Guidelines for Mass Dog Vaccination: Introduction

'The most cost-effective strategy for preventing rabies in people is by eliminating rabies in dogs through vaccination' (WHO, 2013).

Mass dog vaccination is the only method of rabies control consistently supported by leading organisations in the fight to control this preventable disease (FAO, 2008; GARC, n.d.; OIE, 2013, 2011; WHO, 2013).

How to use these Guides

This set of guides was designed to provide a comprehensive resource for the planning and implementation of mass dog vaccination (MDV) programs for humane rabies control. These programs contain many components and steps and it is vital that good animal welfare is maintained throughout, which can be achieved through adhering to these guides. The guides include clear instructions on each step / component of a MDV program including; materials required, recommended personnel, risks and references.
In addition to these guides, please refer to your National Rabies Elimination Plans and any local regulations for controlled drugs and animal handling.

Guides

1. Introduction
2. Preparation for Vaccination
3. Education and Messaging
4. Dog Capture and Handling
5. Vaccine Storage, Transport & Management
6. Vaccination Day
7. Post-vaccination: Estimating Vaccination Coverage
8. Rapid Response to Rabid & Suspect Rabid Dog Alerts
9. Euthanasia of Rabid or Suspect Rabid Dogs

Data collection sheets (Courtesy of Ministry of Agriculture, Republic of Indonesia; FAO)

A set of data collection and reporting sheets (all referenced in the guides) are also available. These can be used and customised to meet your needs.

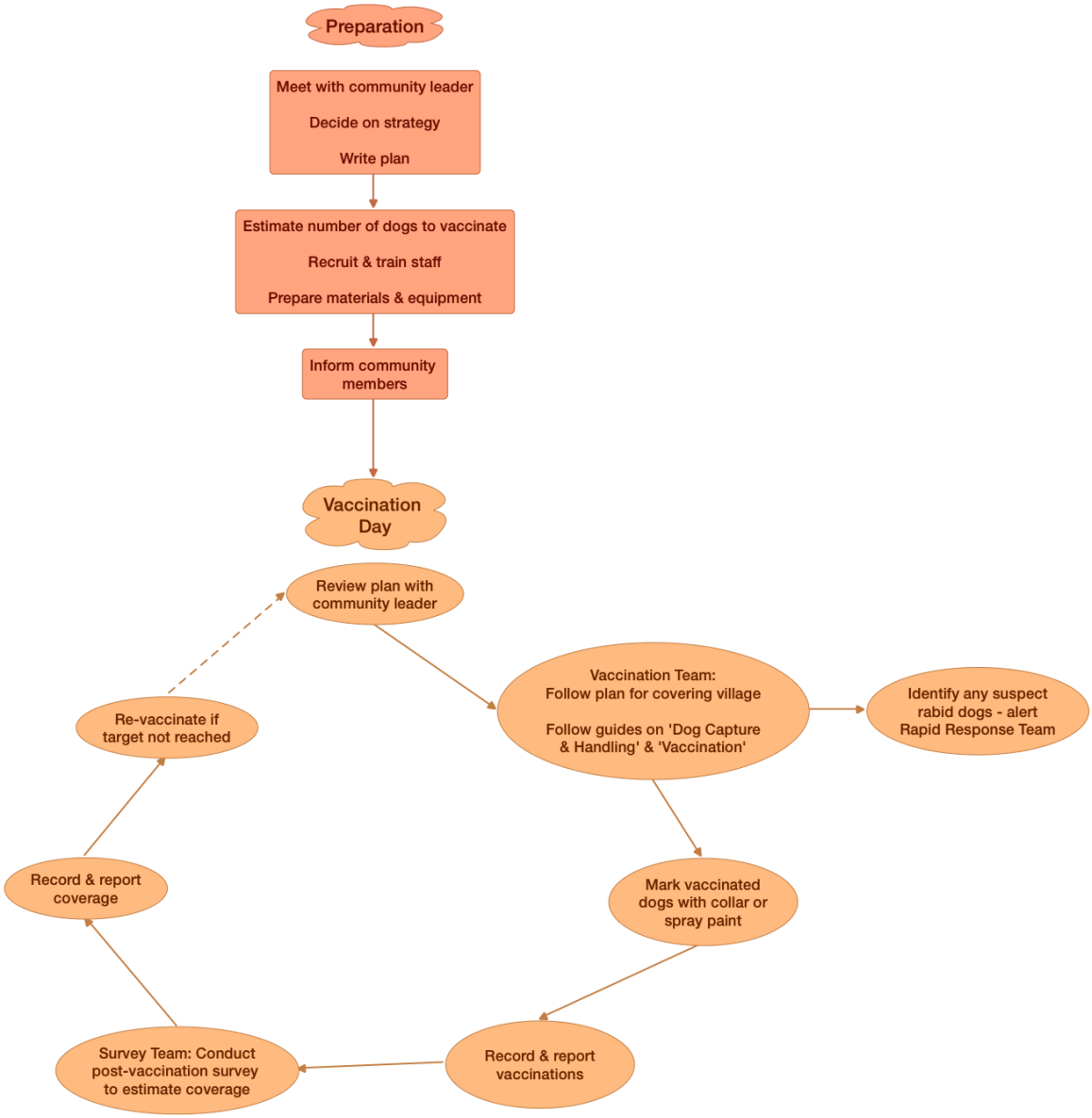
Overview of Mass Dog Vaccination

Key Points

- Dog culling MUST NOT be part of a rabies control program as it makes any vaccination program ineffective and causes needless suffering to dogs, and their owners.
- It is highly recommended that all staff involved in a rabies vaccination program receive a **complete course of pre-exposure vaccinations.**
- A **strategy plan** should be carefully developed and documented before the vaccination program begins.
- **Staff should be trained** in humane dog capture and handling, administering vaccinations and risk management in relation to rabies; and have a good knowledge of rabies and the program.
- **At least 70%** of the dog population must be vaccinated **annually** to achieve and maintain herd immunity in the dog population. (Although some dogs will receive vaccines that provide up to 3 years immunity, it is recommended that these dogs receive an annual booster).
- **All dogs seen** during vaccination rounds should be vaccinated.
- **Roaming / outdoor dogs and puppies** (over 2 weeks old) are the highest priority for vaccination.
- **Efficiency** is essential: vaccination of an area needs to be completed in as short a time as possible, and must cover the whole area. Vaccination teams on motorbikes are recommended to achieve this.
- Vaccination coverage must be **uniform** across the target area.
- **Vaccines** meeting the criteria set by the OIE should be used (i.e. high quality inactivated vaccine providing at least one year immunity, using tissue culture not nerve culture) (OIE, 2014).
- All dogs must be **captured and handled humanely**, according to the guidelines.

- Rabid and highly suspect rabid dogs should be euthanized, according to the guidelines. Low-medium suspect rabid dogs should be quarantined and observed to confirm rabies status where possible (where this is not possible, euthanasia should be performed).
- The **only reliable diagnosis of rabies is through laboratory tests (FAT is the gold standard test)** (OIE, 2014). Where euthanasia is performed due to suspected rabies, and for all dogs found dead, the heads should be sent for laboratory confirmation.
- All vaccinations, surveys of vaccination coverage and cases of rabid and suspect rabid dogs need to be **recorded and the data analysed** and shared with appropriate program staff.

Overview of Steps for Planning and Implementing a MDV Program



Overview of Staff

Community Leader / Representative:

- Consult on vaccination strategy
- Guide surveying of village / ward

Program Coordinator: To oversee the planning and implementation of the MDV program.

Community Liaison Officer: To communicate with local authorities and community members about the program.

Vaccination Team: For dog catching and handling, and administering vaccines.

Vaccination Coordinator: To coordinate vaccination teams and ensure all staff have completed the pre-exposure vaccinations.

Survey Team: To conduct post-vaccination survey of dog population.

Survey Coordinator: To coordinate survey teams.

Rapid Response Team: To respond to reports of suspect rabid dogs, including identification of suspect dogs and action.

