

5.1. What do we need to know before we start planning a canine rabies control programme?

You need to know about:

- ▶ The epidemiology of rabies in your area
- ▶ The reservoir species in your area
- ▶ How rabies is transmitted.

This section contains information on the following:

- **5.1.1. The epidemiology of rabies**
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 - [5.1.3.1 How is rabies transmitted?](#)
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5.1.1. The epidemiology of rabies

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- [5.1.1.5. What other data can be useful?](#)

5.1.1.1. What is epidemiology?

Essentially, rabies epidemiology is the study of the occurrence (i.e. how prevalent it is), transmission and control of rabies in your country/region/continent in animal and human populations. Documenting the epidemiology of rabies in your country requires a surveillance system in place as described [here](#) and the facilities/capability to correctly diagnose rabies as described [here](#).

5.1.1.2. Why is epidemiological information important?

- ▶ Rigorous epidemiological surveillance gives insight into how relatively rare or common rabies is.
- ▶ This information is necessary to determine how rapidly rabies spreads and where rabies is most persistent and prevalent.
- ▶ This information is also essential to plan (targeted) rabies control measures and demonstrate how effective they are.

5.1.1.3. What if we do not have surveillance or epidemiological data?

- ▶ Poor rabies diagnosis, surveillance and lack of reporting of cases lead to low levels of awareness of rabies.
- ▶ Rabies will be given a low national priority if the level of awareness is low and there is a lack of supporting epidemiological data.
- ▶ Without surveillance, the effectiveness of any control strategy cannot be measured or proven.
- ▶ Read this [section](#) to find out how you can obtain epidemiological data.

5.1.1.4. What data can provide the necessary epidemiological information?

- ▶ Rabies surveillance is dependent upon the effective reporting of human and animal rabies cases (clinical data) and submission and laboratory testing of samples (from dogs and other affected species).
- ▶ The collection of animal-bite injury data, which should be notifiable as described [here](#), should also be included and is an important means of indirectly measuring incidence.
- ▶ Evaluation of PEP [\[1\]](#) usage can be useful towards demonstrating the disease burden.
- ▶ Read this [section](#) to find out how you can obtain this information.

[\[1\]](#) Post-exposure prophylaxis

5.1.1.5. What other data can be useful?

- ▶ Human population size (e.g. from national censuses) to make extrapolations about dog population sizes and also to help judge populations at risk.
- ▶ Dog population size, which can be estimated using [these techniques](#), to estimate the amount of vaccines needed for campaigns.

- ▶ Administrative boundaries, topographical and ecological features to help determine when and where to implement campaigns and to effectively evaluate geographically specific surveillance data.
- ▶ Dog movements, including sites that could be used to monitor dog movements (e.g. zoo-sanitary inspection points and police check-points) for targeting surveillance efforts.
- ▶ Information on the management of other zoonotic diseases.

5.1.2. The reservoir species

This section contains information on the following:

- [5.1.2.1. Which animal species should be targeted?](#)
- [5.1.2.2. Are there other animals besides dogs that can transmit rabies \(e.g. cats, cows, horses, sheep, pigs, goats, wildlife, bats, etc.\)?](#)
- [5.1.2.3. Why is it important to know the relationship between man and dog in your country/area?](#)
- [5.1.2.4. What kind of dogs are present in the target area/country?](#)
- [5.1.2.5. What is the total number of dogs in the target area/country?](#)

5.1.2.1. Which animal species should be targeted?

Control efforts should be directed at controlling rabies in the species mostly responsible for maintaining the epidemic. This can be the dog, or wild carnivores or bats. If the disease is maintained by wildlife species it is still important to vaccinate dogs (and cats) since they are an important interface transmitting the disease to people.



Photo courtesy of Serengeti Carnivore Disease Project

5.1.2.2. Are there other animals besides dogs that can transmit rabies (e.g. cats, cows, horses, sheep, pigs, goats, wildlife, bats, etc.)?

Any mammal can contract rabies and if rabid can transmit disease to humans. Affected livestock are generally infected by rabid dogs or vampire bats in certain parts of the world.

5.1.2.3. Why is it important to know the relationship between man and dog in your country/area?

Because traditions and perceptions may influence vaccination strategies (e.g. how dogs are kept, accessibility of dogs, willingness of owners to vaccinate their dogs).



