



## Table of Contents

<b>1.0</b>	<b>GOAL</b> .....	<b>1</b>
<b>2.0</b>	<b>DEFINITIONS</b> .....	<b>1</b>
<b>3.0</b>	<b>RISK ASSESSMENT</b> .....	<b>1</b>
3.1	EXPOSURE HISTORY .....	3
	Table 1: Action to be taken following direct contact by species and location.....	3
3.1.1	<i>Bats</i> .....	4
3.1.2	<i>Terrestrial Mammals</i> .....	5
	3.1.2.1 BC.....	5
	3.1.2.2 Outside BC.....	5
3.1.3	<i>Animal behaviour</i> .....	5
3.1.4	<i>Vaccination status of animal</i> .....	6
3.1.5	<i>Type of exposure</i> .....	6
3.1.6	<i>Human body part exposed</i> .....	6
3.2	DETENTION, OBSERVATION AND TESTING OF ANIMALS .....	6
3.2.1	<i>Detention and Observation</i> .....	7
3.2.2	<i>Testing</i> .....	7
<b>4.0</b>	<b>RISK MANAGEMENT</b> .....	<b>8</b>
4.1	FIRST AID .....	8
4.2	RABIES POST-EXPOSURE PROPHYLAXIS (RPEP) .....	9
4.2.1	<i>RPEP Started in Other Countries</i> .....	10
4.3	RPEP IN PERSONS PREVIOUSLY IMMUNIZED AGAINST RABIES .....	11
4.4	PRE-EXPOSURE RABIES IMMUNIZATION .....	11
	Table 2: Pre-exposure Rabies Immunization.....	12
4.5	RABIES VACCINES – WHO-APPROVED .....	13
4.6	RELEASE OF BIOLOGICALS FOR RPEP .....	13
<b>5.0</b>	<b>CLINICAL PRESENTATION IN HUMANS AND EPIDEMIOLOGY</b> .....	<b>14</b>
<b>6.0</b>	<b>RECORDING AND REPORTING</b> .....	<b>16</b>
<b>7.0</b>	<b>REPORTING AUTHORITY</b> .....	<b>17</b>
<b>8.0</b>	<b>REFERENCES</b> .....	<b>18</b>
	<b>APPENDIX A: CANADIAN FOOD INSPECTION AGENCY CONTACTS</b> .....	<b>21</b>
	<b>APPENDIX B - PACKAGING A RABIES SPECIMEN FOR SHIPMENT TO ADRI</b> .....	<b>22</b>
	<b>APPENDIX C: RABIES EXPOSURE REPORT AND RABIES BIOLOGICALS REQUEST FORM</b> .....	<b>23</b>
	<b>APPENDIX D: RABIES IMMUNE GLOBULIN (RABIG) DOSAGE BY BODYWEIGHT</b> .....	<b>25</b>
	<b>APPENDIX E: INSTRUCTIONS FOR THE ADMINISTRATION OF RABIES VACCINE AND RABIES IMMUNE GLOBULIN</b> .....	<b>26</b>
	<b>APPENDIX F: RECORD OF RABIES VACCINE AND RABIES IMMUNE GLOBULIN ADMINISTRATION</b> .....	<b>27</b>



## 1.0 GOAL

The goal of the provincial Rabies Control Program is to prevent the acquisition of human rabies. Prevention of human rabies disease is undertaken through:

- Evaluation of human exposure to animals for the risk of rabies transmission.
- Provision of post-exposure immunoprophylaxis to persons exposed or potentially exposed to rabies virus.
- Provision of pre-exposure immunization of persons at increased risk of exposure to animal rabies.
- Collaboration and consultation with provincial and federal animal health authorities regarding rabies incidence and control in British Columbia in domestic and wild animals.

The intent of this guideline is to provide direction on:

- Risk assessment (including determining the rabies status of animals involved in an exposure).
- Risk management (post-exposure prophylaxis).
- Pre-exposure prophylaxis for individuals that may be at risk due to occupational or anticipated travel to an endemic area for lengthy periods.
- Reporting exposures.
- Ordering biologicals.

## 2.0 DEFINITIONS

**Direct contact:** contact with a rabid or potentially rabid animal whereby rabies virus present in undessicated saliva or neural tissue could be introduced through contact with eyes or mucous membranes, or through a break in the skin by means of a bite or scratch.

**Enzootic:** consistently present in an animal population (equivalent to endemic in human population).

**Epizootic:** greater than expected occurrence in an animal population (equivalent to epidemic in human population).

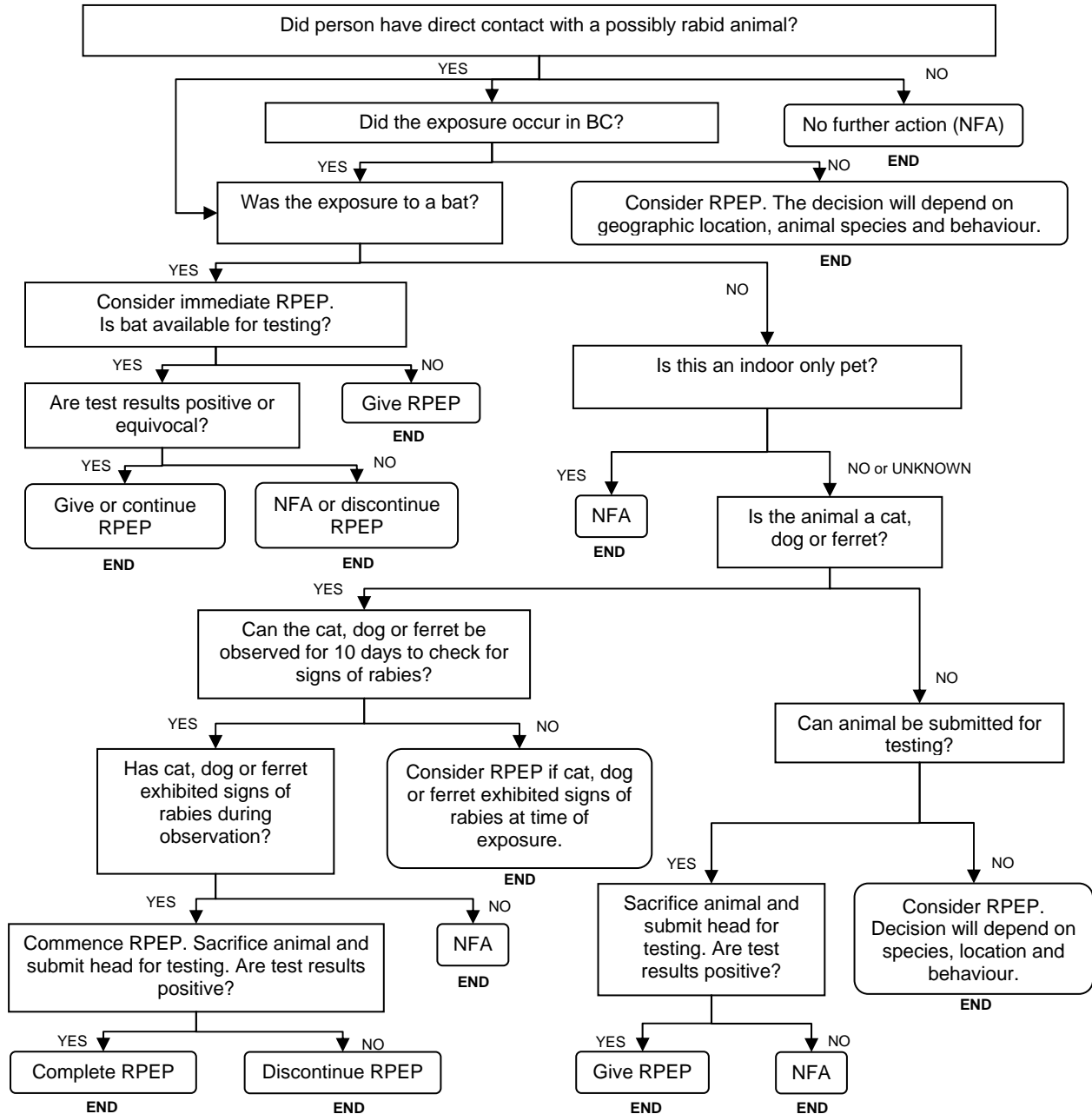
**RPEP:** Rabies post-exposure prophylaxis is accomplished through the administration of rabies immune globulin (Rablg) and rabies vaccine. Rablg provides rapid, short-term protection. Rabies vaccines contain inactivated virus and induce an active immune response beginning 7 to 10 days post-immunization.

## 3.0 RISK ASSESSMENT

The following algorithm is a quick guide to determine the need for rabies post-exposure prophylaxis (RPEP). Supporting information follows.



Figure 1: Risk Assessment Algorithm to Determine the Need for RPEP





### 3.1 Exposure History

Direct contact (see the definition in [Section 2.0](#)) with a potentially rabid animal is necessary for transmission of the rabies virus.