Definitions

Village: For the purpose of these guides, village is used to represent the *smallest administrative division* (defined by the local authorities) (also known as wards, town).

Mobile Vaccinations: Vaccination teams visit a village to carry out house-to-house vaccinations, and catch roaming/outdoor dogs for vaccination. Teams usually travel to the village on motorbikes and walk and /or use the bikes to move around the village.

Temporary fixed vaccination post: One or more vaccination teams are located at a temporary vaccination post in the target community for the day/s of the program. Dog owners / carers bring dogs to this post.

Roaming/Outdoor dog: A dog that is not under direct control or is not restricted by a physical barrier. This includes owned dogs (dogs that have an owner or guardian) that are allowed to roam on public property all or part of the day, as well as un-owned dogs. This term is often used inter- changeably with 'free-roaming', 'free-ranging' or 'stray' dog (ICAM, 2008).

Owned dog: A dog that someone states is their property or claims some right over – simply put, when enquiries are made about a dog someone will say: "That's my dog". This does not necessarily mean it is a responsibly owned dog. Indeed ownership can range from: 'loose' ownership in the form of irregular feeding of a dog that roams freely in the streets; to a dog kept as part of a commercial breeding facility; to a well-cared for, legally registered and confined pet. In reality, what constitutes dog ownership is highly variable and fits along a spectrum of confinement, provision of resources such as food and shelter and the significance of companionship (ICAM, 2008).

Community dog: A dog that has more than one individual (from different families) claiming to be their owner or carer (ICAM, 2008).

Dog Carers: People who feed and know the dogs but may not claim to own the dog.

References

Food and Agriculture Organization of the United Nations (FAO) (2008). AGA in Action: World Rabies Day. Retrieved from http://www.fao.org/ag/againfo/home/en/news_archive/AGA_in_action/world_rabies_day.html

Global Alliance for Rabies Control (GARC) (no date). 'Our model'. Retrieved from http://rabiesalliance.org/what-we-do/our-model#vaccination.

ICAM (International Companion Animal Management Coalition), 'Humane Dog Population Management Guidance', Retrieved from http://www.icam-coalition.org/downloads/Humane_Dog_Population_Management_Guidance_English.pdf

World Health Organization (WHO) (2013). 'Rabies Fact sheet' No.99, updated July 2013. Retrieved from http://www.who.int/mediacentre/factsheets/fs099/en/.

World Organisation for Animal Health (OIE), (2011). 'Resolution', Global Conference on Rabies Control: Towards sustainable prevention at source, 7–9. Retrieved from http://www.oie.int/en/for-the-media/press-releases/detail/article/world-rabies-day-fao-oie-and-who-unite-to-call-for-elimination-of-disease/.

World Organisation for Animal Health (OIE), (2013), 'Manual of Diagnostic Tests and Vaccines for Terrestrial Animals'. Retrieved from http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.01.13_RABIES.pdf.

Additional Resources

Global Alliance for Rabies Control (GARC). 'Canine Rabies Blueprint'. Retrieved from http://canineraabiesblueprint.org/.

World Health Organization (WHO) (2013). 'WHO Expert Consultation on Rabies', Second Report. Retrieved from http://apps.who.int/iris/bitstream/10665/85346/1/9789240690943_eng.pdf.

World Organisation for Animal Health (OIE), (2013). Terrestrial Animal Health Code, Chapter 8.11. Retrieved from http://www.oie.int/index.php?id=169&L=0&htmfile=chapitre_1.8.11.htm.

World Organisation for Animal Health (OIE) Terrestrial Manual, 'Rabies', Chapter 2.1.13. Retrieved from http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.01.13_RABIES.pdf.

Publication

Edited by: Dr Jennifer Ford, End Inhumane Culling Campaign – Asia-Pacific, World Animal Protection

Acknowledgments

World Animal Protection would particularly like to acknowledge Dr Eric Brum and Sally Crafter of the Food and Agriculture Organisation of the United Nations (FAO), Indonesia, for their contribution towards the development of these guides.

The development of these guides also involved drawing upon content from resources developed by the following organisations: the Global Alliance for Rabies Control (GARC), World Organisation for Animal Health (OIE), Government of the Republic of Indonesia, Bali Animal Welfare Association, RSPCA International, and Blue Paw Trust.

Preparation for Vaccination

It is vital to the success of a vaccination program that all important stakeholders are included in the planning stage. The best strategy to use for carrying out the vaccinations will vary depending on the size of the village (smallest administrative division), the nature of the dog population (percentage of owned/un-owned, roaming/indoors dogs) and the resources available.

Contents

Key Points

- A plan must be carefully developed and documented before the vaccination begins.
- All stakeholders need to be involved in the planning process and the community kept informed.
- Staff should be trained in humane dog capture and handling, administering vaccinations and risk management in relation to rabies; and have a good knowledge of rabies and the program.
- High quality, inactivated (killed) vaccines providing at least 1 year immunity should be used (OIE, 2013)
- Vaccinations within a defined area should be carried out in as short a time as possible.

Related Guides

Vaccine Storage, Transport and Handling

Vaccination Day

Dog Capture and Handling

Weblinks

World Health Organization (WHO), 'Current strategies for human rabies pre and post-exposure prophylaxis'

Canine Rabies Blueprint, 'What techniques are available to estimate the number of dogs?'

Canine Rabies Blueprint, 'Human Dog Ratios'

WSPA (2007) 'Surveying roaming dog populations: Guidelines on methodology'

1. Community Preparation

Developing a strategy and plan

At least two months before the vaccination program is due to begin, an initial meeting should be held between those organising the vaccination program and the local administrative body and/or community leaders so that a strategy for implementing the program can be agreed upon and a plan developed.

The Strategy must ensure:

- efficiency in achieving vaccination coverage – with all dogs seen vaccinated
- uniformity of vaccination coverage across the target area
- that roaming/outdoor dogs and puppies are prioritised for vaccination.

The Strategy should be determined by the following factors:

- The estimated number of dogs in the area (see 'Methods for estimating population size').
- The estimated percentage of dogs that are owned and confined, roaming owned and unowned
    - Accessibilitiy of the owned dogs (i.e. behind gates or in homes) and time/days when owners most likely to be present
- Characteristics of the location: demarcation of villages, size of the area, density of dogs
- Expected ease of handling the dogs (i.e. what handling methods may be needed)
- Likely community support and mobilization

The Plan needs to cover the following (You may have one general plan plus one plan for each day /village):

Staff — A description of all teams and staff required, including ideal recruitment, and training (see 'Staff & Training')

Target — The target coverage of the area must be at least 70%

Duration — How long the vaccination program will last (Note: All vaccinations should be completed in as short a time possible. For example, completing coverage over several months reduces effectiveness as it allows time for new dogs to enter the area, including puppies, and for vaccinated dogs to die).

Materials — The materials required (see 'Resource preparation' in this guide)

Methods — A detailed plan of how the vaccination team will operate in each village including:

- Any fixed vaccination posts (Note: Fixed vaccination posts typically target dogs that are easily handled and have willing owners. They are best used along with mobile vaccinations to target all dogs)
- Mobile vaccinations and how vaccination teams will cover the area:
    - roaming / outdoor owned and un-owned dogs – which dog capture and handling methods will be used (see guide Dog Capture and Handling)
    - house to house visits for indoor owned dogs
- Information to be recorded - vaccination record, registration forms

Locations & Timing

- Which villages need to be vaccinated each day
- On what days and times the vaccinations will be carried out (during school holidays is often useful as children are around to bring their dogs)

Communication A plan for communication between teams and the central recording contact

Post-vaccination When and how the post vaccination surveys will be carried out.

Informing community members

It is vital that well before the vaccination teams arrive (at least one month is recommended), people in the target communities are fully informed of the purpose and benefits of the program and how it is likely to affect them and any dog/s that they own or that are roaming in their communities. You will need community cooperation!

