

GUIDELINES FOR MANAGEMENT OF SUSPECTED RABIES EXPOSURES

January, 2010

All suspected incidents must be reported to the local medical officer of health [Health Protection and Promotion Act, Reg. 557, s. 2 (1)] who can provide consultation and the necessary biologicals.

The following is a condensed version of the 'Rabies Vaccine' chapter in the Canadian Immunization Guide (Seventh Edition, Public Health Agency of Canada, 2006, pp.285-97) and the National Advisory Committee on Immunization's 'Recommendations Regarding the management of Bat Exposures to Prevent Human Rabies' (CCDR, November 2009). Text in *italics* has been added or substituted by the Ministry of Health and Long-Term Care based on the *Rabies Prevention and Control Protocol, 2009*.

Please note that this document **ONLY** summarizes post-exposure prophylaxis guidelines. For information about pre-exposure management and vaccination of high-risk occupational categories, please see the relevant chapter in the Canadian Immunization Guide.

Post-exposure management

1. Species of animal

Squirrels, hamsters, guinea-pigs, gerbils, chipmunks, rats, mice or other rodents, rabbits and hares are only rarely found to be infected with rabies and are not known to have caused human rabies in North America; post-exposure prophylaxis should be considered only if the animal's behaviour was highly unusual.

2. Type of exposure

Three broad categories of exposure are recognized as warranting post-exposure prophylaxis: bite, non-bite and bat exposures.

Bite: This is defined as any penetration of the skin by teeth.

Non-bite: This category includes contamination of scratches, abrasions or cuts of the skin or mucous membranes by saliva or other potentially infectious material, such as the brain tissue of a rabid animal. Petting a rabid animal or handling its blood, urine or feces is not considered to be an exposure, but such contact should be avoided. Being sprayed by a skunk is also not considered an exposure. Exposures incurred in the course of caring for humans with rabies could theoretically transmit the infection. No case of rabies acquired in this way has been documented, but post-exposure prophylaxis should be considered for exposed individuals.

Bat exposures: With respect to human exposures to bats, post-exposure prophylaxis (PEP) is recommended *only*:

- when a bat bite or scratch has occurred,

OR

- when there is direct contact with a bat (the bat should be observed to touch or land on the person)

AND either of the following cannot be eliminated:

- a bat bite or scratch
- **or** saliva from a live bat entered an open wound or mucous membranes.

In an adult, a bat landing on clothing would be considered reason for PEP administration **only** if a bite, scratch, or saliva exposure into a wound or mucous membrane could not be ruled out. *Therefore, if a bat lands on the clothing of a person who can be sure that a bite or scratch did not occur and that the bat's saliva did not contact an open wound or mucous membranes, then PEP is not required.*

In a child, any direct contact with a bat (*i.e. the bat landing on or touching the child*) should be considered a reason for PEP administration, including contact through clothes, as a history to rule out a bite, scratch or mucous membrane exposure may not be reliable.

When a bat is found in the room with a child or adult who is unable to give a reliable history, assessment of direct contact can be difficult. Factors indicating that direct contact may have occurred in these situations include the individual waking up crying or upset while the bat was in the room, or observation of an obvious bite or scratch mark.

Extreme care should be taken to ensure that there is no further exposure to the bat if it is captured or handled. In the event that the bat is captured, it should be submitted for rabies testing. Unless exposure to the bat is in the person's head or neck region, PEP can be delayed for up to 48 hours until the rabies test result on the bat is obtained. If PEP was initiated, it can be discontinued if the bat tests negative for rabies.

Please note that spelunker exposure in caves will require special consideration.

Rarely, transmission has been recorded when virus was inhaled, or infected grafts/organs were transplanted into patients. Post-exposure prophylaxis is warranted and recommended in rare instances of non-bite exposure, such as inhalation of aerosolized virus by spelunkers exploring caves inhabited by infected bats or by laboratory technicians homogenizing tissues infected with rabies virus.

3. Investigation of the incident

Each incident of possible exposure requires a full investigation. This should include an assessment of the risk of rabies in the animal species involved and, in a low prevalence area such as Canada, the behaviour of the particular domestic animal implicated. An unprovoked attack is more likely to indicate that the animal is rabid. Nevertheless, rabid cats and dogs may become uncharacteristically quiet. Bites inflicted on a person attempting to feed or handle an apparently healthy animal should generally be regarded as provoked.

Domestic pets with up-to-date rabies vaccination are unlikely to become infected with rabies. If vaccinated animals exhibit signs suggestive of rabies they must be carefully evaluated by a veterinarian.

Any animal that has bitten a human and/or is suspected of being rabid should be reported to the local medical officer of health and to the nearest Canadian Food Inspection Agency (CFIA) veterinarian. These veterinarians are familiar with the regulations concerning rabies and, if necessary, will collect and ship appropriate specimens to a federal laboratory for diagnosis. Further information and advice is obtainable from the CFIA regional offices or local district office on the CFIA Web site (<http://inspection.gc.ca/english/animal/health/offbure.shtml>) or by consulting the blue pages of the local telephone directory.

