Canine Rabies Blueprint - Human Component

5.5. What are we going to do - human component?

Rabies is preventable through a timely administration of vaccines and RIG. Therefore, the population and in particular the at-risk population in rural areas should have a rapid access to these products in all parts of the country.

Using a set of commonly asked questions, this section provides guidelines for both bite-victims and health-care personnel on what they need to do if they/a patient have/has been exposed, including management of animal bite wounds and human rabies prophylaxis. It also provides guidelines on administration of pre-exposure prophylaxis. Click here for more information on human rabies prophylaxis and an overview of the steps required.

- 5.5.1. What is the difference between pre- and post-exposure prophylaxis?
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5.5.1. What is the difference between pre- and post-exposure prophylaxis?

- Pre-exposure Prophylaxis (PreP) [1] consists of a rabies vaccination course given prior to an exposure and does not include RIG [2]. It is given to those at risk of being exposed, for example people working in a rabies vaccine manufacturing facility or in a rabies diagnostic laboratory, veterinarians, and those living in or traveling to regions of the world where rabies is highly endemic or currently epidemic, especially children living at daily risk of exposure.
- Post-exposure Prophylaxis (PEP) [3] is given after an exposure or suspected exposure to rabies has occurred and should include local treatment of the wound, administration of a rabies vaccination course and (dependent of category of exposure and individual health status)-rabies immunoglobulin (RIG) must be administered.
- A person that has received either complete PreP or complete PEP previously and is subsequently exposed to rabies does not need to receive RIG, but should receive a booster series of rabies vaccine. The booster series is either: two booster doses of vaccine, one given on day 0 and one on day 3 (either IM or ID), or 4 ID doses administered on day 0.. All incomplete vaccinations must be ignored and the exposure must be managed appropriately (full PEP).
5.5.2. Who should receive pre-exposure prophylaxis?

Who should receive PreP [1] when starting a canine rabies control program?
All people in potential contact with dogs during the control programme or in contact with potentially infectious tissue, for example in a diagnostic laboratory.

I am planning to bring a pet dog home. Should all of my family members receive PreP?
No. You should ensure that the dog has not been exposed to rabies virus before and that it is vaccinated with an effective, high quality canine rabies vaccine before bringing the dog home and that it is kept current on its rabies vaccination series. You should teach your family, especially children, how to treat the dog properly and to tell a parent if they are bitten.

Should I vaccinate my children?
PreP vaccination of children should be considered if they live in an area at risk for enzootic rabies with a high incidence of dog bites in children, or if PEP is not promptly available. You should educate your children about how to treat pets, how to avoid being bitten by community dogs, and that they need to tell an adult if they were bitten, scratched or licked by a dog.

5.5.3. What do we need to know about products for human rabies prophylaxis?

Where can I find the vaccine?
Vaccine may be available at a specific anti-rabies clinic, in an emergency health clinic, or hospital and in some pharmacies.

Why do I need two different types of products for PEP [1]?
- Depending on the category of exposure and your individual health status, you may need two products because one product provides passive immunity (RIG) and the other provides active immunity (rabies vaccine).
- You receive passive immunity through RIG [2]. RIG is a product containing antibodies produced specifically against rabies virus and begins to destroy rabies virus immediately when it is administered into wounds inflicted by rabid animals.
- You receive active immunity by being vaccinated with rabies vaccine. Rabies vaccine causes your body to produce its own antibodies to protect against rabies virus. It takes 7 to 14 days for your body to produce its own antibodies after receiving rabies vaccine and therefore by injecting RIG into and around the wound areas, your body will have more protection against rabies.

RIG is not available where I live, is there an alternative?
There is no alternative to RIG. It is generally available in larger cities. If there is a delay in finding RIG, you should begin the vaccination series immediately and seek RIG elsewhere if possible. You
can receive RIG up to 7 days after your PEP series was initiated. If RIG is unavailable you should consider getting PrEP, as this eliminates the need for RIG in the event of an exposure.

What is the difference between ERIG [3] and HRIG [4]?
- ERIG is equine RIG and is produced in horses.
- HRIG is human RIG and is produced in humans.
- Both products contain antibodies specifically made against rabies virus. Both products are produced by vaccinating horses (ERIG) or humans (HRIG) and harvesting their plasma which contains antibodies against rabies virus.
- The dose of ERIG is twice as high (40 IU [5]/Kg of body weight) as the dose needed if you receive HRIG (20 IU/Kg of body weight).