When assessing the risk of rabies, the following need to be considered:

- Animal species ([Table 1](#), [Section 3.1.1](#) and [Section 3.1.2](#))
- Geographic location ([Table 1](#) and [Section 3.1.2](#))
- Animal behaviour ([Section 3.1.3](#))
- Animal rabies vaccination status ([Section 3.1.4](#))
- Type of exposure (bite vs. other) ([Section 3.1.5](#))
- Body part exposed ([Section 3.1.6](#))

**Table 1: Action to be taken following direct contact by species and location**

Species	Location	Action following direct contact
Bat	Globally	Provide RPEP unless animal is tested and shown to be negative
Domestic or wild terrestrial mammal	BC	No action needed unless animal demonstrated neurological behaviour indicative of rabies or dies; if so, provide RPEP unless animal is observed (cat, dog, ferret) or tested and shown to be negative
Skunk <sup>a</sup> , raccoon, coyote, bobcat, fox, monkey <sup>b</sup> and other wild animals	Outside BC (except in rabies-free countries) <sup>c</sup>	Consider to be rabid unless tested and shown to be negative <sup>d</sup>
Domestic animals	Enzootic areas	Consider rabid unless observation or testing can be carried out; start RPEP and discontinue if negative; 10-day observation of cats, dogs and ferrets may not be reliable <sup>e</sup>
Rodents and lagomorphs <sup>f</sup>	Globally	RPEP is almost never warranted

Bats are a rabies reservoir worldwide. Various terrestrial animals may be a reservoir depending on the region of the world.

<sup>a</sup> Being sprayed by a skunk is not considered a rabies exposure.

<sup>b</sup> Simian B virus infection can be acquired by the bite of apparently healthy macaque monkeys, or by exposure of injured skin or mucous membranes to infected saliva or macaque monkey cell cultures. Human illness is extremely rare but highly fatal. Refer to [Communicable Disease Control Manual Simian B Virus](#)

<sup>c</sup> Consult the WHO map at [http://www.who.int/rabies/rabies\\_maps/en/index.html](http://www.who.int/rabies/rabies_maps/en/index.html) and the CFIA animal testing results at <http://www.inspection.gc.ca/english/anima/disemala/rabrag/statse.shtml>

<sup>d</sup> In areas where rabies is enzootic in a specific animal species, consider the animal as potentially infected with rabies.

<sup>e</sup> In enzootic areas, dogs may shed rabies virus for longer than 10 days, therefore observation for 10 days is not advised (Dutta 1994; Kasempimolporn 2000). See [Section 3.2.1](#).

<sup>f</sup> Rabies is extremely rare in small rodents and lagomorphs (rabbits and hares). See [Section 3.1.2.2](#).



### 3.1.1 Bats

Bats are the only known rabies reservoir in BC. These recommendations apply to all bat exposures that occur in BC or globally.

For bat exposures, intervene (testing and/or RPEP) when both of the following conditions apply:

- There has been direct contact with a bat ([Section 2.0](#)); AND
- A bite, scratch or saliva exposure into a wound or mucous membrane cannot be ruled out (NACI 2009).

Evidence for direct bat contact may include observation of physical contact, verbal history of physical contact. Consult the NACI statement on bat behaviour and exposure. (NACI 2009)

In children and other people whose histories are less reliable (cannot accurately report bites or scratches), any direct contact with a bat may require RPEP. While clothing may act as a barrier to direct contact, it can also mask exposure. NACI recommends that children who have contact with a bat through clothing may require RPEP because their histories are less reliable. (NACI 2009)

RPEP is not indicated if there is no history of direct contact; for example, if a bat was found in the house, or if someone woke up with a bat in the bedroom, without any evidence it touched someone.<sup>9</sup> When a bat is found in the room with a child or an adult who is unable to give a reliable history, assessment of direct contact can be difficult. Factors indicating that direct contact may have occurred include the individual waking up crying or upset while the bat was in the room or observation of the bat in close proximity to the individual (e.g., in or on the bed).

---

<sup>g</sup> The risk of rabies in the absence of recognized physical contact with bats is exceedingly small. A Québec survey found that ~0.1% of the population may be exposed annually to a bat in the bedroom while they are sleeping (De Serres 2009). However, only a minority (<5%) of these individuals eligible for RPEP sought advice and received RPEP.

There have been 56 non-organ transplant related bat-variant rabies cases in Canada and the US in 1950-2007 (3.9/1 billion person-years) with only 6 of those in Canada. (De Serres 2008) Thirty-one (55%) had direct contact with a bat, 6 (11%) found bats in their home and 19 (34%) reported no bat exposure at all. Among those with a bat found in their home, 2 reported bats in their bedroom while sleeping and the other 4 reported bats in the home either while sleeping or close to the time they may have been exposed. Of the 11 cases with a history of a bat in the bedroom, 9 reported being bitten or awoken by the bat landing on them and 2 reported no direct contact.

The number needed to vaccinate to prevent a single case of rabies from bat-in-bedroom exposures is 2.7 million at a cost of \$2.1 billion (De Serres 2009).



### 3.1.2 Terrestrial Mammals

#### 3.1.2.1 BC

In BC, terrestrial animals are not known to be reservoirs of rabies. However, they may on rare occasions be infected with the bat strain of rabies (see Reservoir in [Section 5.0](#)). If a domestic animal has travelled out of BC to an area where rabies is enzootic, it may have been exposed to rabies and should be assessed accordingly.

#### 3.1.2.2 Outside BC

##### Wild animals

Rabies is enzootic to varying degrees in wild animals in Canada east of the Rockies and in other countries. Consider skunk, raccoon, coyote, bobcat, fox and other wild animals to be rabid unless tested and shown to be negative (except in rabies-free countries).<sup>h</sup>

##### Domestic animals (pets and livestock)

In some countries, domestic animals are enzootic for rabies or are regularly infected with rabies. Dog bites provide the greatest risk of rabies transmission in most developing countries. Consider RPEP on an individual basis, taking into account the behaviour of the animal and the geographic location. The risk is higher in Asia and Africa<sup>i</sup>.

##### Rodents and lagomorphs

Rabies is extremely rare in small rodents and lagomorphs (rabbits and hares). No action is normally needed with exposure to these species, unless unusual behaviour of the animal warrants it. Exceptions include woodchucks found to be rabid in parts of the US in association with raccoon rabies expansion and the occasional report of an infected rodent in other parts of the world (Moro 1991, Childs 1997, Kamoltham 2002, Wang 2009). However, no rodent-human transmission of rabies has been reported (NACI 2011).

### 3.1.3 Animal behaviour

The signs of rabies infection can vary considerably among species. An animal exhibiting behaviour that is considered unusual for that particular species could potentially be rabid.<sup>j</sup> Entering an animal's territory or interacting with it in any way, including feeding it, could be considered provocation. When an animal attacks for no known reason or has no history of aggression, this would be considered an unprovoked attack.

---

<sup>h</sup> For animal rabies activity in Canada, see the CFIA website at:

<http://www.inspection.gc.ca/english/anima/disemala/rabrag/statse.shtml>

<sup>i</sup> In 2000-10, the total human rabies deaths due to domestic animal exposure outside of Asia and Africa was 19. For Asia and Africa, for the years 2000-02 and 2003-09 the total was 2177. (aWHO 2010) For information on the risk of rabies in other countries, consult the WHO publication "International Travel and Health" available at: <http://www.who.int/ith/en/>. To help assess the risk in specific countries, refer to the WHO map at [http://gamapserver.who.int/mapLibrary/Files/Maps/Global\\_Rabies\\_ITHRiskMap.png](http://gamapserver.who.int/mapLibrary/Files/Maps/Global_Rabies_ITHRiskMap.png)

<sup>j</sup> Consult a veterinarian or the Merck Veterinary Manual for a description of the clinical symptoms of rabies: <http://www.merckvetmanual.com/mvm/index.jsp?cfile=htm/bc/102300.htm&word=rabies>



If an animal had physical contact with a rabid animal (e.g., a cat played/fought with a bat which is later determined to be rabid) and then had direct contact with an individual, it is unlikely that rabies would be transmitted. The minimum time for animal rabies to incubate is 2 weeks; transmission of rabies will not occur until the virus is being shed in the animal's saliva. There are no known incidents of rabies transmission via this route.

### 3.1.4 Vaccination status of animal

A domestic animal which has been vaccinated against rabies on an annual basis is likely protected from rabies. However, if the animal behaviour is highly unusual, the animal may need to be observed or euthanized regardless of vaccination status.

### 3.1.5 Type of exposure

In a potentially infected animal, the following body substances/tissues may be infectious:

- Saliva and salivary glands
- Neural fluid and tissue

As such, the highest risk exposure is from the bite of an infected animal that breaks the skin. Scratches from an infected animal can theoretically introduce rabies virus if, for example, the animal had licked its nails prior to the scratch. In practice, very few cases of human rabies have been reported secondary to this route of transmission (Afshar 1979).