Signs of rabies cannot be reliably interpreted in wild animals. These animals should immediately be humanely killed in a way that does as little damage as possible to the head, which should be submitted for laboratory examination. Rabies virus is readily demonstrable in brains of animals that have neurologic symptoms. Stray or ownerless dogs or cats that seem healthy should be observed for evidence of rabies for 10 days if feasible, but if isolation and observation are not feasible, the animal should be euthanized and tested for rabies.

Exotic pets (other than ferrets) should be treated as wild animals because the incubation period and period of rabies virus shedding in these animals are unknown. Recent information regarding the pathogenesis of rabies in domestic ferrets has prompted them to be considered in the same category as domestic dogs and cats rather than wild carnivores.

Management of people after possible exposure to rabies

Immediate washing and flushing of the wound with soap and water is imperative and is probably the most effective procedure in the prevention of rabies. Suturing the wound should be avoided if possible. Tetanus prophylaxis and antibacterial drugs should be given as required. The recommendations in the following table are intended as a guide and may need to be modified in accordance with the specific circumstances of the exposure.

Table 12. Post-exposure Prophylaxis for Persons Not Previously Immunized

Animal species	Condition of animal of time of exposure	Management of exposed person
Dog, cat or ferret	Healthy and available for 10 days' observation	1. Local treatment of wound 2. At first sign of rabies in animal, give Rablg (local and intramuscular) and start HDCV or PCECV, unless bite wound to the head or neck (generally begin immediately – see text below for other considerations)
	Rabid or suspected to be rabid*. Unknown or escaped	1. Local treatment of wound 2. Rablg (local and intramuscular) and HDCV or PCECV
Skunk, bat, fox, coyote, raccoon and other carnivores.	Regard as rabid* unless geographic area is known to be rabies free	1. Local treatment of wound 2. Rablg (local and intramuscular) and HDCV or PCECV**
Livestock, rodents or lagomorphs (hares and rabbits)	Consider individually. Consult appropriate public health and CFIA officials. Bites of squirrels, chipmunks, rats, mice, hamsters, gerbils, other rodents, rabbits and hares may warrant post-exposure rabies prophylaxis if the behaviour of the biting animal was highly unusual.	

Rablg = (human) rabies immune globulin, HDCV = human diploid cell vaccine (Imovax®), PCECV = purified chick embryo cell culture vaccine (RabAvert®)

* If possible, the animal should be humanely killed and the brain tested for rabies as soon as possible; holding for observation is not recommended. Discontinue vaccine if fluorescent antibody test of animal brain is negative.

** See text for potential bat exposure.

Schedule and dosage

Post-exposure prophylaxis of previously unimmunized individuals

Five doses of 1.0 mL of HDCV or PCECV should be given, the first dose (on day 0) as soon as possible after exposure and additional doses on each of days 3, 7, 14 and 28 after the first dose. Vaccine should be administered intramuscularly into the deltoid muscle (never in the gluteal region) or the anterolateral upper thigh in infants. An appropriate dose of Rablg, as described below, should also be given on day 0.
Neutralizing antibodies develop 7 days after immunization and persist for at least 2 years.

Post-exposure prophylaxis should be started as soon as possible after exposure and should be offered to exposed individuals regardless of the elapsed interval. When notification of an exposure is delayed, prophylaxis may be started as late as 6 or more months after exposure.

Based on a risk assessment, and where the specimen is received at the lab within 48hrs of exposure, treatment may be withheld until the Fluorescent Antibody Test (FAT) result is available. The FAT report can be obtained within 6 to 24 hours from receipt of an animal specimen at the laboratory. If the suspect animal is

a cat, dog or ferret and is available for observation, then immunization may be withheld pending the animal's status after the 10-day observation period.

However, if the bite wound is to the head and neck region, prophylaxis should generally begin immediately and not be delayed, unless a risk assessment would support a 10-day observation period instead. Considerations that may support delaying initiation of prophylaxis and instead observing the animal for a 10-day period include:

- if the animal is a domestic pet;
- if the animal is fully vaccinated;
- if the bite was provoked; and
- if there is very low prevalence of rabies in the area.

If a rabies exposure is considered likely then post-exposure prophylaxis should never be delayed.

The vaccine series may be discontinued after consultation with public health/infectious disease experts if the FAT of the brain of an animal killed at the time of attack is negative. However, if suspicion of rabies in the animal remains high, even in the presence of a negative test, the immunization series should be continued.

The recommended dose of human Rablg is **20 IU/kg body weight**. This formula is applicable to all age groups, including children. Preferably, the full dose of Rablg should be thoroughly infiltrated into the wound and surrounding area. If not anatomically feasible, any remaining volume of Rablg should be injected, using a separate needle and syringe, intramuscularly at a site distant from vaccine administration. When more than one wound exists, each should be locally infiltrated with a portion of the Rablg using a separate needle and syringe if possible. In such instances, the Rablg may be diluted 2- to 3-fold in a solution of 0.9% sodium chloride in order to provide the full amount of human Rablg required for good infiltration of sites at risk of rabies. If the site of the wound is unknown, the entire dose should be administered intramuscularly. Because of interference with active antibody production, the recommended dose should not be exceeded. **Under no circumstances should vaccine be administered in the same syringe or at the same site as Rablg.**

Protective antibodies are present immediately after passive vaccination with Rablg, but they have a half-life of only approximately 21 days. Since vaccine-induced antibodies begin to appear within 1 week, there is no value in administering Rablg more than 8 days after initiating an approved vaccine course.