What is the difference between CCV [6] and NTV [7]?
- NTVs are usually crude vaccines made by infecting sheep or goats with rabies virus and harvesting their brain tissue to produce vaccine. The course of vaccination is long and painful and not always effective. A more purified NTV is produced in the brain tissue of infected mice. Side effects are more often reported in persons who receive NTVs than in those that receive CCVs. The side effects from NTVs can be very serious including paralysis, whereas side effects of CCVs are extremely rare and only very minor.
- CCVs are produced in primary or continuous cell lines and are highly purified and among the most efficacious vaccines in the world. The course of vaccination is shorter compared with NTVs. Side effects most often reported are similar to other common vaccines including: pain at the site of injection, headache, fatigue, induration etc. Very rarely more serious adverse reactions to CCVs have been reported including Guillain Barré Syndrome described [here](#).
- WHO [8] strongly advocates the use of CCVs ([click here](#) for the list of WHO pre-qualified vaccines) and recommends complete discontinuation of the production and use of NTVs, as stated [here](#).

I started my PEP with one brand of CCV but need to continue with another brand, is that safe?
It is best to continue with the same brand of CCV if possible, however if this is not possible, substitution with another WHO pre-qualified rabies vaccine is acceptable.

I have been vaccinated previously with a CCV, how long does my vaccine (immunity) last?
Modern CCVs are highly immunogenic (i.e. capable of inducing antibody production) and are long lasting. Immunity usually lasts for several years, but this may vary depending on the vaccine used. Testing for antibodies may be used if available to check whether a booster is necessary. People whose occupation puts them at continual or frequent risk of exposure should receive periodic booster injections as an extra precaution in the absence of recognized exposure. If you have received a CCV previously and are subsequently exposed to rabies, you will need either two IM booster doses (on day 0 and one on day 3), or 4 ID booster doses (all given on day 0).
5.5.4. How do we deal with or prevent exposures?

I have been bitten by a dog, what should I do?
Immediate washing of the wound with soap and water is extremely important and one of the most effective ways of reducing the risk of contracting rabies. Since rabies is transmitted through the bite of a rabid animal, thorough washing of the wound will allow you to remove as much saliva (hence virus) from the wound as possible and will greatly decrease chances of infection. Wash the wound with soap (or detergent, povidone iodine or other substances with rabies virus killing activity) and water for at least 15 minutes and seek medical treatment. If no soap is available, at minimum wash the wound with water for at least 15 minutes. Then go straight to hospital (see below) for appropriate medical attention. Click here for more information on management of bite wounds and rabies prophylaxis.

Can I just observe the dog and not get vaccinated?
Dogs can shed rabies virus several days before showing clinical signs of rabies. In the event of a dog bite, wound care should be applied immediately (washing of the wound with soap and water for at least 15 minutes) and the advice of a medical expert should be sought. Vaccination should be initiated immediately and if the suspected dog remains healthy throughout an observation period of 10 days or is proven to be negative for rabies by a reliable laboratory using appropriate diagnostic techniques, the vaccination series can be stopped.

How do I take care of the wound I just received from a dog that may have had rabies?
Wash the wound with soap, or detergent and lots of water for at least 15 minutes and then seek medical help. It is important not to suture the wound before RIG has been applied and avoid any other procedure that may further contaminate or enlarge the wound.
I was bitten by a dog three months ago and the dog died four days after it bit me. I have not taken any treatment. Am I at risk? What should I do?

In areas where canine rabies is present, it is advisable to get post-exposure vaccination. You should seek medical advice as soon as possible.

After I have been exposed, how long can I wait before getting PEP [1]?

You should seek PEP as soon as possible. Do not wait.

Should I receive PEP even for a small scratch or wound?

Yes, if the animal was a suspect or confirmed rabid animal.

What do I need to do when dressing out/butchering animals that may have been exposed to rabies?

Be sure to wear protective clothing (gloves, mask, goggles) to avoid being exposed to infected tissue. If the animal was exposed less than seven days previously, cut out a large section around where they were exposed and destroy the tissue. If they were exposed more than seven days previously, destroy the animal and do not eat the meat.

Why do I have to have RIG [2] injected into the wound as it may be painful?

RIG is injected into the wound because, in order for it to be effective, it needs to come in direct physical contact with the rabies virus deposited into the wound site through the bite or scratch of a rabid animal.

