

## Rabies Overview

Rabies is an acute viral infection resulting in encephalomyelitis that is nearly always fatal. The rabies virus proliferates in neural tissue and is found in high concentration in saliva following replication in the salivary glands.

The rabies virus may be transmitted when saliva or neural tissue of an infected animal is introduced into the body, usually through a bite or scratch. Fresh saliva and neural tissue can also be infectious if introduced onto a mucous membrane or a fresh break in the skin. Exposure to blood, urine or other bodily fluids from a known or suspected rabid animal are not considered exposures.

Rabies virus is inactivated by desiccation, ultraviolet irradiation, and other factors like heat and sunlight, and does not persist in the environment. In general, if the suspect material is dry, the virus can be considered noninfectious.

Post-exposure prophylaxis combines wound treatment, local infiltration of rabies immune globulin (RIG), and vaccination, which has been shown to be uniformly effective when appropriately administered.

## Reporting Animal Exposures

### South Carolina State Law Mandates Reporting of Animal Bites

Animal (mammal) bites are a reportable condition in South Carolina. As mandated by State Code of Laws Section 47-5-90.

Animal (mammal) exposures are an urgently reportable condition under the [SC List of Reportable Conditions](#). Reports are to be made by phone within 24 hours of a provider's attendance on the patient, or of the provider receiving a report of a bite from a patient. See [DHEC Contacts for Reporting or Medical Consultation](#). Reports of animal incidents may also be faxed to DHEC using the DHEC form 1799 'Animal Incident Report.'

Providers are required to report animal exposures to DHEC so that animal investigations can be promptly initiated. Most animal exposures do not require post-exposure prophylaxis (PEP); locating the animal for quarantine or testing may prevent unnecessary PEP.

[Animal Incident Report form \(pdf\)](#)

### DHEC Medical Consultants Assist with Rabies Risk Assessments

Administration of rabies PEP is a medical urgency, not a medical emergency. The Advisory Committee on Immunization Practices advises that clinicians seek assistance from public health officials when needed, in order to evaluate the risk of rabies and determine if PEP is recommended given the circumstances of the exposure. A consultation with public health officials is known to reduce unnecessary rabies PEP, since they have expertise in the epidemiology of animal rabies and the indications for post-exposure treatment. DHEC physicians are available for medical consultations. Refer to the [DHEC Contacts for Reporting or Medical Consultation](#) if you need assistance.

### Evaluating Animal Exposures to Guide Post-Exposure Prophylaxis Decisions

Determining if PEP is indicated is based on a number of variables. The following criteria should be taken under consideration:

- Is the animal available for quarantine/observation or rabies testing?
- Did the exposure result in an observed wound like a bite or scratch?
- Was there mucous membrane exposure?
- Could there potentially be an unrecognized wound from a bat?
- The severity and location of the wound do not alone determine if PEP is indicated, but may dictate the urgency of treatment if needed.
  - For example, head and neck exposures require more urgent risk assessment.
- The epidemiology of animal rabies – including where the exposure occurred and the animal species involved.
- The circumstances of the exposure – including whether or not there was an unprovoked attack and whether the animal exhibited abnormal behavior.

**Table 1: Rabies Post-Exposure Prophylaxis (PEP) Guide: [Human Rabies Prevention – United States, 2008](#)**

Animal Type	Evaluation and disposition of animal	Post-exposure prophylaxis recommendations
Dogs, cats, and ferrets	Healthy and available for 10-day quarantine	Persons should not begin prophylaxis unless animal develops clinical signs of rabies.*
	Rabid or suspected rabid	Immediately begin prophylaxis.
	Unknown (e.g., escaped)	Consult public health officials.
Skunks, raccoons, foxes, and most other carnivores; bats†	Regarded as rabid unless animal proven negative by laboratory tests§	Consider immediate prophylaxis.
Livestock, small rodents (rabbits and hares), large rodents (woodchucks and beavers), and other mammals	Consider individually	Consult public health officials. Bites from squirrels, hamsters, guinea pigs, gerbils, chipmunks, rats, mice, other small rodents, rabbits, and hares almost never require anti rabies post-exposure prophylaxis

\* During the 10-day quarantine period, begin post-exposure prophylaxis at the first sign of rabies in a dog, cat, or ferret that has exposed someone. If the animal exhibits clinical signs of rabies, it should be euthanized immediately and tested.