Virus can rarely be found in urine, muscle and lungs. Contact with such materials has not been documented to lead to transmission of rabies. Fresh bat feces (guano) may also contain virus. There is theoretical risk of airborne transmission of rabies virus from bat feces (Brown 1971, Heymann 2008). RPEP should only be considered for an aerosol exposure where the number of bats in an enclosed area is very high, the exposure is prolonged and the appropriate personal protective equipment was not used. Blood is considered non-infectious, as infected animals are not viremic.

### 3.1.6 Human body part exposed

Exposure to the face and hands increases the risk of rabies because these body parts are highly innervated, providing greater and faster opportunity for virus to enter the nervous system. Although the distance of the exposed body part to the brain affects the incubation period, it does not affect the time available to provide RPEP (i.e., once the virus enters the peripheral nervous system, RPEP is no longer of use).

## 3.2 *Detention, Observation and Testing of Animals*

The CFIA District Veterinarian should be consulted prior to testing of animals.<sup>k</sup>

---

<sup>k</sup> The CFIA is responsible to investigate potential rabies exposures by domestic animals and apply appropriate disease control measures. See [Appendix A](#) for list of CFIA District Veterinarians. For areas outside BC, communication with the CFIA or another reliable agency or responsible person is necessary to assess the health of the animal.



### 3.2.1 Detention and Observation

In non-enzootic areas, quarantine and observation for 10 days can be used to rule out rabies in cats, dogs and ferrets, even if the animal has been vaccinated.<sup>1</sup> If the animal is still clinically well after that time, the animal was not shedding rabies virus at the time of the exposure and was therefore non-infectious. Cats, dogs, or ferrets that display symptoms of rabies during observation must be humanely killed without injury to the brain and tested for rabies. Contact the CFIA District Veterinarian (see [Appendix A](#)) or the Regional Veterinary Office for assistance regarding animal euthanizing, shipping and testing if the animal is in Canada.

The incubation period and period of rabies virus shedding in other animal species are not clearly known, and therefore observation of other animal species does not apply.

In enzootic areas of the world, dogs may shed rabies virus for longer than 10 days, therefore observation for 10 days is not advised (Dutta 1994; Kasempimolporn 2000; Gamble 2002). However, the 10-day observation period may be used under certain circumstances, such as:

- If the animal is an indoor pet and has had no known exposure to an animal outside, and
- If the animal has been vaccinated and is up to date on boosters

If a domestic animal has had physical contact with an animal suspected of having rabies (including any bats), report it to the CFIA District Veterinarian.

### 3.2.2 Testing

Testing of suspect animals should not be undertaken unless a positive result will indicate the need for RPEP. Testing is the prerogative and decision of the CFIA District Veterinarian.

If an animal dies of natural causes after exposure (and/or during observation), strong consideration should be given to testing it (there is an increased risk it may have died of rabies). If an animal is killed after it has exposed someone (e.g., shooting of an aggressive wild animal), it can be tested pending discussion with the CFIA District Veterinarian.

When there has been no direct contact, bats should not be captured or tested, since an attempt to capture a bat may increase the risk of direct contact. Since no RPEP is recommended if there is no contact, there is no point in testing such bats.

In situations where there is evidence of direct contact with a bat and the bat is available for testing, refer the client to a wildlife specialist or pest control company in the area to capture it. If a specialist is not available, do **not** encourage someone who was not exposed to try and capture the bat, thus increasing their risk of exposure.

---

<sup>1</sup> Vaccination of an animal after it has exposed a human does not stop progression of the virus and should not factor into the decision to observe the animal (Fehlner-Gardiner C, personal communication, 2011). In addition, a small percentage of dogs and cats will not produce adequate levels of rabies antibody after vaccination (Jakel 2008, Kennedy 2007).



If the person **already exposed** is willing, have them:

- Close all doors and windows in the area, put on a hat, leather gloves, a long-sleeved jacket and pants.
- Use a blanket, net, broom or towel to catch the bat (without touching it and while protecting any exposed area such as the face). Use tongs to put it in a container with air holes. Place the container in a cool, safe place away from human or pet contact.
- Not kill the bat.
- Contact the public health unit for further instructions.

Testing of animals for rabies in cases of human and domestic animal exposure is available without charge at the CFIA Animal Disease Research Institute (ADRI), Lethbridge, Alberta (phone number 403-382-5500). The preparation of the specimen for shipping (as per Transportation of Dangerous Goods Regulations) and shipment to Lethbridge is also done by CFIA in some locations. Consult the CFIA District Veterinarian or the Regional Veterinary Office for testing and shipping logistics (see [Appendix A](#)). In some areas of the province, private practice veterinarians or EHOs must prepare and ship specimens (see [Appendix B](#)).

Acceptable samples are non-decomposed, non-fixed, undamaged brains that allow the excision of the medulla oblongata (including pons), hippocampus and cerebellum. This includes whole animal brain extracted (from large animals, if the head will not fit into the shipping container), animal head including brain if the whole body will not fit into the shipping container, or for small animals, the entire carcass (e.g., bats, which also allows for species identification).

A portion of spinal cord should be added when the brain is severely damaged, when the specimen is from a large animal (e.g., elk, bear, cow or horse), or when the animal was killed at a suspected early stage of the disease (Kush J; Wandeler A; personal communication, 2009).<sup>m</sup>

## 4.0 RISK MANAGEMENT

### 4.1 *First Aid*

Wash with a mild soap and flush the wound with copious amounts of water under moderate pressure. Expert opinion suggests washing should be done for at least 15 minutes (NACI 2011). Some authorities recommend disinfecting the wound with an iodine-containing or other topical virucidal disinfectant to further decrease the viral load, although there is no evidence to support this (NACI 2011).

---

<sup>m</sup> In some instances, the fluorescent antibody test may not be obviously positive, and examination of neural tissue further down the brain stem may be necessary. This is especially true if an animal has been killed in the early stages of the disease, before the virus has an increased concentration in the brain. A sample taken from the brain of a larger animal is somewhat less likely to capture virus than if it is taken from the spinal cord, where the concentration of virus is greater (Kush, J; personal communication Nov 10, 2010).



The wound should not be sutured unless indicated for cosmetic or tissue support reasons. Sutures, if required, should be placed after local infiltration of Rablg. They should be loose and not interfere with free bleeding and drainage (Heymann 2008).

As appropriate, follow-up wound care should be undertaken by a physician. Although the risk of rabies may be small, there is a risk of other infections at the wound site. Tetanus-diphtheria vaccination should be updated as required and administration of antibiotics should depend on the clinical picture.

#### **4.2 Rabies Post-Exposure Prophylaxis (RPEP)**

If the risk assessment suggests RPEP is warranted, consider providing immediate RPEP. Expert opinion recommends that if RPEP is indicated, it should not be delayed beyond 48 hours after the exposure while waiting for the results of testing (NACI 2011). However, the decision to wait for test results, regardless of the time it takes, should be based on the level of risk.

RPEP is now a series of one dose of rabies immune globulin (Rablg) and 4 doses of vaccine for immunocompetent individuals (NACI 2011).<sup>n</sup> Rablg (20 IU/kg body weight) is given on day 0 at the same time as the first dose of vaccine (1.0 mL IM), or within 7 days of the first vaccination. Rabies vaccine is given on days 0, 3, 7 and 14. RPEP (Rablg and vaccine) must always be administered by the intramuscular route (IM). Rablg should be infiltrated at the wound site (WHO 1992). If necessary, it can be diluted with normal saline to ensure there is sufficient volume to infiltrate all wounds. See the [Communicable Disease Control Manual, Chapter 2: Immunization Program](#) for details on dosage and administration. Immunocompromised individuals should receive Rablg (20 IU/kg body weight) on day 0 or within 7 days of the first vaccination and 5 doses of vaccine (1.0 mL IM) given on days 0, 3, 7, 14 and 28.

RPEP should be offered to exposed individuals regardless of the elapsed interval since exposure. The longest incubation periods for rabies have been reported to be several years (Smith 1991, Johnson 2008).

---

<sup>n</sup> NACI recommends an RPEP dosage of 1 dose of rabies immune globulin and 4 doses of rabies vaccine, administered on days 0, 3, 7 and 14. This approach is based on evidence that the most critical element of prophylaxis is the rapid administration of Rablg and the first dose of vaccine. In most cases, rabies antibody levels reach  $\geq 0.5$  IU/mL before the 5<sup>th</sup> vaccination. There is no correlation between the number of doses received and the long term presence and level of antibodies. Further, when the prophylaxis of exposed individuals has been interrupted after the 4<sup>th</sup> dose of vaccine, there have been no RPEP failures. Finally, many countries use the WHO-approved Zagreb regimen of Rablg plus a series of 2-1-1 vaccine doses. (Rupprecht 2009, NACI 2011).



#### 4.2.1 RPEP Started in Other Countries

When travellers are exposed to an animal in a rabies-enzootic country, they may be started on RPEP in that country. For various reasons, the RPEP received may not be adequate.<sup>o</sup>

In determining the value of biologicals administered overseas, factors to consider include:

- Does the client have the details of RPEP documented by the provider (label for the biologicals and the schedule of injections)?
- Was the RPEP administered at a well known urban hospital, university or a clinic affiliated with a hospital?
- Is the physician or clinic listed with the International Society of Travel Medicine?

