with the specifications of the product label or package insert.

B. Vaccine Selection. Part III 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. Any of the listed vaccines can be used for revaccination, even if the product is not the same brand as previously administered vaccines. 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 (*3*). No laboratory or epidemiologic data support the annual or biennial administration of 3-year vaccines following the initial series.

C. Adverse Events. Currently, no epidemiologic association exists between a particular licensed vaccine product and adverse events including vaccine failure. Adverse reactions or rabies in a currently vaccinated animal should be reported to USDA, Animal and Plant Health Inspection Service, Center for Veterinary Biologics at 800-752-6255 or by e-mail to 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 animals) 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 III does not constitute a risk for rabies infection. However, human exposure to vaccinia-vectored oral rabies vaccines should be reported to state health officials (*4*).

F. Identification of Vaccinated Animals. Agencies and veterinarians may adopt a standard tag system to aid in the administration of animal rabies control procedures.

1. **Rabies Tags.**

Calendar year	Color	Shape
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. This form is available at www.cdc.gov/ncidod/dvrd/rabies/professional/professi.htm. Computer-generated forms containing the same information are acceptable.

*THE NASPHV COMMITTEE: Suzanne R. Jenkins, VMD, MPH, Chair; Michael Auslander, DVM, MSPH; Lisa Conti, DVM, MPH; William B. Johnston, DVM; Mira J. Leslie, DVM, MPH; Faye E. Sorhage, VMD, MPH. CONSULTANTS TO THE COMMITTEE: Mary Currier, MD, MPH, Council of State and Territorial Epidemiologists (CSTE); Nancy Frank, DVM, MPH; American Veterinary Medical Association (AVMA) Council on Public Health and Regulatory Veterinary Medicine; Donna M. Gatewood, DVM, MS, Animal and Plant Health Inspection Service, USDA; Charles E. Rupprecht, VMD, PhD; CDC; Carolin L. Schumacher, DVM, PhD, Animal Health Institute; Charles V. Trimarchi, MS, New York State Health Department. ENDORSED BY: AVMA, CDC, and CSTE. Address all correspondence to Suzanne R. Jenkins, VMD, MPH, Virginia Department of Health Office of Epidemiology, P.O. Box 2448, Room 113, Richmond, VA 23218.

The material in this report originated in the National Center for Infectious Diseases, James M. Hughes, M.D., Director, and the Division of Viral and Rickettsial Diseases, James W. LeDuc, Ph.D., Director.

Part II: Rabies Control

A. Principles of Rabies Control

1. **Rabies Exposure.** Rabies is transmitted only when the virus is introduced into bite wounds, open cuts in skin, or onto mucous membranes (5).
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) (*5*). 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 89 in 2001 (*6*). Because more rabies cases are reported annually involving cats (270 in 2001) than dogs, vaccination of cats should be required. Animal shelters and animal-control authorities should establish policies to ensure that adopted animals are vaccinated against rabies. The recommended vaccination procedures and the licensed animal vaccines are specified in Parts I and III of the compendium.
4. **Rabies in Wildlife.** The control of rabies among wildlife reservoirs is difficult (*7*). 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 Related to 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 in animals (*8*).

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 28 days 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 28 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 III for vaccines and procedures). There are no laboratory or epidemiologic data to support the annual or biennial administration of 3-year vaccines following the initial series. 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 vaccinated against rabies and revaccinated in accordance with Part III 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.** Consideration should be given to vaccinating livestock that are particularly valuable or that might have frequent contact with humans (e.g., in petting zoos, fairs, and other public exhibitions). 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 (*9–12*).
      2) **Maintained in Exhibits and in Zoological Parks.** Captive mammals 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.** 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 destination 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 Global Migration and Quarantine, CDC, (404) 498-1670.

      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 II, 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 (e.g., 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 officials 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 II, A. 1. Rabies Exposure) by a wild, carnivorous mammal 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. Protocols for the postexposure vaccination of previously unvaccinated domestic animals have not been validated, and evidence exists that the use of vaccine alone will not prevent the disease (*13*). 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 guidelines for meat inspectors require that any ani-

mal known to have been exposed to rabies within 8 months be rejected for slaughter.