Do I really need to have RIG when I have PEP?

If at all possible, RIG should be included in PEP because it begins to work immediately to destroy rabies virus that may have been deposited in bite or scratch wounds. It is generally recommended for more severe exposures or people in poor health, given that in many countries/areas it is not promptly available.
I have been vaccinated previously with a CCV [3], and now I have been exposed to a rabid animal, do I need to go through the full PEP regimen again?

No. You will need either two IM booster doses (on day 0 and 3), or 4 ID booster doses (all given on day 0). No RIG is needed. You should get these booster doses as soon as possible following the exposure.

I have been vaccinated previously with a CCV, and now I have been exposed to a rabid animal, am I protected against rabies or do I need to be vaccinated again?

Yes, you will need either two IM booster doses (on day 0 and 3), or 4 ID booster doses (all given on day 0) as soon as possible after exposure.

The dog that bit me was vaccinated, do I still need to get PEP?

In principle no. In rare occasions, vaccinated dogs have contracted rabies. Therefore, the vaccination history of the dog should be verified by a public health official. If it is questionable, PEP should be administered immediately and the dog should be observed daily for 10 days for signs of rabies under the care of a competent public health official or in the care of the owners with supervision of the public health official. If the dog does show clinical signs of rabies, it should be examined by a veterinarian and he/she should determine if it needs to be euthanized and tested for rabies. If the dog remains healthy throughout the observation period, the vaccination series can be stopped.

Is it necessary to be vaccinated PEP if the dog that bit me is still alive?

Dogs can shed rabies virus several days prior to showing clinical signs of disease. In areas where canine rabies is present and there are no available facilities to test the animal, then PEP should be initiated immediately. If the dog is healthy after a 10 day observation period the PEP can be discontinued.

What do I need to do if a rabies outbreak has occurred?

Contact public health officials. Avoid contact with animals that could have been exposed to rabies. Educate your family members about rabies and avoiding animals that have potentially been exposed to rabies.

5.5.5. What do we need to know about regimens, doses and schedules?

What is the difference between intradermal and intramuscular vaccination?

- Intramuscular administration is given as a 0.5 - 1 mL volume (depending on the vaccine used) deep into the deltoid muscle in adults and into the lateral area of the thigh in infants.
- Intradermal is given as a 0.1 mL volume into the upper skin area over the deltoid muscle in adults or lateral thigh area of infants. A small bleb with an ‘orange peel’ appearance is confirmation that the vaccine was administered correctly.
- Persons of any age group can be vaccinated with WHO pre-qualified CCV vaccines (click here for
the WHO list, or see the information in section 5.2.3) either intramuscularly or most of them also intradermally at the doses recommended above.

- The intradermal regimen requires considerably less vaccine than the intramuscular regimen, therefore intradermal vaccination should be used when resources are limited and the number of patients requiring PEP[3] every day is at least two or more. However, intradermal vaccination is not licensed in every country.

What are the potential cost savings of intradermal compared to intramuscular vaccination?
- For cost-benefit comparisons of different PEP regimens under different clinic conditions, see these papers.
- A simple online tool to calculate the dose usage of different PEP regimens for clinics with different numbers of suspected rabies cases is available here.

Is there a single dose rabies vaccine that is available?
No.

How many doses of vaccine will I need to get for PreP[4]?
Three doses of vaccine given intramuscularly or intradermally on days 0, 7 and either day 21 or 28.

How many doses of vaccine will I need to get for PEP?
- PEP can be administered in one of two ways, either intramuscularly or intradermally.
- If you receive PEP intramuscularly, then you will receive either 4 or 5 doses of vaccine depending on which vaccination regimen your physician will use.
- If you receive intradermal vaccination, you will receive multiple doses of rabies vaccine given in smaller amounts generally given on four different days over a period of 28 t days.

Photo courtesy of Saneekan Rosamontri
Is it okay to switch between intramuscular and intradermal administration of CCV for PEP?
This is not recommended by the WHO.

I have had a delay in my PreP/PEP schedule, what is the flexibility of the schedules?
The regimen should be followed as closely as possible. However, a one or two day deviation from
the PEP/PreP regimen is acceptable. In case of longer delays, you should contact a physician so
that he/she can evaluate the situation.