Rablg is supplied in 2 ml vials containing 150 IU/ml. Use the following formulae to calculate the dose required and use the table to determine how many vials to order:

$$20 \text{ IU/kg} \times (\text{client wt in kg}) \div 150 \text{ IU/mL} = \text{dose in mL}$$

$$9.09 \text{ IU/lb} \times (\text{client wt in lb}) \div 150 \text{ IU/mL} = \text{dose in mL}$$

TOTAL WEIGHT		# OF VIALS	TOTAL WEIGHT		# OF VIALS
To 33 lbs	To 15 Kg	1	166 – 198 lbs	75 - 90 Kg	6
34 – 66 lbs	15 - 30 Kg	2	199 – 231 lbs	90 - 105 Kg	7
67 – 99 lbs	30 - 45 Kg	3	232 – 264 lbs	105 – 120 Kg	8
100 – 132 lbs	45 - 60 Kg	4	265 – 297 lbs	120 – 135 Kg	9
133 – 165 lbs	60 - 75 Kg	5	298 – 330 lbs	135 – 150 Kg	10

Post-exposure prophylaxis of previously immunized individuals

Post-exposure prophylaxis for people who have previously received rabies vaccine differs according to which preparation of vaccine was received.

1. Two doses of HDCV or PCECV, one injected immediately and the other 3 days later, without Rablg, are recommended for exposed individuals with the following rabies immunization history:
 - Completion of an approved course of pre-or post-exposure prophylaxis with HDCV or PCECV;
 - Completion of immunization with other types of rabies vaccine or with HDCV or PCECV according to unapproved schedules as long as neutralizing rabies antibody has been demonstrated in serum (see serologic testing below).

2. A complete course of HDCV or PCECV plus Rablg is recommended for those who may have received rabies vaccines in the past but do not fulfill the criteria listed in point 1. A serum sample may be collected before vaccine is given, and if an acceptable antibody (≥ 0.5 IU/ml) is demonstrated, the course may be discontinued, provided that at least two doses of vaccine have been given. If in doubt, consultation with an infectious diseases or public health physician is recommended.

Route of administration

Rablg is always given intramuscularly. If possible, the full dose of Rablg should be thoroughly infiltrated into the wound and surrounding area. If this is not anatomically feasible, any remaining volume of Rablg should be injected, using a separate needle and syringe, intramuscularly at a site distant from vaccine administration.

Rabies vaccine for post-exposure prophylaxis must be administered intramuscularly. Both HDCV and PCECV are approved in Canada for intramuscular (IM) use.

Serologic testing

Healthy people immunized with an appropriate regimen do not require routine post-immunization antibody determinations. Determination of post-immunization antibody titre may be advisable for those whose immune response may be reduced by illness, medication or advanced age. Corticosteroids, immunosuppressive agents and immunosuppressive illnesses may interfere with the antibody response.

Where antibody levels are required, a sample of 5cc whole clotted blood, or serum therefrom, should be submitted to the nearest regional public health laboratory or directly to the Central Public Health Laboratory, 81 Resources Road, Toronto, Ontario M9P 3T1, telephone: (416) 235 – 5725. There is no charge for this test. To establish laboratory priority, please indicate the purpose of the sample. An acceptable antibody response is a titre of ≥ 0.5 IU/mL by the rapid fluorescent-focus inhibition test.

Other considerations

Vaccine interchangeability: wherever possible, an immunization series should be completed with the same product. However, if this is not feasible, RabAvert® and Imovax® Rabies are considered interchangeable in terms of indications for use, immunogenicity, efficacy and safety.

FOR MORE INFORMATION:

www.phac-aspc.gc.ca/publicat/cig-gci/index.html (Canadian Immunization Guide, 7th Edition)

www.vaccineshoppecanada.com/secure/pdfs/CA/IMOVAX_E.pdf (HDCV/Imovax product monograph)

www.merckfrosst.ca/mfcl/en/corporate/products/rabavert.html (PCEC / RabAvert product monograph)

www.vaccineshoppecanada.com/secure/pdfs/ca/imogam_e.pdf (Rablg/Imogam product monograph)

<http://www.mnr.gov.on.ca/en/Business/Rabies/index.html> (Ministry of Natural Resources – rabies in Ontario)

<http://www.inspection.gc.ca/english/anima/disejala/rabrag/rabrage.shtml> (Canadian Food Inspection Agency – rabies in Canada)

<http://www.cdc.gov/rabies> (Centre for Disease Control and Prevention)

<http://www.who.int/rabies/en/> (World Health Organization)