Making the plan public

The plan for the vaccination program should be posted in a public place (such as a mosque, church or temple) well before the program begins. This should include details on how anyone can get further information about the program (such as contact details for the Community Liaison Officer – see below). Loud speaker messages can also be used. It may also be effective to communicate details of the program to school classes and women's groups, as they can spread the message in their villages.

Community Liaison Officer

This person should be friendly in nature, have very good communication skills, and if known locally, be well respected.

It is recommended that a Community Liaison Officer is assigned to:

- Consult local authorities to understand existing community networks and how best to mobilise their support
- Brief the community on the details of the vaccination program
- Inform the community about:
    - the nature of rabies including how it affects human and dogs, and bite management
    - rabies control through MDV
    - the importance of reporting suspect rabid dogs
- Act as the contact person for further information/questions
- Survey community members post-program and collect personal stories
- Identify community 'champions/advocates' that help advocate the program to this and ideally subsequent villages.

Details of the vaccination plan that should be explained to the community includes:

- The method of dog capture and handling for roaming dogs
- Days, times and methods for vaccination (and registration) of owned dogs (including the locations of any fixed vaccination posts)
- How long it takes for vaccination to take protective effect (i.e. 2 to 3 weeks)
- How the program will affect the community both short-term and long-term (i.e. follow-up vaccination programs, how long it takes to reduce the number of rabies cases).
- Actions to take if bitten by a dog. (Although at least 70% of dogs will be vaccinated, people still need to seek treatment if bitten by a dog after the vaccination round).
- How and to whom to report a suspect case of animal rabies.

Rabies Education

Resources are available from World Animal Protection to help you to explain the nature of the disease and the importance of rabies control measures. Also see the Global Alliance for Rabies Control (GARC) website.

2. Resources: Vaccines, Equipment, Staff & Training

Estimating the number of dogs to vaccinate

An estimate of the number of dogs (including owned, unowned and roaming) in the target area is needed to calculate the target number of dogs to vaccinate and hence:

- the number of vaccines to buy
- the number of staff required
- the number of vaccination days needed.

For the first vaccination round in an area, you will need to use one of the methods detailed below to estimate population size.

For the second vaccination round, the estimated population size from the post-vaccination survey of the first round can be used (see guide Post-vaccination: Estimation of Vaccination Coverage).

For third and subsequent rounds, aim to vaccinate the number vaccinated in the last round plus 10-20% (to account for population increase).

Minimum number of dogs to vaccinate for 70% coverage = estimated population size x 0.7
(For example, if the estimated population size is 1500, you need to vaccinate at least 1050 dogs.)

Methods for estimating population size –*First vaccination round*

For the first vaccination round, there are a number of approaches for estimating dog population size - though none are ideal and tend not to account for puppies (which can be 20-40% of the population at given times of the year). It is recommended that you use more than one of the following methods and use the highest estimate.

Also, refer to GARC Canine Rabies Blueprint, 'What techniques are available to estimate the number of dogs?' and WSPA (2007) 'Surveying Roaming Dog Populations: Guidelines on Methodology'.

Human:Dog ratio

- Generally, most dogs are owned or known within the community. Therefore ask the community leader how many households are in the village, the approximate proportion of households owning dogs and the average number of dogs in each household. Also ask about the numbers of roaming un-owned dogs.
- See estimates of human:dog ratios per country at GARC, Canine Rabies Blueprint, Human Dog Ratios.

Note: An 'upper-bound' of dog population size should be used, i.e. "I estimate there are no more than 'N' dogs in this village". This allows for some contingency.

Registration or census data

If available, the estimated population size can be taken from municipality data on dog registration or census data (which may slightly under-estimate the community or roaming dog population).

Surveys

Dog numbers can be assessed quite quickly by staff during the planning phase of the program (allowing enough time to order the vaccines) by conducting a house-to-house survey or zig-zag survey of the village.

House-to-house survey

This method is best for villages where most dogs are owned, but will not get an accurate estimate of stray dog numbers. Utilising the assistance of village leaders, asking households about their dog ownership and dogs they know of within the area is an accurate way to estimate population numbers.

For each house record:

- Owner's name
- No. of owned dogs
- Sex and approximate age of owned dogs
- Whether dogs are indoor or outside / roaming dogs

Simple transect (zig-zag) survey (WSPA, 2007)

This method is best for urban areas where there are many parks, rubbish dumps, markets etc. where dogs are found. (Note: This method can be quite inaccurate – through under-estimation – but it can be valuable for identifying areas with high numbers of roaming dogs.)

Time: Surveys are best carried out during the cooler hours of the day when the dogs are active and their owners are likely to be at home (for example, early morning and late afternoon / early evening).

Method:

Counters (at least two) should:

- Move through the village making a **zig-zag across the length and width of the village** to ensure there is no bias for certain parts.
- Use a method of travel to allow them to **move at a reasonable rate of progress** to reduce the number of times a dog is seen more than once but also allow a **thorough search**. Walking will allow for a thorough count but is slow. Cycling and walking the bike, when needed, is a good compromise.
- Stop to **ask local people** to about their knowledge of both roaming and confined dogs in the area.
- **Move quietly and inconspicuously** so as to not scare off dogs.
- Move down every street, counting each dog they see and searching for dogs in potential hiding places (e.g. under cars, in drains). Avoid recounting the same street.
- Visit all areas in the course of the transect including beaches, markets, slaughterhouses, hospitals, mosques/temples/churches, construction sites etc.
- For open public areas such as parks or waste ground, it is usually possible to scan effectively from a vantage point or by walking across them.

Add 20% to the figure gained through the survey to account for underestimation.

For more comprehensive guidelines on surveying roaming dog populations, see WSPA (2007) 'Surveying Roaming Dog Populations: Guidelines on Methodology'.

For the second and subsequent vaccination rounds

For the second vaccination round, the estimated population size from the post-vaccination survey from the first vaccination round in the same area should be used. Add around 10% to this figure to take account for possible underestimation, and new dogs (such as puppies) entering the area.

For example, for Area A:

- Round 1 (in 2013) the post-vaccination survey estimated the dog population to be 1450.
- Round 2 (in 2014)

- Estimated population size is 1450 x 1.1 (adding 10%) = 1595
- Minimum number of dogs to vaccinate is: 1595 x 0.7 (70%) = 1117

For the third and subsequent vaccination rounds: Aim to vaccinate the number of dogs vaccinated in the previous round plus at least 10%.

- For Round 3 (in 2015)
  - Assume total dogs vaccinated in Round 2 (in 2014) was 1150
  - Minimum number of dogs to vaccinate is: 1150 x 1.1 = 1265

Materials/Equipment

Once the number of dogs to be vaccinated has been estimated, use this table to determine the quantity of materials you will need per 100 dogs.

Material/equipment for one team to vaccinate 100 dogs	Quantity
Vaccines – including registration number from relevant authority **Note: Use high quality, inactivated (killed) vaccine giving at least 1yr immunity (OIE, 2013). Although some vaccines can provide up to 3yr immunity, an annual booster in recommended.**	110
Box of Disposable Needles 21-23 G, one per dog vaccinated.	110
Disposable Syringes (ideally use one per dog, however one per maximum 10 dogs is acceptable if no blood in the hub) in a box or plastic bag.	22–110
Safety box: Hard plastic containers (ideally medi-waste containers) for used needles/syringes	2
Gloves – disposable (non-sterile) – range of sizes	20 pairs
Cotton wool	500g
Collars – for adult dogs only	110
Scissors (if collar is type that requires length cut)	2 per team
Clamps (2 per set): For attaching collars through nets	One set per dog handler
Non-toxic paint spray can or *gentian violet* – for puppies and/or adult dogs caught by nets	3 cans
Rope leash	5
Catching nets (and materials to repair nets)	2
Muzzle, using 2" gauze bandage (non-stretch)	10 metres
Cool box, cool packs, thermometer x 2 as per guide Vaccine Storage, Transport & Management	1 per team
Human First-Aid box including soap, water, towels, band aids, cotton wool, bandages, antibacterial cream, antiseptic	1 per team
Tables and chairs for fixed vaccination posts	1 table & 2-3 chairs per post
Advertisement board or poster for advertising vaccination program and identifying any if fixed posts	2 per team
Record sheet for vaccinations	1 per team
Vaccination cards / certificates	100
Registration forms (in duplicate)	100
Pens and clip boards for writing certificates	2
Education materials on vaccination, rabies symptoms, bite prevention & treatment	200+

Vaccine Storage, Transport and Management

Refer to the guide Vaccine Storage, Transport & Management.