Photo courtesy of Ad Vos

5.1.2.4. What kind of dogs are present in the target area/country?

- ▶ For effective vaccination campaigns to be organized in an area it is important to know the structure of the dog population in terms of their [accessibility](#) as it may have an impact on your vaccination strategy.
- ▶ Information on the ratio of owned dogs vs unowned dogs (abandoned/lost owned dogs and dogs born as unowned roaming dogs) is important in establishing the vaccination coverage, which can be estimated following the methods described [here](#). Note that dogs that are seen roaming on public property may not necessarily be unowned. In many countries the majority of roaming dogs do have owners, but they are allowed to roam freely on public property for some of the day and night. There may also be a population of ‘community dogs’ which do not have one single reference household, but that are provided some level of care by several members of the local community.
- ▶ Information on unowned dogs is important because they may not be accessed easily, hence strategies other than parenteral vaccination may be necessary (oral vaccines). Read [here](#) about available vaccination strategies.

5.1.2.5. What is the total number of dogs in the target area/country?

- ▶ In some situations, for effective rabies control at least 70% of the dog population need to be vaccinated, as shown in [this study](#). This threshold could be higher in very dense populations or lower in areas where most dogs are restricted in their movements. Campaign efficacy needs to be established ideally by both comparing the number of vaccinations given to the original population estimates and post-vaccination surveys.
- ▶ Household and ecological surveys should be conducted before the campaign is started to provide more precise information for planning campaigns and to obtain information on the accessibility of dogs for vaccination, e.g. owned/unowned or restrained/non-restrained. Methods for these surveys are provided [here](#).
- ▶ If this is not possible (outbreak, urgent situation), it should be understood that human:dog ratios usually fall within specific ranges, depending on culture and community type (i.e. rural, urban etc.) and so rapid first estimates of dog populations can usually be made. Click [here](#) to find information

on these ratios from specific study areas.

- ▶ Once a vaccination campaign is underway, more detailed information should be collected through post-vaccination household and street surveys, as described [here](#), that will also provide information in relation to dog vaccination coverage. These data will help improve subsequent campaigns and indicate whether supplementary vaccination is needed.
- ▶ You could use vaccination campaigns for “operational research” on dog population size and dog accessibility by marking vaccinated dogs with special collars or temporary colorants for re-observations in streets and in households.

5.1.3. How rabies is transmitted

This section contains information on the following:

- [5.1.3.1 How is rabies transmitted?](#)
- [5.1.3.2. What exactly is an exposure to rabies?](#)
- [5.1.3.3. How long is the incubation period after an exposure occurs?](#)
- [5.1.3.4. Can rabies be transmitted through food \(i.e. by eating milk or meat\)?](#)
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5.1.3.1 How is rabies transmitted?

The bite route is still considered the most important mode of transmission leading to infection, but more rarely other types of exposures to infection can occur as described [here](#). Rabies is transmitted when virus enters an open wound or mucous membrane.

5.1.3.2. What exactly is an exposure to rabies?

An exposure to rabies occurs when the virus infected saliva or other potentially infectious material (e.g. neural tissue), is introduced into fresh, open cuts in skin or onto mucous membranes. Click [here](#) for more information on how to prevent or deal with an exposure. Indirect contact (petting or handling an animal, contact with blood, urine or feces, and contact of saliva with intact skin) are not exposures.

5.1.3.3. How long is the incubation period after an exposure occurs?

The incubation period may vary according to several factors including the severity and location of the bite, but the average is three to eight weeks after exposure in humans, and domestic and wild animals, although much longer incubation periods (up to 6 years) have been reported.

5.1.3.4. Can rabies be transmitted through food (i.e. by eating milk or meat)?

Rabies virus is killed by heating, therefore eating pasteurized milk or cooked meat (including dog meat) is not an exposure. However, drinking unpasteurized milk from a rabid cow/goat is considered an exposure.

5.1.3.5. Can rabies be transmitted by feeding street dogs?

No. Rabies cannot be transmitted in this manner unless the street dog bites the person or licks broken skin.

5.1.3.6. Can rabies be transmitted while butchering animals?

Exposure to rabies as a result of butchering, processing or consuming a rabid animal is possible. Butchering of unvaccinated dogs and cats, for example, has been recognised as an increasing human health risk in countries where consumption of dog and, to a lesser extent, cat meat is common (e.g. many Asian countries), as shown [in this study](#). Points of entry of the rabies virus in these cases might be several: contamination of cuts or abrasions, especially of the hands; removal and preparation of the animal brain, which could generate large amounts of infectious rabies virus with transmission occurring via mucous membranes; and consumption of brain meals. Ways of preventing exposure in these cases include wearing protective clothing and avoiding consumption of uncooked meat (read also [here](#)). Click [here](#) for more information on how to prevent or deal with an exposure in these and other circumstances.

5.1.3.7. Can I get rabies from a patient that had rabies if I shared food and water with him/her?

It is unlikely that rabies will be transmitted through sharing food and water but if saliva from the infected patient came in contact with your mucous membranes (mouth), then this would be an exposure and you should seek treatment.