† Post-exposure prophylaxis should be initiated as soon as possible following exposure to such wildlife. Unless the animal is available for testing and public health authorities are facilitating expeditious laboratory testing, or the animal has already tested negative for rabies. Discontinue vaccine if appropriate laboratory diagnostic test (i.e., the direct fluorescent antibody test) is negative.

§ The animal should be euthanized and tested as soon as possible. Holding for observation is not recommended.

## Non-Bite Exposures

Rabies from non-bite exposures is rare; however, non-bite exposures as a potential for rabies transmission require assessment.

PEP should be considered in the event of the introduction of fresh saliva and/or neural tissue from a known or suspected rabid animal into an open wound, fresh scratch or abrasion, or mucous membrane.

## Bat Exposures

The majority of human rabies cases reported in the United States in the last few decades have been attributed to exposures to bats that were unrecognized as a risk for rabies transmission.

Bat bites cause minimal trauma making identification of a wound difficult. A potential exposure to a bat requires a thorough evaluation if the bat is not available for testing. Bat exposures are defined as:

1. Waking up to find a bat in your room;
2. Finding a bat where children, pets, or persons with impaired mental capacity (intoxicated or mentally disabled) have been left unattended;
3. A pet or person that has been in direct contact with a bat.

If possible, bats involved in potential human exposures should be safely collected and submitted for rabies testing. The majority of bats submitted for testing are not rabid. Timely rabies testing will eliminate the need for risk assessments and unnecessary prophylaxis.

PEP may be indicated if a potential bat exposure cannot be ruled out. If the person can be reasonably certain a bite, scratch, or mucous membrane exposure did not occur, or the bat tested negative for rabies, post-exposure prophylaxis is not necessary.

## Online Rabies PEP Continuing Education Course for Providers

The Centers for Disease Control and Prevention (CDC) provides continuing education for professionals involved in rabies prevention and control. While CDC provides some resources directly, others are offered through partnerships and collaborations with other public health entities.

### [Rabies Post-Exposure Prophylaxis \(PEP\) Basics](#)

This online course is designed to educate healthcare providers and public health professionals about rabies, the approach used in evaluating patients for rabies virus exposure, and the administration of rabies post-exposure prophylaxis (PEP) as recommended by the Advisory Committee on Immunization Practices (ACIP). There is no cost to view the course or to receive [continuing education \(CE\) credit](#).

## Table 2: Rabies Post-Exposure Prophylaxis (PEP) Schedule and Administration Guidance

All post-exposure treatment should begin with immediate and thorough cleansing of all wounds with soap and warm water. If available, a virucidal agent, such as povidine-iodine solution, should be used to irrigate the wounds.

Consultation with a DHEC Medical Consultant is recommended for any patient that does not receive the vaccine by the recommended post-exposure prophylaxis schedule. The DHEC consultant can assist in determining the appropriate schedule for completing the series and in determining whether Rapid Fluorescent Focus Inhibition Test (RFFIT) titers are indicated to assess the adequacy of the immune response.

Vaccination Status	Intervention	Regimen*
<b>Not previously vaccinated</b>	Wound cleansing	All PEP should begin with immediate thorough cleansing of all wounds with soap and water. If available, a virucidal agent (e.g., povidine-iodine solution) should be used to irrigate the wounds.
	Human rabies immune globulin (HRIG)	Administer 20 IU/kg body weight. If anatomically feasible, the full dose should be infiltrated around and into the wound(s), and any remaining volume should be administered at an anatomical site (intramuscular [IM]) distant from vaccine administration. Also, HRIG should not be administered in the same syringe as vaccine. Because RIG might partially suppress active production of rabies virus antibody, no more than the recommended dose should be administered.
	Vaccine	Human diploid cell vaccine (HDCV) or purified chick embryo cell vaccine (PCECV) 1.0 mL, IM (deltoid area†), 1 each on days 0,§ 3, 7 and 14.
<b>Previously vaccinated**</b>	Wound cleansing	All PEP should begin with immediate thorough cleansing of all wounds with soap and water. If available, a virucidal agent such as povidine-iodine solution should be used to irrigate the wounds.
	HRIG	HRIG should not be administered.
	Vaccine	HDCV or PCECV 1.0 mL, IM (deltoid area†), 1 each on days 0§ and 3.