Staff & Training

It is important to carefully plan the recruitment of staff and investment in training to ensure a highly skilled team is developed that can be used for future vaccination programs.

The number of staff required will vary with the budget, ease of handling of the dogs and other features of the strategy. However, the following can be used as a general guide:

Vaccination Teams

Mobile Vaccinations: It is recommended that each vaccination team comprises 4-6 individuals (with one team for approximately every 100 dogs):

- 1 recorder and communication person
- 1-2 vaccinators, ideally a vet, or if unavailable a trained veterinary technician or vaccinator. They will also be responsible for managing the cold chain
- 2-4 dog catchers/handlers, with more handlers required for roaming dogs and if owners are commonly unable to handle their own dogs for vaccination.
- Where motorbikes are used, some team members can be riding a motorbike while others are passengers.

Fixed Vaccination Posts: For fixed vaccination posts, you will not require dog catchers, and may be capable of vaccinating more than 100 dogs in one day. It is recommended that you have:

- 1 recorder and communication person
- 2 vaccinators, ideally a vet, or if unavailable a trained veterinary technician or vaccinator. They will also be responsible for managing the cold chain
- 2 handlers, with more handlers required if owners are commonly unable to handle their own dogs for vaccination.

Vaccination Coordinator

It is recommended that you have one coordinator for every three or so vaccination teams. The coordinator is ideally a veterinarian – as any vaccination teams that do not include a veterinarian, will need easy access to one. The coordinator is responsible for local scheduling, communication with community leaders, preparing and resourcing vaccination teams, team safety, and data recording and submission to a central point.

Training

Staff will need to be trained in humane dog capture and handling, administering vaccinations and risk management in relation to rabies, and have a good knowledge of rabies and the program.

- Dog capture & handling: It is vital that staff are trained in using capture and handling procedures that reduce the risk of bites from potentially rabid animals, reduce stress to the animals and to make vaccination as easy as possible. (See the guide Dog Capture and Handling).
- Administering vaccinations: It is best for the vaccinations to be administered by a veterinarian but, when sufficient vets are not available, other staff may need to be trained in the correct procedure for giving the vaccinations. (See the guide Vaccination Day.)
- Rabies knowledge: Staff should have basic knowledge about rabies and prevention, and the benefits of MDV and ineffectiveness of culling, as they will act as the main communicators with the public.
- Suggested training resources can be obtained from World Animal Protection.

Rabies prevention and treatment

It is strongly recommended that all staff involved in capture, handling and vaccination of dogs complete pre-exposure vaccinations.

Actions if bitten or scratched: All staff should be educated in the actions to be taken if themselves, other staff or any members of the public are bitten or scratched by a dog (this includes staff who have received pre-exposure vaccinations).

1. Immediately wash the wound **under running water** for 15 minutes with soap.
2. If readily available, use ethanol (700ml/l) or iodine (tincture or aqueous solution) to disinfect the wound.
3. Report to the bite centre / medical clinic for an assessment of the need for PEP vaccination immediately.

Also see WHO 'Current strategies for human rabies pre and post-exposure prophylaxis'.

Survey Teams

Each survey team should consist of one officer to record and one motorcycle driver (unless on bicycles).

Survey Coordinator

One survey coordinator is recommended for every 5 to 10 survey teams. The coordinator should be responsible for:

- scheduling surveys, preparing and resourcing teams
- ensuring prompt data collection and feedback to vaccination teams on coverage achieved
- analysing patterns in coverage – including whether some vaccination teams are consistently achieving low or high coverage and amending/learning from their strategies to improve vaccination coverage overall

Note: If one key data coordinator for the program is preferred, this coordinator can also be responsible for the collection, storage and reporting of data received from the Vaccination Coordinator.

References

Global Alliance for Rabies Control (GARC), Canine Rabies Blueprint. Retrieved from http://caninerabiesblueprint.org/.

Global Alliance for Rabies Control (GARC), Canine Rabies Blueprint, 'What techniques are available to estimate the number of dogs?'. Retrieved from http://caninerabiesblueprint.org/5-4-1-What-techniques-are.

Global Alliance for Rabies Control (GARC), Canine Rabies Blueprint, 'Human Dog Ratios'. Retrieved from http://caninerabiesblueprint.org/IMG/pdf/Link46_HumanDogRatios.pdf.

World Health Organization (WHO), 'Current strategies for human rabies pre and post-exposure prophylaxis'. Retrieved from http://www.who.int/rabies/human/WHO_strategy_prepost_exposure/en.

World Organization for Animal Health (OIE) Terrestrial Manual, 'Rabies', Chapter 2.1.13. Retrieved from http://www.OIE.int/fileadmin/Home/eng/Health_standards/tahm/2.01.13_RABIES.pdf.

World Society for the Protection of Animals (WSPA) (2007), 'Surveying roaming dog populations: Guidelines on methodology'. Retrieved from http://caninerabiesblueprint.org/Guidelines-on-surveying-roaming.

Education and Messaging

Contents

Related Guides

Guidelines for 'Responsible Pet Ownership & Rabies Prevention' Education in the Classroom and for Public Awareness

Guidelines for Mass Dog Vaccination: Introduction

Preparation for Vaccination

Dog Capture and Handling

Rapid Response to Suspect Rabid Dog Alerts

1. Introduction

Community education to generate public awareness of rabies and support for rabies control measures is vital for sustainable rabies control programs. This includes both public awareness campaigns and educating children through schools.

Public Awareness Campaigns aim to:

- Raise awareness on the importance of protecting and respecting dogs.
- Generate support for vaccination programs.
- Inform communities about upcoming programs and reasons behind them.
- Inform dog owners and communities of their responsibilities to help care for and protect dogs, and about dog bite management.

Educating children through school programs is vital as:

- School children often share messages learnt at school with their families.
- Children are most commonly bitten by dogs (according to WHO '4 out of every 10 human deaths by rabies occur in children younger than 15 years').
- Children are often aware of, and play with either owned or community dogs, and can often be involved in finding and bringing dogs for vaccination.
- Young people are the next generation of decision makers.

This guide aims to provide key messages for government officials, personnel and stakeholders on Mass Dog Vaccination (MDV) programs (both as deliverers and receivers) and to provide a list of resources to develop and implement formal and informal education / public awareness initiatives.

2. Information on Rabies

Facts about rabies

- Rabies is a viral disease that is transmitted through the saliva or tissues from the nervous system from an infected mammal to another mammal.
- Rabies is the deadliest disease on earth with a 99.9% fatality rate. It is always fatal once clinical symptoms appear.
- Most human rabies cases (90%) are caused by exposure to an infected dog.
- Post-exposure prophylaxis (PEP) stops the virus before clinical symptoms appear, if given immediately after a bite from a rabid or suspect rabid animal.

For these and more facts about rabies, please refer to the Global Alliance for Rabies Control (GARC) website (http://rabiesalliance.org/rabies/what-is-rabies-and-frequently-asked-questions/what-is-rabies/).

Interpreting dog behaviours

Please refer to the guide 'Dog Capture and Handling'.

Controlling rabies: Mass Dog Vaccination

- Mass Dog Vaccination is the only proven, effective, sustainable, and humane way to control rabies.
- Annual vaccination of at least 70% of the dogs in an area creates 'herd immunity', slowing the spread of rabies until it dies out.