If the validity of the RPEP series given or begun in another country is in question (e.g., non-WHO approved vaccine or counterfeit vaccine), draw serum for rabies antibody titres and start a new series of RPEP (WHO 2008 and CATMAT 2002). Provide Rablg if the person had not received WHO-approved vaccine and no Rablg or Rablg of questionable validity was provided (CATMAT 2002).

Submit the specimen to the BCCDC PHMRL which forwards it to the National Microbiology Laboratory. Allow for at least a 1-week turnaround. If the titre returns an Ab level of  $\geq 0.5$  IU/mL, and the client has had a complete series of vaccinations, the new series of vaccinations can be discontinued. If the titre is  $< 0.5$  IU/mL, the series of vaccinations started in Canada should be completed.

If a WHO-approved vaccine was administered using a WHO-approved schedule<sup>p</sup> under appropriate conditions but no Rablg was administered, there is no need to repeat vaccination, provide Rablg, or test antibody titres. This is based on the logic that such a vaccine course will induce an antibody response and Rablg will not be effective given more than 7 days after the first dose of vaccine.

If a WHO-approved vaccine series was started overseas, the series can be completed with another WHO-approved vaccine licensed in Canada (aWHO 2010). If the vaccine series was started using the ID route, it can be completed using the IM route.<sup>q</sup> The opposite is not recommended. If a different, but WHO-approved, dosing schedule was used overseas, attempt to continue with this schedule. If the schedule used is not WHO-approved, consider re-initiation of the series.<sup>r</sup>

---

o RPEP provided in some countries may be inadequate for various reasons such as compromised cold chain, counterfeit vaccine or lack of Rablg. There are reports of counterfeit vaccines being used in the developing world, however, there are no specific details as to the countries where this occurs or how widespread the practice is (Wandeler A; Meslin FX; Rupprecht CE; personal communication, 2008). As of 2008, there was no WHO-approved Rablg available in China, apart from Hong Kong (Davis 2008).

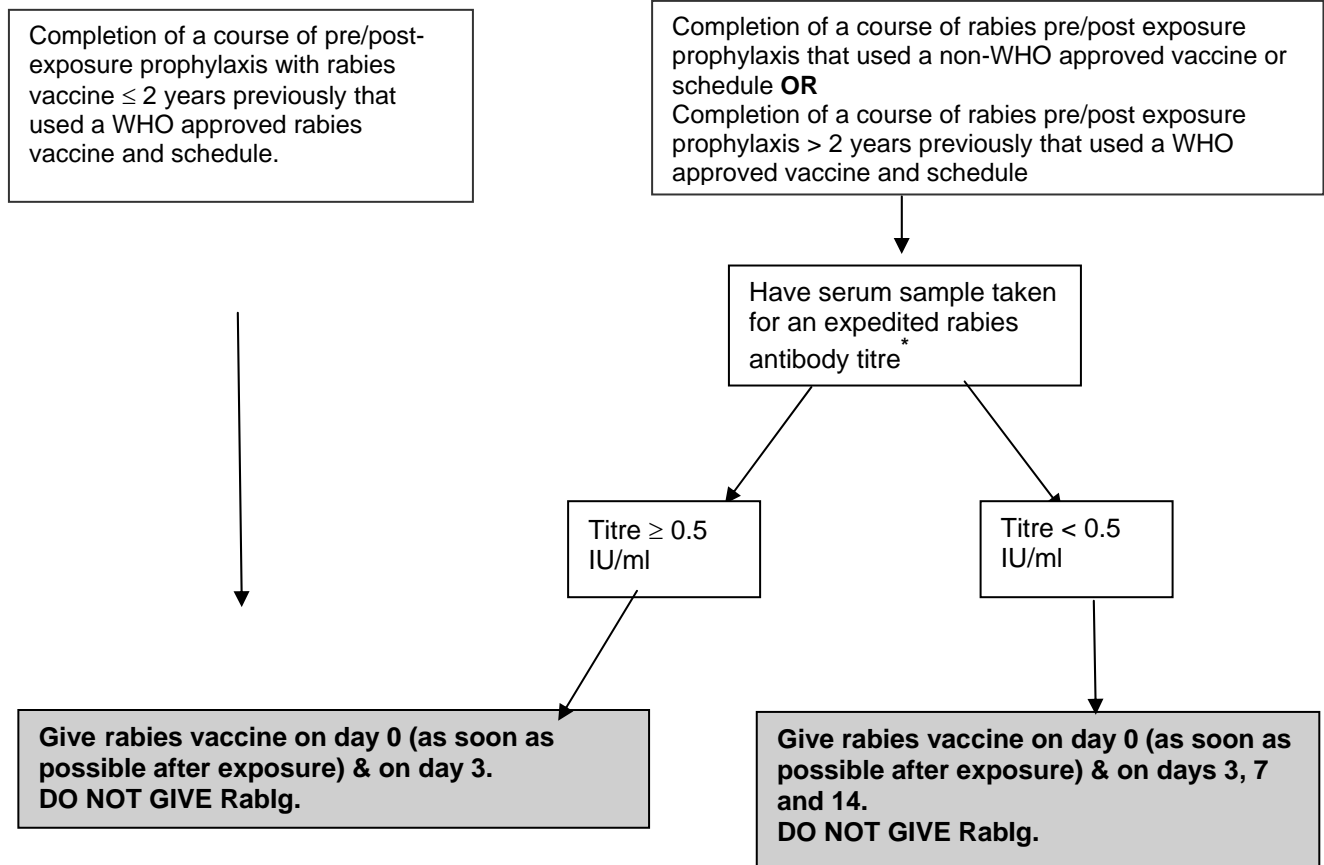
p WHO-recommended IM dosing schedules include a 5 dose schedule on days 0, 3, 7, 14 and 28, a 4 dose schedule with 2 doses on day 0 followed by 1 dose each on days 7 and 21 and a 4 dose schedule on days 0, 3, 7 and 14 (aWHO 2010). ID schedules can be found at

q No study has been done on immunogenicity following a change of the route of vaccine administration. The recommendation provided here is based expert opinion and on current practice which have led to no failures.

r There is no evidence for or against this. This recommendation is based on expert opinion.



### 4.3 RPEP in Persons Previously Immunized Against Rabies



\*Have serum sample taken and administer first doses of rabies vaccine while awaiting lab results. Phone the BCCDC PHMRL with the patient's demographics: Lab Supervisor at 604-707-2828 or Medical Microbiologist on call at 604-661-7033.

The BCCDC PHMRL forwards samples to the National Microbiology Laboratory where rabies antibody titre tests are run twice a week. The test takes 2 days. The BCCDC PHMRL will attempt to obtain an expedited result. If the antibody levels are not available before the scheduled dates of the vaccine administration, continue the series.

### 4.4 Pre-exposure Rabies Immunization

Pre-exposure rabies immunization is elective and should be offered to persons at potentially increased risk of contact with rabid animals. Refer to the [Communicable Disease Control Manual, Chapter 2: Immunization Program](#) for details regarding vaccine administration. The BCCDC will only provide pre-exposure rabies vaccine free to British Columbia students attending a Canadian Veterinary College or Animal Health Technology Training Centre.



Table 2 presents the personal risk categories for which pre-exposure rabies immunization is recommended.

**Table 2: Pre-exposure Rabies Immunization**

<b>Personal Risk Category</b>	<b>Nature of Risk</b>	<b>Typical Populations</b>	<b>Pre-exposure Immunization</b>
<b>Very low risk</b>	Rare exposure to virus Potential for mucous membrane, bite or non-bite exposure.	BC population at large and most travellers to enzootic areas not in any of the higher risk groups below.	o immunization necessary.
<b>Low risk</b>	Exposure to virus nearly always episodic with source recognized. Potential for mucous membrane, bite, or non-bite exposure.	Veterinarians and staff, animal control and wildlife workers in areas of low rabies enzooticity (BC); veterinary and animal health technology students. Children and travellers visiting foreign enzootic areas for one month or more. Travellers to foreign epizootic areas, trekking/hiking for any length of time, and far from a major medical centre.	Initial series. Booster only following a subsequent exposure, or as determined by post-exposure serology.
<b>Moderate Risk</b>	Virus present episodically, with source recognized, but exposure may be unrecognized. Potential for mucous membrane, bite, non-bite or aerosol exposure.	Rabies diagnostic lab workers and spelunkers. Veterinarians and staff, animal control and wildlife workers in rabies enzootic areas. Hunters and trappers in high-risk areas such as the far north.	Initial series. Serologic testing every 2 years. Booster immunization when antibody level is < 0.5 IU/ml.
<b>High Risk</b>	Frequent exposure. Virus present continuously, often in high concentrations. Potential for mucous membrane, bite, non-bite or aerosol exposure. Specific exposures may go unrecognized.	Rabies research lab workers; rabies biologicals production workers.	Initial series. Serologic testing every 6 months. Booster immunization when antibody level is < 0.5 IU/ml



Pre-exposure prophylaxis should be given by the intramuscular (IM) route. It can be given by the intradermal (ID) route by staff who are well-trained in using this route but only for immunocompetent people. It is necessary to check antibody titres after using the ID route. Refer to the Canadian Immunization Guide for dosing and testing protocols (NACI 2006).