\* These regimens are applicable for persons in all age groups, including children.

† The deltoid area is the only acceptable site of vaccination for adults and older children. For younger children, the outer aspect of the thigh may be used. Vaccine should never be administered in the gluteal area.

§ Day 0 is the day dose 1 of vaccine is administered.

¶ For persons with immunosuppression, rabies PEP should be administered using all 5 doses of vaccine on days 0, 3, 7, 14, and 28.

\*\* Any person with a history of pre-exposure vaccination with HDCV, PCECV, or rabies vaccine adsorbed (RVA); prior PEP with HDCV, PCECV or RVA; or previous vaccination with any other type of rabies vaccine and a documented history of antibody response to the prior vaccination.

Source: [Use of a Reduced \(4-Dose\) Vaccine Schedule for Postexposure Prophylaxis to Prevent Human Rabies: Recommendations of the Advisory Committee on Immunization Practices](#) *MMWR* 2010:59(RR02);1-9.

## DHEC Contacts for Reporting Animal Incidents or Medical Consultation

During working hours, animal bites may be reported to the DHEC Bureau of Environmental Health Services Offices. DHEC physicians are available for medical consultation to assist with rabies risk assessment. Please call the number listed for the county of occurrence for assistance. On nights, weekends or holidays, call 1-888-847-0902 and the answering service will route calls to the appropriate DHEC responder.

### Animal Incident Reports & Medical Consultation

	Business Hours (M-F 8:30a-5:00p)				Nights/ Weekends/ Holidays
County of Occurrence	Animal Incident Reports			Medical Consultation for Rabies PEP	All calls (Bite Reports & Medical Consultation)
	Phone	Fax	Email	Phone**	Phone
Abbeville	864-227-5915	864-942-3680	<a href="mailto:RabiesGreenwood@dhec.sc.gov">RabiesGreenwood@dhec.sc.gov</a>	864-372-3269	888-847-0902
Aiken	803-642-1637	803-643-4027	<a href="mailto:RabiesAiken@dhec.sc.gov">RabiesAiken@dhec.sc.gov</a>	803-576-2900	888-847-0902
Allendale	803-533-5490	803-268-5784	<a href="mailto:RabiesOrangeburg@dhec.sc.gov">RabiesOrangeburg@dhec.sc.gov</a>	843-953-0038	888-847-0902
Anderson	864-260-5569	864-222-3923	<a href="mailto:RabiesAnderson@dhec.sc.gov">RabiesAnderson@dhec.sc.gov</a>	864-372-3269	888-847-0902
Bamberg	803-533-5490	803-268-5784	<a href="mailto:RabiesOrangeburg@dhec.sc.gov">RabiesOrangeburg@dhec.sc.gov</a>	843-953-0038	888-847-0902