2) Neither tissues nor milk from a rabid animal should be used for human or animal consumption (*14*). 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 uncommon; 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 and the head shipped for testing as described in (c) below. Any stray or unwanted dog, cat, or ferret that bites a person may be euthanized immediately and the head submitted 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, the biting animal's history, current health status, and potential for exposure to rabies.

c. Rabies testing should be done by a qualified laboratory, designated by the local or state health department (*15*). Euthanasia (*16*) should be accomplished in such a way as to maintain the integrity of the brain so that the laboratory can recognize the anatomical parts. Except in the case of very small animals (e.g., bats) only the head or brain (including brain stem) should be submitted to the laboratory. Any animal or animal part being submitted for testing should be kept under refrigeration (not frozen or chemically fixed) during storage and shipping.

C. Control Methods Related to Wildlife. The public should be warned not to handle or feed wild mammals. 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 ACIP [*5*]). 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 (*17*); 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 (*7*). The distribution of oral rabies vaccine should be based on scientific assessments of the target species and followed by timely and appropriate analysis of surveillance data; such results should be provided to all stakeholders. Continuous and persistent programs for trapping or poisoning wildlife are not effective in reducing wildlife rabies reservoirs on a statewide basis. However, limited control in high-contact areas (e.g., picnic grounds, camps, and suburban areas) may be indicated for the removal of selected high-risk species of wildlife (*7*). 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 36 humans in the United States (*18*). Bats should be excluded from houses and adjacent structures to prevent direct association with humans (*19,20*). Such structures should then be made bat-proof by sealing entrances used by bats. Controlling rabies in bats through programs designed to reduce bat populations is neither feasible nor desirable.