If exposed while out of the country, travellers who receive RPEP abroad are advised to obtain detailed, written information on the type of Rablg and vaccine they have received, and the vaccination schedule. It would also be advisable to obtain a label of the biologicals they have received. This will help determine the validity of the vaccine used. Reference should also be made to the list of WHO-approved vaccines in [Section 4.5](#).

#### **4.5 Rabies Vaccines – WHO-approved**

Who approves of the use of cell-culture and embryonated egg based vaccines. These include vaccines produced on human diploid cells (HDCV), fetal rhesus diploid cells, Vero (African green monkey kidney) cells (PVRV), primary Syrian hamster kidney cells, primary chick embryo cells (PCECV), and embryonated duck eggs (PDEV).

The following rabies vaccines meet WHO's safety, potency, and efficacy requirements (WHO 2002):

- Imovax® Rabies\*; Rabivac (HDCV)
- RabAvert®\*; Rabipur™ (PCECV)
- Verorab™; Imovax Rabies vero; TRC Verorab™ (PVRV)
- Lyssavac N™ (PDEV)

\* Licensed in Canada

Nerve tissue vaccines are less immunogenic and more reactogenic and are not WHO-approved (CATMAT 2002, aWHO 2010). Individuals who have received it should be considered unvaccinated.

#### **4.6 Release of Biologicals for RPEP**

Health units are encouraged to depot an appropriate quantity of rabies vaccine and Rablg based on demand from the previous year and any changes in RPEP guidelines. When the product dating is within 6 months of expiry and there is concern that product will not be used prior to expiry, return to BCCDC under cold chain conditions. Contact BCCDC Biologicals Desk at (604) 707-2582 to obtain authorization for this Field Return.

**The MHO must authorize all releases of rabies vaccine and Rablg.** Consultation is available with BCCDC Communicable Disease Prevention and Control Services. During the day or after hours call (604) 312-9220. On establishing that RPEP should be administered, the MHO requests release of the appropriate biologicals from the local depot or from BCCDC.



If rabies biologicals are to be released from BCCDC during regular office hours (8:30 am to 4:30 pm) the MHO must use the “Rabies Exposure Report and Rabies Biologicals Request Form” (see [Appendix C](#)) to obtain the release of the biologicals. Fax the form to the BCCDC Biologicals Desk at (604) 707-2581 [phone number: (604) 707-2582].

This form must specify the required number of doses of vaccine and vials of Rablg. The dose of Rablg is calculated according to the person’s body weight. Refer to the chart in [Appendix D](#). Personnel releasing the biologicals are not responsible for computing this information.

For after hours release of RPEP biologicals from BCCDC, the MHO needs to phone:

<p><b>BCCDC Vaccine and Pharmacy Services: Pager # (604) 977-0059</b> <b>Cell: (604) 809-4670</b></p>
---

The MHO may wish to provide an instruction sheet ([Appendix E](#) and [Appendix F](#)) to personnel who will be administering the RPEP series.

The [Rabies HealthLink BC File](#) should be used for obtaining informed consent from the individual who will be receiving RPEP:

## 5.0 CLINICAL PRESENTATION IN HUMANS and EPIDEMIOLOGY

**Clinical description:** The first signs of illness are non-specific and include fever, anxiety, and malaise. Often there is tingling and severe pruritus at the site of the animal bite. After 2 – 10 days, frank neurological signs appear, ranging from hyperactivity to paralysis. The disease is divided into encephalitic (“furious rabies”) and paralytic (“dumb rabies”) forms:

- In the encephalitic form, signs of irritation of the CNS predominate, including agitation, confusion, hydrophobia, aerophobia, hyperventilation, hypersalivation, priapism, and convulsions. After a few days to a week, the person may experience a stage of excitement that lasts only a few days before the person lapses into coma and death.
- The paralytic form of rabies differs in that the person does not experience a stage of excitement, but retreats steadily and quietly downhill, with some paralysis, to coma and death.

Once the virus enters the nervous system, treatment rarely affects the rapid progression to death. In 2004, a teenager who had not received RPEP developed rabies disease but survived following aggressive treatment (Willoughby 2005). This is the only known instance of survival following disease.



**Incubation period:** After inoculation, the virus may persist and replicate at the inoculation site for hours to weeks before progressing to nerve endings at the site of the bite. As the virus does not travel through the bloodstream or lymph system, it does not readily induce an immune response prior to entering the nerves. Once the virus enters the nerves, it is virtually impossible to treat it. The virus slowly travels up the nerves to reach the CNS where it replicates and then disseminates through nerves to many body sites including the cornea, hair follicles, and salivary glands where there is further replication.

The incubation period is usually 3 – 8 weeks, rarely as short as a few days or as long as several years. The length of the incubation period depends on the severity of the wound, site of the wound in relation to the richness of the nerve supply and its distance from the brain, and the amount and strain of virus introduced (Heymann 2008).

**Infectious agent:** The rabies virus is a rhabdovirus belonging to the genus *Lyssavirus*.

**Mode of transmission:** Infection occurs by percutaneous introduction of the virus-laden saliva or CFS of a rabid animal through a bite or scratch, or into a fresh break in the skin, or by contact with intact mucous membranes. Transmission has been reported through the transplantation of organs taken from persons who died of undiagnosed rabies. Also, wild animals may bite and infect domestic animals which in turn may infect humans.

Airborne transmission has been reported in 2 instances in a laboratory setting, where there was significant aerosolization and possible lack of personal protection. Also, there have been 2 reports of rabies acquired in a bat infested cave attributed to aerosol transmission, but there is no proof in either case that a bite or wound contamination did not occur (Irons 1957, Humphrey 1960). No well-documented natural transmission of rabies by aerosols has occurred (Gibbons 2001).

**Reservoirs:** In BC, bats are the only known reservoir. Over the past 10 years, approximately 4 to 8% of the BC bats submitted for testing each year have been shown to be infected (Kush J, CFIA, personal communication, 2010). Bats submitted for testing have a higher likelihood of being infected.

There is occasional spill-over of bat-variant rabies to other species but no evidence of continued transmission within these species in BC:

- 2007 – a cat in Maple Ridge
- 2004 – 4 skunks in Stanley Park
- 1992 – 3 cats in Delta\*
- Late 1980s – a beaver\*
- 1984 – a horse in the Sorrento area
- 1969 – a cat on Vancouver Island

---

\* Skunk strain of rabies virus was recovered from one of the Delta cats and the beaver. A wildlife survey in Delta (prior to 1989) following the isolation of the skunk strain rabies in a beaver, and intensified testing of cats following the Delta incident, indicated that the skunk strain of rabies is not enzootic in BC. The skunk strain identification has never been fully explained, although a lab error is possible. Strain testing was not available for the 1969 cat case, but it was most likely due to bat strain of virus.



In other parts of Canada, bats, skunks, raccoons and foxes may be reservoirs. In the developing world, dogs are a major source of infection, responsible for up to 99% of rabies deaths (bWHO 2010).

In all geographic jurisdictions, squirrels, hamsters, guinea pigs, gerbils, chipmunks, rats, mice and other rodents, rabbits and hares are only rarely infected with rabies. They are not known to have caused human rabies in North America.

**Human epidemiology:** In Canada, there have been 23 human cases reported since 1924 and only 1 of these occurred in BC. Of the eleven cases that occurred since 1950, 6 were due to bat strain of rabies. Among them, a 25 year old male, Alberta resident was infected by a bat while in Alberta and died in BC in 1983, and a 60 year old male BC resident was infected by bat variant rabies virus in BC, and died in 2003 (NACI 2006, DeSerres 2008).

## 6.0 RECORDING AND REPORTING

Potential rabies exposures and the administration of Rablg and rabies vaccine are reported to monitor the occurrence of potentially rabid animal contacts, support rabies risk assessment, and monitor the utilization of RPEP in BC.

1. Record the incident/exposure history in the rabies module of iPHIS. Only exposures leading to the provision of RPEP need to be reported. Information on how to enter data is available in the BCCDC iPHIS training manual (PartnerNet under “iPHIS, 6.5.X Upgrade, Resources, CD – Rabies Training Manual”) and the data standards document that identifies mandatory entry fields (PartnerNet under “iPHIS, iPHIS Policy, 1.11 Entering information related to rabies incidents in iPHIS”).

If iPHIS is not utilized by the region where the exposed person resides, fax the “Rabies Exposure Report and Rabies Biologicals Request Form” ([Appendix C](#)) to the Biologicals Desk at (604) 707-2581. The Biologicals Desk in turn forwards the form to Communicable Diseases Prevention and Control Services where this information is entered into iPHIS. If biologicals are stored in a depot regionally, the Health Unit should indicate on the Form that biologicals are not needed. When the form is received, only the exposure will be recorded in iPHIS.