Barnwell	803-642-1637	803-643-4027	<a href="mailto:RabiesAiken@dhec.sc.gov">RabiesAiken@dhec.sc.gov</a>	803-576-2900	888-847-0902
Beaufort	843-846-1030	843-846-0604	<a href="mailto:RabiesBeaufort@dhec.sc.gov">RabiesBeaufort@dhec.sc.gov</a>	843-953-0038	888-847-0902
Berkeley	843-953-0150	843-202-7050	<a href="mailto:RabiesCharleston@dhec.sc.gov">RabiesCharleston@dhec.sc.gov</a>	843-953-0038	888-847-0902
Calhoun	803-533-5490	803-268-5784	<a href="mailto:RabiesOrangeburg@dhec.sc.gov">RabiesOrangeburg@dhec.sc.gov</a>	843-953-0038	888-847-0902
Charleston	843-953-0150	843-202-7050	<a href="mailto:RabiesCharleston@dhec.sc.gov">RabiesCharleston@dhec.sc.gov</a>	843-953-0038	888-847-0902
Cherokee	864-596-3327	864-596-3920	<a href="mailto:RabiesSpartanburg@dhec.sc.gov">RabiesSpartanburg@dhec.sc.gov</a>	864-372-3269	888-847-0902
Chester	803-909-7377	803-909-7397	<a href="mailto:RabiesYork@dhec.sc.gov">RabiesYork@dhec.sc.gov</a>	803-576-2900	888-847-0902
Chesterfield	843-661-4825	843-661-4858	<a href="mailto:RabiesFlorence@dhec.sc.gov">RabiesFlorence@dhec.sc.gov</a>	843-661-4830	888-847-0902
Clarendon	803-778-6548	803-934-2938	<a href="mailto:RabiesSumter@dhec.sc.gov">RabiesSumter@dhec.sc.gov</a>	843-661-4830	888-847-0902
Colleton	843-846-1030	843-846-0604	<a href="mailto:RabiesBeaufort@dhec.sc.gov">RabiesBeaufort@dhec.sc.gov</a>	843-953-0038	888-847-0902
Darlington	843-661-4825	843-661-4858	<a href="mailto:RabiesFlorence@dhec.sc.gov">RabiesFlorence@dhec.sc.gov</a>	843-661-4830	888-847-0902
Dillon	843-661-4825	843-661-4858	<a href="mailto:RabiesFlorence@dhec.sc.gov">RabiesFlorence@dhec.sc.gov</a>	843-661-4830	888-847-0902
Dorchester	843-953-0150	843-202-7050	<a href="mailto:RabiesCharleston@dhec.sc.gov">RabiesCharleston@dhec.sc.gov</a>	843-953-0038	888-847-0902
Edgefield	803-642-1637	803-643-4027	<a href="mailto:RabiesAiken@dhec.sc.gov">RabiesAiken@dhec.sc.gov</a>	803-576-2900	888-847-0902
Fairfield	803-896-0620	803-896-0617	<a href="mailto:RabiesColumbia@dhec.sc.gov">RabiesColumbia@dhec.sc.gov</a>	803-576-2900	888-847-0902
Florence	843-661-4825	843-661-4858	<a href="mailto:RabiesFlorence@dhec.sc.gov">RabiesFlorence@dhec.sc.gov</a>	843-661-4830	888-847-0902