PART III: Rabies vaccines licensed and marketed in the United States, 2003

Product name	Produced by	Marketed by	For use in	Dosage (mL)	Age at primary vaccination*	Booster recommended	Route of inoculation
A) MONOVALENT (Inactivated)							
DEFENSOR 1	Pfizer, Inc. License No. 189	Pfizer, Inc.	Dogs	1	3 mos	Annually	IM† or SC§
			Cats	1	3 mos	Annually	SC
DEFENSOR 3	Pfizer, Inc. License No. 189	Pfizer, Inc.	Dogs	1	3 mos	1 year later and triennially	IM or SC
			Cats	1	3 mos	1 year later and triennially	SC
			Sheep	2	3 mos	Annually	IM
			Cattle	2	3 mos	Annually	IM
RABDOMUN 1	Pfizer, Inc. License No. 189	Schering-Plough	Dogs	1	3 mos	Annually	IM or SC
			Cats	1	3 mos	Annually	SC
RABDOMUN	Pfizer, Inc. License No. 189	Schering-Plough	Dogs	1	3 mos	1 year later and triennially	IM or SC
			Cats	1	3 mos	1 year later and triennially	SC
			Sheep	2	3 mos	Annually	IM
			Cattle	2	3 mos	Annually	IM
TRIMUNE	Fort Dodge Animal Health License No. 112	Fort Dodge Animal Health	Dogs	1	3 mos¶	1 year later and triennially	IM
			Cats	1		1 year later and triennially	IM
RABVAC 1	Fort Dodge Animal Health License No. 112	Fort Dodge Animal Health	Dogs	1	3 mos	Annually	IM or SC
			Cats	1		Annually	IM or SC
RABVAC 3	Fort Dodge Animal Health License No. 112	Fort Dodge Animal Health	Dogs	1	3 mos	1 year later and triennially	IM or SC
			Cats	1		1 year later and triennially	IM or SC
			Horses	2		Annually	IM
PRORAB-1	Intervet, Inc. License No. 286	Intervet, Inc.	Dogs	1	3 mos	Annually	IM or SC
			Cats	1		Annually	IM or SC
			Sheep	2		Annually	IM
PRORAB-3F	Intervet, Inc. License No. 286	Intervet, Inc.	Cats	1	3 mos	1 year later and triennially	IM or SC
IMRAB 3	IMerial, Inc. License No. 298	Merial, Inc.	Dogs	1	3 mos	1 year later and triennially	IM or SC
			Cats	1	3 mos	1 year later and triennially	IM or SC
			Sheep	2	3 mos	1 year later and triennially	IM or SC
			Cattle	2	3 mos	Annually	IM or SC
			Horses	2	3 mos	Annually	IM or SC
			Ferrets	1	3 mos	Annually	SC
IMRAB 3 TF	Merial, Inc. License No. 298	Merial, Inc.	Dogs	1	3 mos	1 year later and triennially	IM or SC
			Cats	1		1 year later and triennially	IM or SC
			Ferrets	1		Annually	SC
IMRAB Large Animal	Merial, Inc. License No. 298	Merial, Inc.	Cattle	2	3 mos	Annually	IM or SC
			Horses	2		Annually	IM or SC
			Sheep	2		1 year later and triennially	IM or SC
IMRAB 1	Merial, Inc. License No. 298	Merial, Inc.	Dogs	1	3 mos	Annually	SC
			Cats	1		Annually	SC
B) MONOVALENT (Rabies glycoprotein, live canary pox vector)							
PUREVAX Feline Rabies	Merial, Inc. License No. 298	Merial, Inc.	Cats	1	8 wks	Annually	SC
C) COMBINATION (Inactivated rabies)							
ECLIPSE 3 + FeLV/R	Fort Dodge Animal Health License No. 112	Schering-Plough	Cats	1	3 mos	Annually	IM or SC
ECLIPSE 4 + FeLV/R	Fort Dodge Animal Health License No. 112	Schering-Plough	Cats	1	3 mos	Annually	IM or SC
Fel-O-Guard 3 + FeLV/R	Fort Dodge Animal Health License No. 112	Fort Dodge Animal Health	Cats	1	3 mos	Annually	IM or SC
Fel-O-Guard 4 + FeLV/R	Fort Dodge Animal Health License No. 112	Fort Dodge Animal Health	Cats	1	3 mos	Annually	IM or SC
IMRAB 3 + Feline 3	Merial, Inc. License No. 298	Merial, Inc.	Cats	1	3 mos	1 year later and triennially	SC
IMRAB 3 + Feline 4	Merial, Inc. License No. 298	Merial, Inc.	Cats	1	3 mos	1 year later and triennially	SC
MYSTIQUE II	Intervet, Inc. License No. 286	Intervet, Inc.	Horses	1	3 mos	Annually	IM
Equine POTOMAVAC + IMRAB	Merial, Inc. License No. 298	Merial, Inc.	Horses	1	3 mos	Annually	IM
D) COMBINATION (Rabies glycoprotein, live canary pox vector)							
PUREVAX Feline 3/Rabies	Merial, Inc. License No. 298	Merial, Inc.	Cats	1	8 wks	Annually	SC
PUREVAX Feline 4/Rabies	Merial, Inc. License No. 298	Merial, Inc.	Cats	1	8 wks	Annually	SC
PUREVAX Feline 3/Rabies + LEUCAT	Merial, Inc. License No. 298	Merial, Inc.	Cats	1	8 wks	Annually	SC
PUREVAX Feline 4/Rabies + LEUCAT	Merial, Inc. License No. 298	Merial, Inc.	Cats	1	8 wks	Annually	SC
E) ORAL (Rabies glycoprotein, live vaccinia vector) - RESTRICTED TO USE IN STATE AND FEDERAL RABIES-CONTROL PROGRAMS							
RABORAL V-RG	Merial, Inc. License No. 298	Merial, Inc.	Raccoons Coyotes	N/A	N/A	As determined by local authorities	Oral

* Minimum age (or older) and revaccinated 1 year later.
† Intramuscularly.
§ Subcutaneously.
¶ 1 month = 28 days.

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