If the exposure occurs outside the Health Authority (HA) of residence, the HA conducting the follow-up should inform the HA of residence. The information should be entered by the HA of residence.

2. Next, record the administration of rabies vaccine and Rablg in iPHIS, in the PHS Module, Immunizations/TST tab. **Do not use the Rabies Module, Immunizations Tab.**



---

If the HA does not utilize iPHIS, the vaccine and Rablg administration should be recorded on the “Record of Rabies Vaccine and Rabies Immune Globulin Administration” ([Appendix F](#)). This completed record should then be faxed to the Biologicals Desk at (604) 707-2581. The Biologicals Desk in turn forwards the form to Communicable Diseases Prevention and Control Services where this information is entered into iPHIS.

If a non-public health site (e.g. hospital) is administering the RPEP, the HA should fax the “Record of Rabies Vaccine and Rabies Immune Globulin Administration” ([Appendix F](#)) to the person who will be administering the Rablg. Instruct this person to fax the completed record back to the HA after the Rablg has been administered. The HA then enters the data in iPHIS or faxes the record to the BCCDC Biologicals Desk.

If the exposed client refuses RPEP or discontinues RPEP prior to completion, document this in the Exemption tab of the Rabies Module in iPHIS and inform the client’s physician.

## **7.0 REPORTING AUTHORITY**

Rabies in animals is reportable to the CFIA under the Reportable Disease Regulations of the federal Health of Animals Act. Rabies in humans is reportable to the Medical Health Officer under the Public Health Act Communicable Disease Regulation (BC Reg 4/83), pursuant to the Public Health Act (SBC 2008) c. 28.



---

## **8.0 REFERENCES**

Advisory Committee on Epidemiology, Bureau of Communicable Disease Epidemiology, Laboratory Centre for Disease Control. (2000). Supplement: Case Definitions for Diseases Under National Surveillance. Canada Communicable Disease Report, 26S3.

Afshar A. A review of non-bite transmission of rabies virus infection. *Br Vet J.* 1979 Mar-Apr;135(2):142-8.

Alringham, J. D. (1996). *Bats: biology and behaviour.* Oxford University Press, Oxford.

Bleck, TP, Rupprecht, CE. Rhabdoviruses. (1997). In Richman, D.D., Whitley, R.J., & Hayden, F.G., (eds.), *Clinical Virology* (pp. 879-897). New York: Churchill Livingstone.

Brown RC. Pre-exposure prophylaxis in amateur spelunkers. *JACHA* 1971;20:132-4.

Committee to Advise on Tropical Medicine and Travel (CATMAT). Statement on travelers and rabies vaccine. *Canada Communicable Disease Report.* 2002 Mar 1; 28; 1-12.

Centers for Disease Control and Prevention. Human rabies prevention – United States, 2008. *MMWR.* 2008 May 23; 57(No. RR-3):1-27

Childs JE, Colby L, Krebs JW, Strine T, Feller M, Noah D, Drenzek C, Smith JS, Rupprecht CE. Surveillance and spatiotemporal associations of rabies in rodents and lagomorphs in the United States, 1985-1994. *J Wildl Dis.* 1997 Jan;33(1):20-7.

Chomchay P, Khawplod P, and Wilde H. Neutralizing antibodies to rabies following injection of rabies immune globulin into gluteal fat or deltoid muscle. *J Travel Med* 2000;7, 187-8.

Cooper K, Skowronski D, Galanis E. Rabies in BC: a prophylaxis guideline update. *BCMJ* 2009 March; 51: 82-84.

Davis X, MacDonald S, Borwein S, Freedman D, Kozarsky P, von Sonnenburg F et al. Health risks in travelers to China: the GeoSentinel experience and implications for the 2008 Beijing Olympics. *Am J Trop Med Hyg.* 2008;79(1): 4-8.

De Serres G, Dallaire F, Cote M, Skowronski D. Bat rabies in the United States and Canada from 1950 through 2007: Human cases with and without bat contact. *Clin Infect Dis* 2008;46:1329-37.

De Serres G, Skowronski D, Mimault P, Ouakki M, Maranda-Aubut R, Duval B. Bats in the bedroom, bats in the belfry: re-analysis of the rationale for rabies post-exposure prophylaxis. *Clin Infect Dis.* 2009;48:1493-9.

Dobardzic A, Izurieta H, Woo EJ, et al. Safety review of the purified chick embryo cell rabies vaccine: Data from the Vaccine Adverse Event Reporting System (VAERS), 1997-2005. *Vaccine* 2007;25:4244-51.

Dutta JK, Dutta TK. Rabies in endemic countries. *Brit Med J.* 1994 Feb 19; 308:488-89.

Fishbein DB, Robinson L.E.. Rabies *N Engl J Med* 1993;329, 1632-8.

Gibbons RV. Cryptogenic rabies, bats, and the question of aerosol transmission. *Ann Emerg Med.* 2002 May; 39(5):528-36.

Heymann, D.L. (2008). *Control of Communicable Diseases in Man.* 19th edition, American Public Health Association, Washington, D.C.



Humphrey GL, Kemp GE, Wood EG. A fatal case of rabies in a woman bitten by an insectivorous bat. *Public Health Rep.* 1960;75(4):317-25.

Huot C, De Serres G, Duval B, Maranda Aubut R, Ouakki M, Skowronski D. The cost of preventing rabies at any cost : Post-exposure prophylaxis for occult bat contact. *Vaccine* 2008; 26(35):4446-50.

Irons JV, Eads RB, Grimes JE, Conklin A. The public health importance of bats. *Tx Rep Biol Med* 1957;15:292-8.

Jackson AC. Rabies virus infection: an update. *J Neurovirol* 2003;33, 20.

Jakel V, König M, Cussler K, Hanschmann K, Thiel H-J. Factors influencing the antibody response to vaccination against rabies. *Dev Biol (Basel)*. 2008;131:431-7

Johnson N, Fooks A, McColl K. Human rabies case with long incubation, Australia. *Emerg Infect Dis.* 2008 Dec;14(12):1950-1.

Kamoltham T, Tepsumethanon V, Wilde H. Rat rabies in Phetchabun Province, Thailand. *Travel Med.* 2002 Mar-Apr;9(2):106-7.

Kasempimolporn S, Saengseesom W, Lumlertdacha B, Sitprijia V. Detection of rabies virus antigen in dog saliva using a latex agglutination test. *J Clin Micro.* 2000 Aug; 38(8):3098-99.

Kennedy LJ et al. Factors influencing the antibody response of dogs vaccinated against rabies. *Vaccine* 2007 (25):8500-8507.

Mcquiston, J.H., Yager, P.A., Smith, J.S., & Rupprecht, C.E. (2001). Epidemiologic characteristics of rabies virus variants in dogs and cats in the United States, 1999. *J Am Vet Med Assoc*, 218, 1939-42.

Moro MH, Horman JT, Fischman HR, Grigor JK, Israel E. The epidemiology of rodent and lagomorph rabies in Maryland, 1981 to 1986. *J Wildl Dis.* 1991 Jul;27(3):452-6.

NACI. Rabies Vaccine. In: *Canadian Immunization Guide*. (7th ed.). Ottawa, On: Public Health Agency of Canada. 2006. p 285-297.

NACI. Recommendations regarding the management of bat exposures to prevent human rabies. *CCDR.* 2009 Nov;35 ACS-7. Available from: <http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/09vol35/acs-dcc-7/index-eng.php>

NACI. Rabies Vaccine. *Canadian Immunization Guide*. (8th ed.). 2011 DRAFT.

Plotkin S.A. (2000). Rabies. *Clinical Infectious Diseases*, 30, 4-12.

Public Health Agency of Canada. Material Safety Data Sheet – Infectious Substances [database on the Internet]. [cited Jan 29, 2009]. Available at <http://www.phac-aspc.gc.ca/msds-ftss/msds124e-eng.php>

Rupprecht CE, Briggs D, Brown CM, Franka R, Katz SL, Kerr HD, Lett S, Levis R, Meltzer MI, Schaffner W, Cieslak PR. Evidence for a 4-dose vaccine schedule for human rabies post-exposure prophylaxis in previously non-vaccinated individuals. *Vaccine.* 2009 Nov 27;27(51):7141-8.

Siwasentiwat, D., Lumlertdaecha, B., Polsuwan, C. (1992). Rabies: is provocation of the biting dog relevant for risk assessment? *Trans R Soc Trop Med Hyg*, 86, 443.



---

Smith JS, Fishbein DB, Rupprecht CE, Clark K. Unexplained rabies in three immigrants in the United States. A virologic investigation. *N Engl J Med.* 1991 Jan 24;324(4):205-11.

U.S. Department of Health and Human Services. Human rabies prevention - United States, 2008. Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR* 2008 May 7;57.

Wang X, Werner BG, Konomi R, Hennigan D, Fadden D, Caten E, Soliva S, DeMaria A. *J Wildl Dis.* 2009 Apr;45(2):375-87. Animal rabies in Massachusetts, 1985-2006.