Georgetown	843-915-8801	843-915-6503	<a href="mailto:RabiesHorry@dhec.sc.gov">RabiesHorry@dhec.sc.gov</a>	843-661-4830	888-847-0902
Greenville	864-372-3273	864-282-4371	<a href="mailto:RabiesGreenville@dhec.sc.gov">RabiesGreenville@dhec.sc.gov</a>	864-372-3269	888-847-0902
Greenwood	864-227-5915	864-942-3680	<a href="mailto:RabiesGreenwood@dhec.sc.gov">RabiesGreenwood@dhec.sc.gov</a>	864-372-3269	888-847-0902
Hampton	843-846-1030	843-846-0604	<a href="mailto:RabiesBeaufort@dhec.sc.gov">RabiesBeaufort@dhec.sc.gov</a>	843-953-0038	888-847-0902
Horry	843-915-8801	843-915-6503	<a href="mailto:RabiesHorry@dhec.sc.gov">RabiesHorry@dhec.sc.gov</a>	843-661-4830	888-847-0902
Jasper	843-846-1030	843-846-0604	<a href="mailto:RabiesBeaufort@dhec.sc.gov">RabiesBeaufort@dhec.sc.gov</a>	843-953-0038	888-847-0902
Kershaw	803-778-6548	803-934-2938	<a href="mailto:RabiesSumter@dhec.sc.gov">RabiesSumter@dhec.sc.gov</a>	803-576-2900	888-847-0902
Lancaster	803-285-7461	803-285-5594	<a href="mailto:RabiesLancaster@dhec.sc.gov">RabiesLancaster@dhec.sc.gov</a>	803-576-2900	888-847-0902
Laurens	864-227-5915	864-942-3680	<a href="mailto:RabiesGreenwood@dhec.sc.gov">RabiesGreenwood@dhec.sc.gov</a>	864-372-3269	888-847-0902
Lee	803-778-6548	803-934-2938	<a href="mailto:RabiesSumter@dhec.sc.gov">RabiesSumter@dhec.sc.gov</a>	843-661-4830	888-847-0902
Lexington	803-896-0620	803-896-0617	<a href="mailto:RabiesColumbia@dhec.sc.gov">RabiesColumbia@dhec.sc.gov</a>	803-576-2900	888-847-0902
Marion	843-661-4825	843-661-4858	<a href="mailto:RabiesFlorence@dhec.sc.gov">RabiesFlorence@dhec.sc.gov</a>	843-661-4830	888-847-0902
Marlboro	843-661-4825	843-661-4858	<a href="mailto:RabiesFlorence@dhec.sc.gov">RabiesFlorence@dhec.sc.gov</a>	843-661-4830	888-847-0902
McCormick	864-227-5915	864-942-3680	<a href="mailto:RabiesGreenwood@dhec.sc.gov">RabiesGreenwood@dhec.sc.gov</a>	864-372-3269	888-847-0902
Newberry	803-896-0620	803-896-0617	<a href="mailto:RabiesColumbia@dhec.sc.gov">RabiesColumbia@dhec.sc.gov</a>	803-576-2900	888-847-0902
Oconee	864-260-5569	864-222-3923	<a href="mailto:RabiesAnderson@dhec.sc.gov">RabiesAnderson@dhec.sc.gov</a>	864-372-3269	888-847-0902

Orangeburg	803-533-5490	803-268-5784	<a href="mailto:RabiesOrangeburg@dhec.sc.gov">RabiesOrangeburg@dhec.sc.gov</a>	843-953-0038	888-847-0902
Pickens	864-372-3273	864-282-4371	<a href="mailto:RabiesGreenville@dhec.sc.gov">RabiesGreenville@dhec.sc.gov</a>	864-372-3269	888-847-0902
Richland	803-896-0620	803-896-0617	<a href="mailto:RabiesColumbia@dhec.sc.gov">RabiesColumbia@dhec.sc.gov</a>	803-576-2900	888-847-0902
Saluda	803-642-1637	803-643-4027	<a href="mailto:RabiesAiken@dhec.sc.gov">RabiesAiken@dhec.sc.gov</a>	803-576-2900	888-847-0902
Spartanburg	864-596-3327	864-596-3920	<a href="mailto:RabiesSpartanburg@dhec.sc.gov">RabiesSpartanburg@dhec.sc.gov</a>	864-372-3269	888-847-0902
Sumter	803-778-6548	803-934-2938	<a href="mailto:RabiesSumter@dhec.sc.gov">RabiesSumter@dhec.sc.gov</a>	843-661-4830	888-847-0902
Union	864-596-3327	864-596-3920	<a href="mailto:RabiesSpartanburg@dhec.sc.gov">RabiesSpartanburg@dhec.sc.gov</a>	864-372-3269	888-847-0902
Williamsburg	843-915-8801	843-915-6503	<a href="mailto:RabiesHorry@dhec.sc.gov">RabiesHorry@dhec.sc.gov</a>	843-661-4830	888-847-0902
York	803-909-7377	803-909-7397	<a href="mailto:RabiesYork@dhec.sc.gov">RabiesYork@dhec.sc.gov</a>	803-576-2900	888-847-0902

**If you do not receive a response from the county medical consultation number during working hours, call the Division of Acute Disease Epidemiology: 803-898-0861 (M-F 8:30a-5:00p)**

### **Serologic Testing by Rapid Fluorescent Focus Inhibition Test (RFFIT)**

Every attempt should be made to adhere to the recommended vaccination schedules. Once vaccination is initiated, delays of a few days for individual doses are unimportant, but the effect of longer lapses is unknown. For most minor deviations from the schedule, vaccination can be resumed as though the patient were on schedule. When substantial deviations from the schedule occur, immune status should be assessed by performing serologic testing 7 – 14 days after administration of the final dose in the series.