- For more information on Mass Dog Vaccination programs, refer to 'Guidelines for Mass Dog Vaccination: Introduction' and 'Preparation for Vaccination'.
- **Dog culling is ineffective for controlling either rabies or dog population numbers, and causes needless suffering to dogs and their owners.** There is a high risk of including vaccinated dogs in culls resulting in a reduction in the herd immunity that has been built up over years of annual vaccinations, potentially jeopardising rabies control efforts and wasting the resources invested in the program. Additionally, after culling the dog population quickly regenerates itself with unvaccinated dogs (new puppies or dogs relocating from other areas).

Exposure, prevention and treatment

- Anyone bitten or scratched by a dog in a rabies-infected area should wash the wound immediately **under running water** for 15 minutes with soap, then disinfect with ethanol (700ml/l) or iodine (tincture or aqueous solution) if available. Then they should **immediately** go to the nearest approved hospital or bite treatment centre for an assessment of whether post-exposure rabies vaccination is needed – this includes dog owners assisting staff with vaccination and staff that have been previously vaccinated.

- For more information on exposure, prevention and treatment, go to the GARC website (http://rabiesalliance.org/rabies/what-is-rabies-and-frequently-asked-questions/exposure-prevention-treatment/).

2. Key Messages for Mass Dog Vaccination

Messages for communities

1. **Vaccinated dogs = Safer communities**
2. **Mass Dog Vaccination is the only effective and humane way to control rabies.** Culling dogs does not control rabies (i.e. vaccinated dogs are killed reducing the rabies immunity of the population, hence working against rabies control efforts) and causes needless suffering for dogs and their owners.
3. **Your dog is your responsibility.** Responsible dog ownership involves:
    - De-sexing / sterilising your dog
    - Allowing your dog to run and play but control any roaming freely
    - Vaccinating your dog annually against rabies
    - Vaccinating your dog against other diseases (such as distemper and parvovirus) and protecting them from parasites, as advised by a veterinarian
    - Registering your dog
    - Ensuring good welfare through providing appropriate shelter, nutritious food, clean water, adequate exercise, and companionship (with people and / or other dogs).
4. **Understanding basic dog behaviours to prevent dog bites:**
    - Dogs are not naturally aggressive animals. Stay safe around dogs by respecting their feelings and behaviours.
    - Stay away from suspect rabid dogs (see guide 'Rapid Response to Rabid and Suspect Rabid Dog Alerts' for further guidance on identifying suspect rabid dogs).
5. **Dog bite management:**

- Know what to do if bitten.
- Report any suspect rabid dogs to authorities.

6. Promoting good animal welfare:
   - Good animal welfare is an integral part of ensuring animal health.
   - An animal that is in good health is deemed to be fit and able to cope physically and mentally with its environment, as well as being able to display natural behaviours.

The Messengers

Those who are delivering the messages need to know key facts about rabies, and details of the mass dog vaccination program, dog bite management and responsible dog ownership (RDO).

Vaccination team members who have personal contact with dog owners during MDV programs, have a valuable opportunity to educate community members about rabies prevention and RDO.

Additionally, vets in clinics, school teachers and community leaders, either during or outside programs, can play a vital role in educating people and raising awareness and public support for programs.

Key messages for each of the messengers to deliver are outlined in the following Table.

Messengers	Audience			Key Messages
	Dog owners	Carers of community dogs	Non-dog owners	
Vaccinators for MDV; Vets in clinics	Yes	Yes	No	Vaccinating a dog provides a valuable opportunity to provide the owner with advice on: • The health and welfare of the dog: o Seeking treatment for sick dogs o Proper diet and importance of parasite treatment etc. o Importance of annual rabies vaccination and other recommended vaccination programs o Benefits of sterilising dogs o Basic training for dogs o Positive feedback for dogs that are well cared for. • What constitutes Responsible Dog Ownership (see above)
Dog catchers and handlers	Yes	Yes	No	• How to safely handle and restrain your dog (for more details see the guide 'Dog Capture and Handling'). • The importance of keeping the dog's collar on / marking indicating the dog is vaccinated • The importance of annual vaccination and registering dogs • The importance of keeping dogs off the

				streets
Community Liaison Officers / champions	Yes	Yes	Yes	• MDV programs control rabies • Details of the MDV program: where to bring dogs, about capture of roaming dogs, time frame • Help with locate roaming dogs • Dog registration
Local community leaders	Yes	Yes	Yes	• Annual MDV programs control rabies and need community support • Dog registry updating and maintenance
School teachers	Children of	Children of	Children of	• Facts about rabies • If a dog is roaming / stray, it does not mean they have rabies • Understanding dog behaviour and dog bite prevention • Responsible pet ownership • Being safe around dogs. Dogs are not naturally aggressive, staying safe by respecting their feelings and behaviours • Killing dogs doesn't control rabies • Legislations on animal welfare

*Also refer to 'Guidelines for Responsible Pet Ownership & Rabies Prevention Education in the Classroom and for Public Awareness' for further guidance on tailoring messaging for the general public and school children.

Recommended Resources

General resources

World Animal Protection (Formerly WSPA)

- 'Guidelines for Responsible Pet Ownership & Rabies Prevention Education in the Classroom and for Public Awareness' (please contact World Animal Protection)
- Rabies and Herd Immunity: http://www.youtube.com/watch?v=f_3XTEdDrXc
- 5 keys to preventing dog bites (please contact World Animal Protection)
- Responsible dog ownership (please contact World Animal Protection)

Global Alliance for Rabies Control (GARC)

- Resources http://rabiesalliance.org/resources/
- Factsheets: http://rabiesalliance.org/resources/factsheets/ (multiple languages)
- Resources in English: http://rabiesalliance.org/uploads/media/Resources_in_English/
- Canine Rabies Blueprint: http://caninerabiesblueprint.org/
- Videos on rabies http://www.monkeysee.com/search?utf8=%E2%9C%93&term=rabies

Other

- World Organisation for Animal Health (OIE): Fighting Rabies in Asia, http://www.youtube.com/watch?v=RS4_38sZF3w&feature=share&list=UUYWwT1w9Yv2qpKChz9Hoomg
- Doggone Safe: Dog Safety for Children – Be a Tree™ Program, http://www.be-a-tree.com/
- PAHO Videos for kids: Caring for your Pets; http://www1.paho.org/English/DD/PIN/pets_psa.htm

School education and other formal programs

Rabies

World Animal Protection (Formerly WSPA)

- WSPA lessons plans: http://rabiesalliance.org/resources/teaching-children/

Global Alliance for Rabies Control (GARC)

- Rabies Educator Certificate (REC): http://rabiesalliance.org/media/news/online-course-for-rabies-educators-launched
- Lesson plans (various authors): http://rabiesalliance.org/resources/teaching-children/

Animal Welfare

World Animal Protection:

- Animal Mosaic http://www.animalmosaic.org/education/
- School education: First Concepts in Animal Welfare: contact ElodieGuillon@worldanimalprotection.org.
- Tertiary education / Vets: Advanced Concepts in Animal Welfare: contact NatashaLee@worldanimalprotection.org.

Dog Capture and Handling

Contents

Key Points

- Target roaming / outdoor dogs and puppies as a priority
- Catching a dog requires coordination between team members
- Once the dog is restrained, vaccinate quickly
- If a dog cannot be easily handled by its owner, catch it in a net

Training: Dog Capture and Handling

Please contact World Animal Protection for assistance with finding suitable trainers for dog capture and handling.

Risks and Precautions

- Avoid getting bitten!
- All staff involved in mass vaccination of dogs should have completed the full course of pre-exposure vaccinations.
- Anyone bitten or scratched should wash the wound immediately **under running water** for 15 minutes with soap, then disinfect with ethanol (700ml/l) or iodine (tincture or aqueous solution) if available, and **immediately** go to the nearest approved hospital or bite treatment centre for an assessment of whether post-exposure rabies vaccination is needed – this includes dog owners assisting staff with vaccination and staff that have been previously vaccinated.
- Vaccination team members should not attempt to capture a dog without training.
- If dogs are observed to show potential signs of rabies refer to the guides Euthanasia of Rabid or Suspect Rabid Dogs and Rapid Response to Rabid and Suspect Rabid Dog Alerts.