Weir E. Putting the bite on rabies. *CMAJ.* 2002;167, 781.

WHO Expert Committee on Rabies. Technical Report Series 824. (1992). Geneva: World Health Organization.

WHO. Current WHO Guide for Rabies Pre and Post-Exposure Treatment in Humans. 2002. Available from: [http://www.who.int/rabies/en/WHO\\_guide\\_rabies\\_pre\\_post\\_exp\\_treat\\_humans.pdf](http://www.who.int/rabies/en/WHO_guide_rabies_pre_post_exp_treat_humans.pdf). Accessed Mar 23 2011.

WHO Expert Consultation on Rabies 2004. First Report. WHO Technical Report Series 931. (2005). Geneva: World Health Organization.

aWHO. Rabies vaccines: WHO position paper. *Weekly epidemiological record.* 2010 Aug 6;85:425-35.

bWHO. WHO Guide for Rabies Pre and Post-Exposure Prophylaxis in Humans. 2010. Available from [www.who.int/rabies/PEP\\_prophylaxis\\_guidelines\\_June10.pdf](http://www.who.int/rabies/PEP_prophylaxis_guidelines_June10.pdf) Accessed 4 Jan 2011.

WHO. Post-exposure treatment of previously vaccinated persons. [updated 2008; cited 2008 Aug 21]. Available from: <http://www.who.int/rabies/human/prevvaccperson/en/print.html>

WHO. RabNet. [updated 2010; cited 2010 Nov 10]. Available from: <http://apps.who.int/globalatlas/default.asp>

Willoughby RE Jr, Tieves KS, Hoffman GM, Ghanayem NS, Amlie-Lefond CM, Schwabe MJ, Chusid MJ, Rupprecht CE. Survival after treatment of rabies with induction of coma. *N Engl J Med.* 2005 Jun 16;352(24):2508-14.

Woldehiwet Z. Rabies: recent developments. *Res Vet Sci.* 2002;73, 17-25.

**APPENDIX A: Canadian Food Inspection Agency Contacts**

<b>District Office</b>	<b>Name Disease Control Specialist and Program Assistant</b>	<b>Office No</b>	<b>Fax No</b>
<b>CFIA Regional Office (BC)</b> 400 – 4321 Still Creek Drive Burnaby BC V5C 6S7	Dr. Robert Cooper	(604) 666-8900	(604) 666-1963
	Josée Pauls	(604) 666-2484	
<b>Abbotsford</b> Rm 102, 30585B Progressive Way Abbotsford BC V2T 6W3	Dr. Avtar Singh	(604) 557-4500	(604) 557-4502
	Lori Anglin		
<b>Vancouver/Richmond</b> Unit 201 4831 Miller Road Richmond BC V7B 1K7	Dr. Amrinder Brar	(604) 666-7042	(604) 666-6027
	Gloria Tan	(604) 666-7172	
<b>Cranbrook</b> Room 108, 1525 Cranbrook St, North Cranbrook BC V1C 3S7	Dr. Shirley McDonald	(250) 417-2293	(250) 417-2292
	Maureen Williamson		
<b>Dawson Creek</b> Unit #2 – 12008 – 8 <sup>th</sup> St Dawson Creek BC V1G 4Y5	Dr. Al Chambers/ Dr. Corinna Harvey	(250) 719-6855	(250) 719-6849
	Lynne Litwin		
<b>Oliver</b> 34577 91 <sup>st</sup> Street PO Box 1530 Oliver BC V0H 1T0	Dr. Ken Roblesky	(250) 498-5301	(250) 498-5303
	Glenda Buyan	(250) 498-5322	
<b>Osoyoos</b> 202 Hwy. 97 South Osoyoos BC V0H 1V1	Dr. Ken Roblesky	(250) 495-6574	(250) 495-3255
	Glenda Buyan		
<b>Surrey</b> Room 175, 17735 – 1st Ave Surrey BC V3S 9S1	Dr. Peter Bertram	(604) 541-3365	(604) 541-3375
	Lucia Hunter	(604) 541-3364	
<b>Vernon</b> 2814 - 48th Avenue Vernon BC V1T 3R4	Dr. Witold Wince	(250) 260-5030	(250) 260-5031
	Tova Wadsworth		
<b>Victoria</b> 103 – 4475 Viewmont Avenue Victoria BC V8Z 6L8	Dr. Sujinder Bhachoo	(250) 363-3097	(250) 363-0144
	Kenan Sweezie	(604) 363-3972	
<b>Williams Lake</b> Room 307 – 35 2 <sup>nd</sup> Ave South Williams Lake BC V2G 3W3	Dr. Gary DeBruin	(250) 305-3004	(250) 305-3003
	Stella Ramsay		
<b>Harbour Operations</b>	Inspection Officer	(604) 666-3837	(604) 666-1156
<b>Import Service Centre</b>		(888) 732-6222 (604) 666-9240	(604) 666-1577



**APPENDIX B - PACKAGING A RABIES SPECIMEN FOR SHIPMENT TO ADRI**

<p>The following items have been supplied:</p> <p>Labelled green can                      cardboard box 2 plastic sample bags                  icepacks Labels for box (not needed if sent unregulated) Rabies Submission Form (NT &amp; NU only)</p> <p>(District Offices forwarding rabies can kits to vet clinics, health units, etc. need to provide a rabies submission form)</p> <p><b>Rabies Submission Form:</b> Ensure that all the required information is recorded on the rabies submission form.</p> <p>Place the submission form inside the box but <b>not</b> inside the can or taped to the can.</p> <p><b>Specimen Packing:</b></p> <ol style="list-style-type: none"> <li>1. Place the rabies specimen in the first bag and close tightly. Use two knots if possible.</li> <li>2. Wrap the bagged sample in absorbent material such as newspaper.</li> <li>3. This is now placed within the second plastic bag and sealed tightly.</li> <li>4. Attach an eartag or identifying label to the outer bag. Record the eartag number or identifier label on the rabies submission form.</li> <li>5. Place additional newspaper at the bottom of the can. Place the bagged sample in the green can. Ice packs should be placed around the sample if there is sufficient room.</li> <li>6. Replace the lid and metal collar and tighten the collar bolt.</li> <li>7. Place the can and the completed rabies submission form in the box provided. Seal the box.</li> </ol>	<p><b>Labelling and Shipping Documentation</b></p> <p>If rabies is <b>not</b> suspected, the specimen may be shipped <b>unregulated</b>.</p> <p>If rabies is suspected, the specimen must be shipped as Dangerous Goods (UN 3373).</p> <p>Only unregulated samples may be shipped by bus.</p> <p><b>A. Unregulated</b> Labels (on both box and can):</p> <ol style="list-style-type: none"> <li>1) Shipper's name, address and phone #</li> <li>2) Consignee's name, address and phone #</li> <li>3) Exempt Animal Specimen</li> </ol> <p>Mark box with the word "R-UNIT".</p> <p>Documentation: Description of goods statement on waybill: Exempt Animal Specimen</p> <p><b>B. Dangerous Goods UN3373</b> Labels (on both box and can):</p> <ol style="list-style-type: none"> <li>1) Shipper's name, address and phone #</li> <li>2) Consignee's name, address and phone #</li> <li>3) UN3373 diamond shaped label</li> <li>4) Biological substance, Category B...label</li> </ol> <p>Mark box with the word "R-UNIT".</p> <p>Mark box with the word "Overpack" if the shipment is to be transported by AIR.</p> <p>Documentation: Only a shipper's waybill is needed. Description of goods statement on waybill: <b>Biological substance, Category B, UN3373, PI650</b></p> <p><b>CFIA-Lethbridge Laboratory, Rabies Lab</b> <b>Township Rd. 9-1, Lethbridge, AB T1J 3Z4</b> <b>Phone: 403-382-5559                  Fax: 403-381-1202</b> <b>E-mail: <a href="mailto:kushi@inspection.gc.ca">kushi@inspection.gc.ca</a></b></p>
---	---



**APPENDIX C: Rabies Exposure Report and Rabies Biologicals Request Form**

CLIENT INFORMATION	
*Last Name:	*First Name:
*Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female	*PHN:
Present Weight: (kg)	*Date of Birth: ____/____/____ (yyyy/mm/dd)
*No. and Street Address:	
*City/Town:	*Phone #: H: ( ) _____ W: ( ) _____ Other: ( ) _____
*Postal Code:	
PHYSICIAN INFORMATION	
Last Name:	First Name:
No. and Street Address:	Phone: ( ) _____
City/Town:	Postal Code:
ANIMAL INFORMATION	
*Animal species: <input type="checkbox"/> Bat <input type="checkbox"/> Cat <input type="checkbox"/> Dog <input type="checkbox"/> Monkey: <i>note</i> ♦ <input type="checkbox"/> Other (describe) _____ <input type="checkbox"/> Unknown	
Animal type: <input type="checkbox"/> Household pet -indoor <input type="checkbox"/> Household pet -outdoor <input type="checkbox"/> Stray <input type="checkbox"/> Wild <input type="checkbox"/> Unknown	
Animal immunized against rabies? <input type="checkbox"/> Yes: ____/____/____ (yyyy/mm/dd) <input type="checkbox"/> No <input type="checkbox"/> Unknown	
Animal behaviour at time of exposure:	
Observation period following exposure? <input type="checkbox"/> No <input type="checkbox"/> Yes, from: ____/____/____ to: ____/____/____ Observation location: _____ (yyyy/mm/dd) (yyyy/mm/dd) Symptoms: _____ Onset date: ____/____/____ (If clinically rabid, Symptoms and Onset date are mandatory.) (yyyy/mm/dd)	
Vet name: _____ Phone: ( ) _____	
*Brain sent for testing? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unknown	Date specimen shipped: ____/____/____ (yyyy/mm/dd)
Testing Result: ____ *Rabies Status: ____ (Positive, Negative, Indeterminate)	Date of test: _____ (yyyy/mm/dd)