How often do I need to get a booster after I have had my PreP?
Persons at continuous or frequent risk of exposure (workers in rabies vaccine production facilities,
veterinarians living in highly endemic areas etc.) should have their titer (i.e. the quantity of
antibody present in their blood) checked periodically: every 6 months for persons working with
live rabies virus and every year for other professions at permanent risk of exposure to rabies. If
their levels falls below 0.5 IU [5]/mL, they should receive one routine booster.. Specific
laboratory analyses are required to measure the level of antibody in serum samples of vaccinated
individuals. These tests are costly and are currently only performed in international reference
laboratories. According to WHO, other persons do not need a routine booster. However, the labels
of licensed rabies vaccines do recommend periodic booster shots.

Do I need to have a blood test to check my antibody titer before I receive my booster vaccination after exposure?
No.

I have received three doses of vaccine in the PEP regimen and the dog that bit me is still healthy, should I continue with the vaccination regimen and complete the entire PEP course?
There is no need to continue if the dog is still healthy ten days after the exposure occurred.

The doctor administered the vaccine into my buttocks, what do I do now?
The vaccine should be re-administered correctly, in the deltoid area.

What do I do if I have missed a dose of vaccine on the prescribed date?
The regimen should be followed as closely as possible. However, a one or two day deviation from
the PEP/PreP regimen is acceptable. In case of longer delays, you should contact a physician so
that he/she can evaluate the situation.

5.5.6. Are there any conditions that might affect post-exposure prophylaxis?

My baby was bitten by a suspect rabid animal, is he/she too young to get PEP [1]?
No. Rabies vaccine is a life saving vaccine and should not be withheld to anyone that has been exposed.
I am pregnant, is it safe for me to get PEP?
Yes. Pregnancy is not a contraindication for PEP. Rabies vaccine is a life saving vaccine and should not be withheld to anyone that has been exposed.

I am immunocompromised, is it safe for me to get PEP?
Yes. Rabies vaccine is a life saving vaccine and should not be withheld to anyone that has been exposed. If you are immunocompromised, you should receive PEP under the personal care of a physician. Antibody levels may need to be checked to ensure an adequate response to vaccine has been made. You may need to get one or more further vaccine shots to ensure you are developing adequate antibody levels. No deaths due to rabies are known in people who are immunocompromised and received timely full PEP.

I have a fever, should I wait to receive PEP?
No. Rabies vaccine is a life saving vaccine and should not be withheld to anyone that has been exposed. You should receive PEP under the personal care of a physician.

Can I drink alcohol during my course of vaccination?
Excessive consumption of alcohol should be avoided.

5.5.7 How do we ensure that bite victims seek PEP?
People who have been bitten by an animal may not be aware of the need to seek PEP to prevent rabies. In some countries, bite victims may seek the advice of traditional healers instead of going to medical facilities. It is important that communication is carried out in communities to make sure people seek medical attention and PEP in the event of a bite.

Section 4 contains much more detailed guidance on developing communication plans and the channels that might be available to help the community understand when and how to receive proper medical attention following an animal bite.

The Rabies Educator Certificate, part of the GARC Education Platform can be used to train health professionals or community members in the basics of rabies prevention, and how to pass this information on to others in their communities.

5.5.8 End of life care for rabies patients
An increasing number of patients surviving clinical rabies are being reported. However, these remain a tiny fraction of rabies patients and the disease is still regarded as almost 100% fatal. In low resource settings reducing suffering in the terminal stages of rabies is important, even if patients leave medical facilities to die at home.
WHO recommendations say that patients should receive adequate sedation and care in an appropriate medical facility, preferably in a quiet private room, free of drafts and with suitable emotional and physical support. Once furious rabies has been diagnosed, invasive procedures should be avoided, and the focus should be on comfort, with heavy sedation and the avoidance of intubation or life-support measures once the diagnosis is certain. Patients with hydrophobia should have their often intense thirst alleviated by intravenous rehydration.

Guidance on how to best care for patients in less well equipped health settings and how to reduce suffering in patients who leave the hospital to die are also available. See [here](#) for more information.

**Footnotes:**

CCV - Cell-culture Vaccine
ERIG - Equine Rabies Immunoglobulin
HRIG - Human Rabies Immunoglobulin
ID - Intradermal
IM - Intramuscular
IU - International Unit
NTV - Nerve Tissue-based Vaccine
RIG - Rabies Immunoglobulin
PEP - Post-exposure prophylaxis
PreP - Pre-exposure prophylaxis
WHO - World Health Organization