Related Guides

Euthanasia of Rabid or Suspect Rabid Dogs

Rapid Response to Suspect Rabid Dog Alerts

1. Personnel & Training

Personnel

Vaccination team: Including at least 2 to 4 dog catchers. See the guide Preparation for Vaccination.
The role of dog catcher is best suited to people with some dog handling experience or who, once trained are available for future Mass Dog Vaccination rounds.

Community Liaison Officer (CLO): It is recommended that this person should be friendly in nature, have very good communication skills, and if known locally, be well respected. They should also have a good knowledge of the location and local administration.

Training

It is essential to the success of the program that staff receive dog capture and handling training prior to the program.

Dog handlers should be able to:

- Explain details of the MDV program and rabies to community members (including why culling is inhumane and ineffective)
- Recognise basic dog behaviour and translate different behaviours into the appropriate catching methods
- Advise owners/carers on handling dogs for vaccination
- Lift a large (docile) dog
- Hold a large dog on the ground
- Carry a small dog / puppy
- Catch a dog safely and humanely using a net
- Safely and humanely catch a loose dog using a slip lead or control-pole
- Safely muzzle a dog
- Safely use a lead as a muzzle

Protective Clothing

All operators handling dogs should cover all exposed skin, with a minimum of closed shoes, long pants and shirt to minimise the chance of injury from a random dog bite. Gloves can make handling difficult, but once an animal is sedated or anaesthetised double layered, thinner, disposable gloves can be used.
A person with wounds on their hands or arms should not handle any dogs. (Note: Animals infected with rabies can shed virus in their saliva for up to 10 days before rabies is identified (OIE, 2013).

Note: When handling suspect rabid dogs additional precautions need to be taken. See the guide Rapid Response to Suspect Rabid Dog Alerts.

2. Dog Capture

Community involvement

The CLO should communicate to the community the reason for the dog capture. Involving the community in the capture is also highly recommended as local people are aware of the location of the dogs they feed, and

can advise on what might be the best bait and which are friendly and unfriendly dogs. The CLO can gather this information for the locations in advance of capture.

Dog reactions

When attempting to capture a dog, it is important to understand how a dog is likely to react. If it feels threatened it has two instinctive responses; **'fight' (becomes aggressive)** or **'flight' (runs away)**. The purpose of both is to try to distance themselves from the threat.

In most countries stray/roaming dogs are rarely dangerous if handled correctly (but remember they are not used to being handled by humans, often only being given food).

Asking the owner to assist

The fastest and safest option is for any owners to assist with catching and holding their dog. Therefore, firstly, ask the owners if they are happy to hold their dog – this should be their choice. If they are willing, the dog catcher can then direct the owner on the correct way to hold the dog for vaccination (see 'Dog Handling'). However for roaming, or un-owned dogs follow the following guidelines on 'Catching by Hand' and 'Dog Capture using Equipment'.

2.1 Catching by Hand

Catching a dog by hand is possible for friendly dogs – this should not be tried for aggressive or suspect rabid dogs. It is the least invasive and least stressful method of capture and should always be used where possible. Handlers should handle the dog gently – if it feels pain, it could bite.

Approaching an animal

The following is a general guide for attempting to catch a dog by hand:

1. Stand back and discretely observe the dog, trying to read whether it is likely to run or stand its ground.

2. Avoid eye contact – if you are not staring at them, dogs will assume you are not interested in them and feel safe.

3. Keep your body posture unthreatening: let your body relax, shoulders droop, and avoid threatening gestures such as a raised arm etc. As you get closer you can reduce your size and threat by crouching down.

4. Speak in a quiet, calm and friendly way.

5. Move slowly and avoid a direct approach by making small sideways steps.

6. **Entice using food** — an animal approaching you calmly will be easy to slip a leash on or use a net (See 'Dog Capture using Equipment').

7. If you see any unwanted reaction by the dog, STOP and reassess the situation.
Try to predict where and when it might run – can you direct the dog into an enclosed area?
Consider if it is time to use a net.

8. If the dog runs, do not chase it but watch where it is going.

9. When the dog is caught, attempt to restrain the dog with a slip leash and use a muzzle if required.

Key Points: Approaching an Animal

- Before approaching assess the situation
- Observe the dog without eye contact
- Remain calm
- Do not walk directly to the dog
- Stop when the dog becomes agitated
- Stoop down, lower your body posture
- Entice dog with food
- DO NOT CHASE if the dog takes flight
- Do not provoke the dog to run away
- If in doubt use a net

2.2 Dog Capture using Equipment

If the dog cannot be held by an owner or caught by hand by the vaccination team then you will need to use capture equipment such as a net or slip leash.

Capture is always stressful for the animal so any person involved must attempt to minimise this stress.

Using baits: Baits (such as bread or meat) can be used to distract the dog's attention from the catchers. While one catcher attracts the dog with bait, the other catcher can come behind the dog and catch it.

Catching dogs in confined areas

- At least three dog catchers are needed for this method. All catchers should observe the alertness of the dog.
- One walks alongside and past the dog. When the dog is looking at them, the other two catchers remaining on the other side of the dog, approach and catch the dog (either by hand or using a net or other equipment – See 'Equipment').
- If the dog is in a passage, one catcher can direct the dog in the direction of the other two. Those two catchers should stay one behind the other albeit to the side. Then if the first one misses the dog the other should be able to catch it.

Catching dogs in an open area – Using Nets (Courtesy of FAO, Indonesia)

Catching a dog in an open area using a net requires a coordinated team of at least 4 people. (Note: If the dog is alert and running around, consider looking for another opportunity to catch the dog in a different location). This method is also effective for a dog hiding in a room or in a house.

Key points: Catching dogs using nets

- Plan before you begin
- Use team work with one coordinator, and one provocateur
- First check that there are no surprise exits. If the dog has an owner, ask them where it is likely to run
- Do not allow the dog to run onto a busy road
- Work quickly and silently or the dog will become suspicious and may panic – you will only have one chance
- Do not place the net over a running dog – always allow the dog to run into the net

Sneaking up on a dog (Calm, curious, sleeping dogs)

- A dog can be netted if you can sneak up while it is asleep or distracted by something in front of it as dogs have good front and peripheral vision, but cannot see directly behind them. Noise, such as barking, will stop the dog hearing what is behind.
- Distraction can be food, another caught dog, female dog on heat, calling the dog. Note that this only works if the dog is curious and calm.
- One person on the team should be responsible for trying to attract the dog's attention from the front (diversion) while those with nets approach quietly from behind. Usually only one net is needed.
    - Surprise: This strategy uses surprise. Keep the dog focussed on one person (i.e. with the food or by looking interesting) while another person walks quietly and catches it from behind. It is important that the "distractor" looks only at the dog and not at the person with the net. He should use hand signals to tell the catcher that the dog is focused and it is time to catch it.
    - Sleeping dogs: Many dogs sleep in the middle of the day and by keeping silent and moving fast, it is possible to catch sleepy dogs.
    - Two for one: You may find that you can catch other dogs when they come to investigate the caught dog. This is very effective.
    - Using a motorbike: It is much easier to get close to a dog on a motor bike than on foot. The person behind should hold the net while the other drives the motorbike. The team approach the dog without looking at it. As soon as they arrive alongside the dog the driver slows down and stops while keeping the engine running. At exactly the same time, the person with the net steps off the bike and catches the dog before it realizes that something is happening. The team must move fast and not hesitate.

Using an exit pathway (Wild, aggressive and scared dogs)

1. It is important to plan ahead to determine where the dog will run. There should only be one exit path available to the dog — block off any alternative exits.
2. Two dog catchers should be placed along the escape route, hiding behind solid objects, such as a house. They need to be in staggered formation so that they do not hit each other with the nets, and if the first person misses the dog the next one can catch it.
3. Another team member (the provocateur) then shepherds the dog through the exit.

(Source: ICAM, n.d.)