Per ACIP guidance, the Rapid Fluorescent Focus Inhibition Test (RFFIT) gives an indicator of adaptive immune response to rabies vaccination. Complete virus neutralization at a 1:5 serum dilution by the RFFIT is an indicator of an adequate immune response.

The medical plan for patients who are not vaccinated on schedule, do not demonstrate an adequate antibody response when tested, or are immunocompromised is best managed on a case-by-case basis incorporating consultation between the patient’s private provider, a DHEC Medical Consultant and the CDC Rabies Section Consultant.

DHEC does not provide the RFFIT. The following laboratories perform RFFIT:

- **Atlanta Health Associates:** [www.atlantahealth.net](http://www.atlantahealth.net)
- **Kansas State University:** <http://www.ksvdl.org/rabies-laboratory/>

CDC performs serologic testing with a more rapid turn-around-time than private labs, but CDC testing is only available through the request of the state health department.

## Manufacturers and Distributors of Rabies Biologics

**Table 3. Rabies Vaccines and Immunoglobulin Available in the United States**

Type	Name	Route	Indications
<b>Human Diploid Cell Vaccine (HDCV)</b>	Imovax® Rabies	Intramuscular	Pre-exposure or Post-exposure
<b>Purified Chick Embryo Cell Vaccine (PCEC)</b>	RabAvert®	Intramuscular	Pre-exposure or Post-exposure
<b>Human Rabies Immune Globulin</b>	Imogam® Rabies-HT	Local infusion at wound site, with additional amount intramuscular at site distant from vaccine	Post-exposure
<b>Human Rabies Immune Globulin</b>	HyperRab™	Local infusion at wound site, with additional amount intramuscular at site distant from vaccine	Post-exposure

Ordering rabies biologics will be simpler for health care providers that have established accounts with vaccine suppliers. Contacts for vaccine manufactures and distributors are provided below to assist in locating rabies biologics. Contact the DHEC Immunization Division at 803-898-0460 for assistance in ordering rabies PEP biologics if needed.

### Rabies Vaccine

Sanofi Pasteur – Imovax®

Phone: 1-800-822-2463

Website: <http://www.sanofipasteur.us/>

Norartis Vaccines and Diagnostics – RabAvert®

Phone: 1-862-778-2100

Website: <https://www.novartis.com/>

### Human Rabies Immune Globulin

Sanofi Pasteur – Imogam®

Phone: 1-800-822-2463

Website: <http://www.sanofipasteur.us/>

Grifols – HyperRab™

Phone: 1-888-474-3657

Website: <https://www.grifolsusa.com>

CDC works with partners to monitor the status of rabies biologic samples. [Subscribe](#) to receive email notices of updates.

## **Programs for Uninsured and Underinsured Patients**

Patient assistance programs that provide medications to uninsured or underinsured patients are available for rabies vaccine and Immune globulin.

Sanofi Pasteur's Patient Assistance Program (providing Imogam® Rabies-HT and Imovax® Rabies as well as other vaccines) is now administered through the Franklin Group. A healthcare professional or patient can either contact the Franklin Group directly, or call the customer service team (1-800-VACCINE) who will transfer them to the Franklin Group. The Franklin Group will review the application against the eligibility criteria. For more information about the program or to request an application, please contact the Sanofi Pasteur, Inc. Patient Assistance Program (Franklin Group) at 1-866-801-5655.

Novartis' Patient Assistance Program for RabAvert® is managed through RX for Hope and can be accessed at 1-800-589-0837. Instructions and request forms are also available at the Rx for Hope website [RabAvert Patient Assistance Program](#). Instructions and request forms are also available at the [Sanofi Patient Connection](#).

## **Rabies Vaccine Information Sheet for Patients**

- <http://www.cdc.gov/vaccines/hcp/vis/vis-statements/rabies.html>