♦ If exposure was to a monkey, assess risk for Simian B virus. Refer to Communicable Disease Control Manual: Simian B virus



**APPENDIX D: Rabies Immune Globulin (Rablg) Dosage by Bodyweight****Rablg:** 1 vial = 2 ml = 300 IU**Dose (ml):** 20(IU per kg) x wt (kg)/150(IU per ml)

Infiltrate as much Rablg as possible deep into and around the wound(s) in order to neutralize the virus. Inject the remaining amount intramuscularly (IM) in the ventrogluteal area (in those > 7 months of age) or in the anterolateral thigh. When more than one wound site exists, each site should be locally infiltrated with a portion of the Rablg using a separate syringe and needle for each infiltration. If there are extensive wounds, where the calculated dose of Rablg (by weight) is **not** adequate in volume to infiltrate all wounds, dilute the Rablg 2-3 fold in normal saline to create an adequate volume to infiltrate all wounds. When there is no wound site, the Rablg should be given IM in the ventrogluteal site (in those > 7 months of age) or in the anterolateral thigh.

Rablg should not be given in the deltoid. Both deltoid muscles should be reserved for the administration of rabies vaccine.

***Do not exceed the recommended dose*****POST-EXPOSURE RABIES VACCINE :****Not previously immunized:**

- 1mL IM days 0, 3, 7, 14 (Rablg day 0) for immunocompetent
- 1 ml IM days 0, 3, 7, 14, 28 (Rablg day 0) for immunocompromised

**Previously immunized:**

- Refer to Subsection 4.3 RPEP in persons previously immunized against rabies

Weight (pounds)	Weight (Kg)	Dose (I.U)	# of vials	Dose (ml)
10	4.5	91	1	0.6
12	5.4	109	1	0.7
15	6.8	136	1	0.9
20	9.1	181	1	1.2
22	10.0	200	1	1.3
25	11.3	227	1	1.5
30	13.6	272	1	1.8
35	15.9	318	2	2.1
40	18.1	363	2	2.4
45	20.4	408	2	2.7
50	22.7	454	2	3.0
55	24.9	499	2	3.3
60	27.2	544	2	3.6
65	29.5	590	2	3.9
70	31.8	635	3	4.2
75	34.0	680	3	4.5
80	36.3	726	3	4.8
85	38.6	771	3	5.1
90	40.8	816	3	5.4
95	43.1	862	3	5.7
100	45.4	907	3	6.0
105	47.6	953	4	6.4
110	49.9	998	4	6.7
115	52.2	1043	4	7.0
120	54.4	1089	4	7.3
125	56.7	1134	4	7.6
130	59.0	1179	4	7.9
135	61.2	1225	5	8.2
140	63.5	1270	5	8.5
145	65.8	1315	5	8.8
150	68.0	1361	5	9.1
155	70.3	1406	5	9.4
160	72.6	1452	5	9.7
165	74.8	1497	5	10.0
170	77.1	1542	6	10.3
175	79.4	1588	6	10.6
180	81.6	1633	6	10.9
185	83.9	1678	6	11.2
190	86.2	1724	6	11.5
195	88.5	1769	6	11.8
200	90.7	1814	6	12.1
205	93.0	1860	7	12.4
210	95.3	1905	7	12.7
215	97.5	1950	7	13.0
220	99.8	1996	7	13.3
225	102.1	2041	7	13.6
230	104.3	2087	7	13.9
235	106.6	2132	8	14.2
240	108.9	2177	8	14.5
245	111.1	2223	8	14.8
250	113.4	2268	8	15.1



**APPENDIX E: Instructions for the Administration of Rabies Vaccine and Rabies Immune Globulin**

Date: \_\_\_\_\_ (yyyy/mm/dd)

Dear Doctor/Nurse:

Re: \_\_\_\_\_ , dob \_\_\_\_/\_\_\_\_/\_\_\_\_  
(yyyy/mm/dd)

The following outlines the protocol for rabies post-exposure prophylaxis (RPEP). RPEP consists of a series of rabies vaccine and one dose of rabies immune globulin. Additional information can be found in the package inserts for these products. **Please note that these products must remain refrigerated (between 2°- 8°C) at all times and should only be handled and stored where this can be assured.** If this temperature has not been maintained, please contact the local health unit.

**RABIES IMMUNE GLOBULIN (Rablg) - given if not previously immunized against rabies:**

**Series:** A single dose of Rablg is given as soon as possible after exposure (day 0) for those who have not been previously immunized against rabies.

**Dose:** The dose of rabies immune globulin is calculated based on weight in kilograms. The calculated volume should not be exceeded because of possible interference with active antibody production.

The dose of Rablg (in ml) is calculated as: **[20 (IU/kg) x Weight (kg)]**  
**150 IU/ml**

We have calculated Rablg dose for this client to be \_\_\_\_\_ml, using \_\_\_\_\_kg as the weight. You have been shipped \_\_\_\_\_ vials of Rablg (each vial contains 2 ml). **The client’s weight should be confirmed prior to Rablg administration.**

**Site:** Infiltrate as much Rablg as possible deep into and around the wound(s) in order to neutralize the virus. Inject the remaining amount intramuscularly (IM) in the ventrogluteal area (in those > 7 months of age) or in the anterolateral thigh. When more than one wound site exists, each should be locally infiltrated with a portion of the Rablg using a separate syringe and needle for each infiltration. If there are extensive wounds, where the calculated dose of Rablg (by weight) is **not** adequate in volume to infiltrate all wounds, dilute the Rablg 2-3 fold in normal saline to create an adequate volume to infiltrate all wounds. When there is no wound site, the Rablg should be given IM in the ventrogluteal site (in those > 7 months of age) or in the anterolateral thigh. The deltoid should **not** be used for rabies immune globulin administration. Both deltoid sites should be reserved for the administration of rabies vaccine. ***Under no circumstances should rabies immune globulin be administered in the same syringe or at the same site as rabies vaccine.***

**RABIES VACCINE:**

**Person not previously immunized for rabies:** Give the first dose of rabies vaccine as soon as possible after exposure (**day 0**). Give subsequent doses on **days 3, 7 and 14** after the first dose given on day 0.

**Dose:** Each dose is 1 ml intramuscularly (IM).

**Site:** Vaccine should be administered into the anterolateral upper thigh for infants less than 12 months of age and into the deltoid muscle for children ≥ 12 months of age and adults (**never in the gluteal region**).

**Person previously immunized for rabies:** consult local health unit (see below)

**TETANUS:**

Tetanus is also an important consideration and the opportunity to update tetanus-diphtheria immunization should not be missed. If you have any further questions, please contact your local health unit at: ( ) \_\_\_\_\_ . Also, the Medical Health Officer is on call after hours at: ( ) \_\_\_\_\_ .



**APPENDIX F: Record of Rabies Vaccine and Rabies Immune Globulin Administration**

Please complete the following information and fax it to your local health unit at:

( ) \_\_\_\_\_.

**Health Unit: Please record in iPHIS.** If iPHIS is not utilized, fax to Biologicals Desk at (604) 707-2581.

<b>CLIENT INFORMATION</b>		
Last Name: _____		First Name: _____
Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female		Personal Health No. _____
Date of Birth: ____/____/____ (yyyy/mm/dd)		
No. and Street Address: _____		
City/Town: _____		Postal Code: _____
<b>RABIES VACCINE</b>		
Dose 1: _____ (yyyy/mm/dd)	Lot #: _____ Site: _____	#1 _____ (Provider)
Dose 2: _____ (yyyy/mm/dd)	Lot #: _____ Site: _____	#2 _____ (Provider)
Dose 3: _____ (yyyy/mm/dd)	Lot #: _____ Site: _____	#3 _____ (Provider)
Dose 4: _____ (yyyy/mm/dd)	Lot #: _____ Site: _____	#4 _____ (Provider)
Dose 5: _____ (yyyy/mm/dd) <small>(dose 5 needed only if immunocompromised)</small>	Lot #: _____ Site: _____	#5 _____ (Provider)
<b>RABIES IMMUNE GLOBULIN</b>		
Date administered: _____ (yyyy/mm/dd)		
Lot #(s): _____		
Provider: _____		