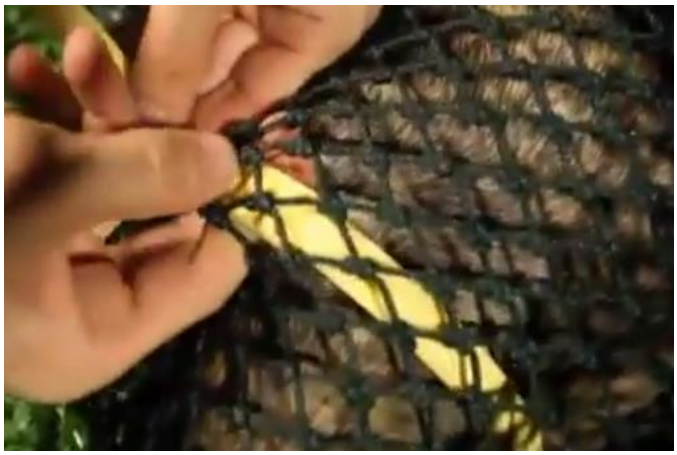
4. Always allow the dog to run into the net by placing the net in front of the dog. (Note: Do not try to place the net over a running dog as the dog can easily escape and then it becomes very difficult to catch that dog again.)
5. Once the dog is in the net, twist it to trap the dog tightly in the end of the net.

Calming dogs once caught

Dogs can scream out of fear after being caught so it is important to calm the dog. Try covering their eyes (which typically calms them) and pet the dog but be careful not to get bitten through the net (remember the dog is threatened and could fight).

Fitting collars through nets

If dogs are caught using a net, it is possible to fit them with a collar using clamps. For a guide see Dog Collar Video (FAO, 2014). Also, see the guide Vaccination Day.



(Source: FAO, 2014)

3. Dog Handling

Small and Medium Dogs

If you have a raised table, you can lift all small and medium dogs onto this. However, it is often difficult to find a raised surface for vaccinations in the field. For small dogs, **the best method is for the owner or operator to pick the dog up for vaccination (see below),** being careful to support the weight of the dog properly. The person holding the dog should be aware of where the dog's mouth is so they can avoid being bitten.

- Dog feels safe and secure in owner's arms
- Dog cannot get traction to move
- Neck or rear is exposed for injection
- Dog cannot turn to bite vaccinator

(Source: World Animal Protection)

Calm, small dog.

(Source: World Animal Protection)

Restrain head for more flighty dogs.

Large Dogs

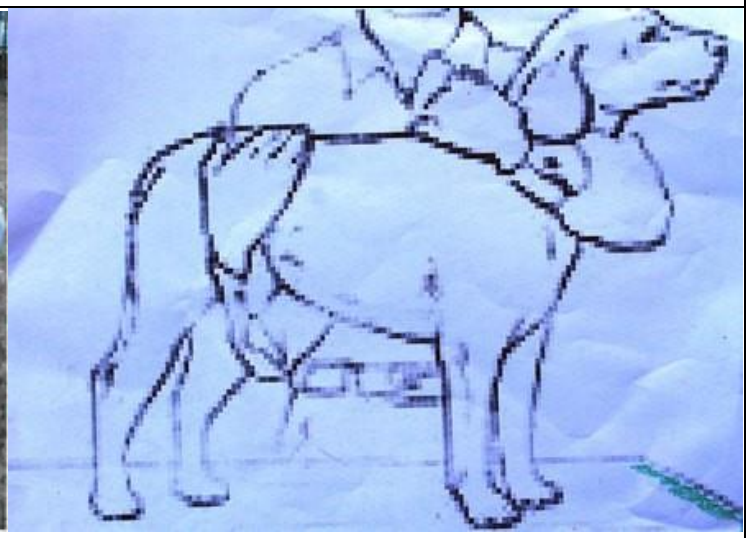
Recommended

Large dogs and dogs that don't like to be carried can stay on the ground/floor.

Pull the dog against body and hold head firmly but not restrictively – be aware of where the mouth is and hold by the scuff of neck or by the muzzle if needed.

In this way,

- Dogs are made to feel secure
- Neck and rear is exposed
- Dog is mostly unaware of the vaccinator
- Dogs cannot turn and bite if held properly



(Source: World Animal Protection)

Alternatives

Straddling the dog:

- Can be used with problem dogs
- Can hold dog by head or shoulders

Note: Vaccination site can be obscured by person's leg.

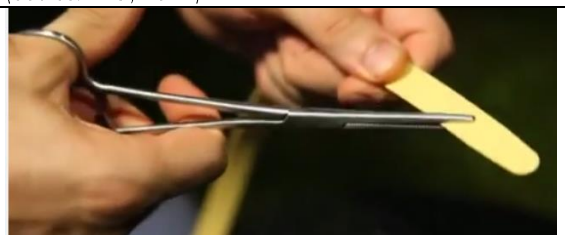
(Source: World Animal Protection)

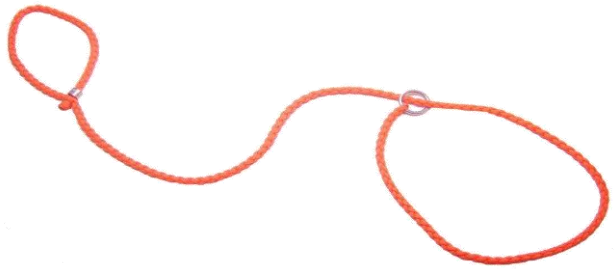
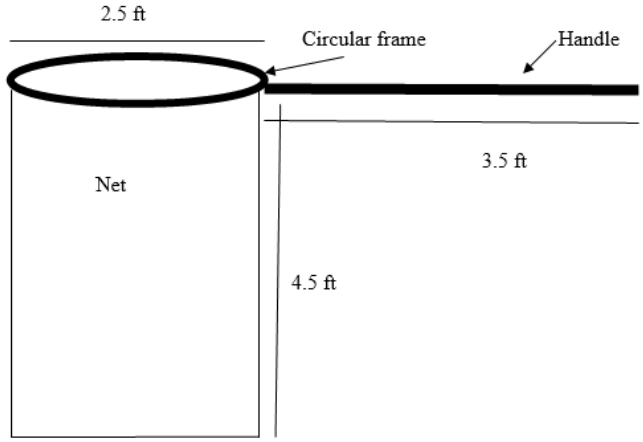
(Source: WSPA, n.d.)

Standing in front of the dog and holding them by the neck: • Commonly used in some areas • Can calm the dog as dogs can see person • holding them.	 (Source: WSPA, n.d.)

4. Equipment

The equipment outlined here has been found to be effective and humane.

Equipment	Use	Instructions
Collars	Marking vaccinated adult dogs	 (Source: FAO, 2014) For a guide to fitting a collar see Dog Collar Video (FAO, 2014). (Image source: FAO, 2014)
Clamps	For fitting collars through nets	 For a guide to fitting a collar using a surgical clamp, see Dog Collar Video (FAO, 2014). (Image source: FAO, 2014)
Leash	Essential Use as lead and/or muzzle.	To use a leash as a muzzle, wrap it around the dog's muzzle once or twice while holding leash with the other hand at the neck. Bring around the back of neck and hold firmly. (Source: WSPA, n.d.) 

Slip leads	For calm tempered dogs: Made into a running noose that can be slipped around dog's neck and used to restrain the dog.	Simply made from rope or cord about 10mm in diameter with an 'O' ring at the end. 
Throw nets	Medium, small dogs	Net usually about 2x2m with a weighted rim cord to help with throwing. Once netted, dogs must be carefully released and restrained with control-pole or slip leash.
Pole nets	Useful for capturing dogs that are not used to being held by people. The hoop is placed over the front end of the dog and the dog moves to the end of the net, or allow the dog to run in to the net. The pole is lifted and the net twisted several times until the dog is restrained/not able to move.	 Weight of the whole net – 3 kg (Lighter and stronger is better) Circular frame – Made of aluminium is ideal as it is strong and light. Handle – Made of aluminium – must be strong. Handle should be removable from the ring. Net – Nylon net used for fishing with a minimum depth of 4ft. Eye size of the net is 1" x 1". The net should be made of very strong fishing line as dogs are very good at tearing/biting through and escaping. (Source: Samarasinghe, 2009)

		 (Source: World Animal Protection)
Control pole/ Graspers	**Aggressive & difficult dogs, temperament unknown:** Adjustable noose/ pincers on end of a pole	Purchased or home-made. **Training is necessary** as they can be harmful to a dog if used incorrectly. **To make:** Use a hollow metal tube 1-2m long, 3 cms diameter. Take a length of rope or plastic covered steel cable, double it and feed loop through the tube until it appears at the far end. Tie off the loose ends to prevent them being pulled through the tube. **To use:** Slip adjustable loop over the dog's head and around its neck. Then use the pole to keep the dog at arms' length and move to a secure area. Make sure you do not strangle the dog (if the breath is raspy or tongue appears blue, slacken off immediately).  

Muzzles	To prevent a dog from biting other dogs or people.	If a commercial muzzle is not available, one can be made easily using cotton gauze. 1. First form a loop from an overhand knot that is big enough to pass over the dog's muzzle. 2. Holding the ends of the tape in both hands, with the knot side up, slip the loop over the dog's muzzle and pass up approximately halfway to the corner of the dog's mouth, then tighten. 3. The ends pass under the dog's chin. 4. Some staff may then form another overhand knot under the chin. 5. The ends are then brought around either side of the dog's neck and finally tied off at the back with a bow for quick release. (RSPCA International, 2009)  (Image source: World Animal Protection)

Additional Resources

Food and Agricultural Organization of the United Nations (FAO), Emergency Centre for Transboundary Animal Diseases (ECTAD), (2014). Dog Collar Video (in Bahasa Indonesia). Retrieved from https://www.youtube.com/watch?v=1a4EOTZwt8k

RSPCA International (2009), 'Operational Guidance for Dog Control Staff'. Retrieved from http://www.rspca.org.uk/whatwedo/international/reports/details/-/articleName/INT_ReportsAndResourcesCompanionAnimals (Last accessed: 25 June 2014).

References

Food and Agriculture Organization of the United Nations (FAO), ECTAD, (2014). 'Dog Collar Video' (in Bahasa Indonesia). Retrieved from https://www.youtube.com/watch?v=1a4EOTZwt8k.

International Companion Animal Management Coalition (ICAM) (n.d.), 'The welfare basis for euthanasia of dogs and cats and policy development'. Retrieved from http://www.icam-coalition.org/downloads/ICAM-Euthanasia%20Guide-ebook.pdf. (Last accessed 6 July 2014).

Samarasinghe, Chandika (2009), 'Humane and Sustainable Dog Population Management in Colombo: Protocol for dog catching'. Blue Paw Trust.

World Organisation for Animal Health (OIE) (2013). OIE Terrestrial Manual, Chapter 2.1.13. Retrieved from http://www.OIE.int/international-standard-setting/terrestrial-manual/access-online/. (Last accessed: 25 June 2014).

World Society for the Protection of Animals (WSPA) (Africa), 'Animal Welfare Aspects: Rabies Elimination Project, Kwa-Zulu Natal'. Unpublished document.

Vaccine Storage, Transport & Management

Risk and Precautions

Only use vaccines that have been stored correctly; destroy (through incineration) vaccines that have been stored outside the recommended temperature range or that have exceeded the expiry date.

Key Points

- High quality, inactivated (killed) vaccines providing at least 1 year immunity should be used (OIE, 2013)
- For storage of vaccines, also see manufacturer's instructions.

Cold Chain and Stock Management

The cold chain and stock management should ideally be managed by an authority that has experience with, and an existing procedure for, the handling of animal or human vaccines.

The careful and correct management of the cold chain (the temperature of the vaccines) is essential to ensure that the rabies vaccines are stored and transported to the field correctly and that the vaccines are viable at the point of vaccination.

> Rabies vaccines can be destroyed if exposed to UV or fluorescent light, refrigerated to a temperature below 2 °C or frozen, subjected to temperatures above 8 °C, or packed exceeding the storage capacity.
>
> Monitoring is needed to ensure that vaccine cold chain and stock management are conducted properly to maintain temperature between 4 and 6°C.

The following should be done by the provincial logistic coordinator (or similar):

- Develop a monitoring schedule
- Fill out the monitoring form
- Respond if any fault is discovered in storing and cold chain management by immediately notifying relevant staff and ensuring improvements and contingencies are in place to prevent the issue happening again.

Materials & equipment

Item
Vaccine refrigerator - designed specifically for vaccine storage. (Some domestic fridges with manual defrost might also be suitable.)
Thermometers (digital with small probes attached, and standard)
Vaccine store bin
Temperature record ledger
Vaccine stock ledger
Vaccine monitoring form
Cool box large
Cool box small
Cool packs: Recommended made from plastic (e.g. plastic bag or bottle filled with water)
Monitoring Form
Back-up generator and fresh fuel in case of power failure
Styrofoam box
Safety box (box for sharp objects)

Receiving the vaccine

The receiving officer should:

- Inspect the vaccine document and record the name, type of vaccine and amount, doses per bottle, batch number, and expiry date. Record in the stock ledger.
- Check the temperature by using a digital thermometer inserted into the package. If the temperature is outside the 2° to 8°C range or the expiry date is exceeded, the vaccine is unusable and should be rejected.

If any inconsistencies in the documentation or physical conditions are found, this should be reported to the logistic coordinator.

Vaccine storage

- Vaccines should be stored in the vaccine refrigerator supported by properly maintained back up power generators.
- Rabies vaccines must be **stored between 2 and 8°C** and the temperature regularly monitored, and recorded on the temperature ledger, to ensure the integrity of the cold chain (water bottles or gel packs in the door of storage units can help buffer temperature fluctuations).
- Vaccines should not be packed tightly together – air must be able to circulate.
- It is advised to store vaccine bottles in clear plastic containers which are clearly labelled to avoid unnecessary opening. Placing gel packs within containers can act as a further temperature buffer.

Storage management

- Stock should be rotated to ensure oldest vaccines, within expiry dates, are used first. Therefore all new vaccines should be packed behind the older vaccines.
- The store records should be updated daily on the monitoring form.
- If the power to the fridge goes off, **do not open the refrigerator.**

If power is off for more than 4 hours, move the vaccine into a styrofoam box with cool packs from another source. Monitor and record the temperature twice a day. Ideally transfer the vaccine in cool boxes to another facility with a fridge and properly maintained back-up generator (e.g. the local hospital).

Transport to the field

- The quantity of vaccines needed for the projected work should be collected from storage early morning or the night before.
- To hold and transport vaccines to the field they should be placed in the large insulated cold box with cool packs:
    - Cool packs need to be cooled in the freezer for at least 24hrs – they can be frozen as long as the temperature of the vaccines does not drop below 2^0C.
    - About 60% of the volume of the cool box should be the cool packs which should line the bottom, sides and top of the cool box and cover the top of the vaccines.
    - The vaccine can be stored in the original packages inside the box.

(Source: World Animal Protection)

- When driving, store the large cold box in the coolest part of the vehicle, out of direct sunlight and off hot surfaces. When parked, store the box in the coolest possible spot, for example in the vehicle parked in the shade or with you in the shade. Cover the box with paper or boxes to increase insulation and slow down heating.
- The temperature of the large cold box should be checked and recorded once an hour to make sure that the temperature is between 2° and 8°C. Using digital thermometers with small probes attached for remote reading will allow temperature reading without regular opening of cool boxes.

During vaccination

- On site, the vaccine can be transferred to the small cold box with cold packs to increase portability. The vaccine will keep cool for up to 4 hours (depending on the number of times the box is opened and ambient temperature).
- Check the temperature of the small cold box once per hour and record.
- Once a vial of vaccine is opened all of the vaccine must be used as recommended by the manufacturer. It is best to use the vaccine on the same day it is opened.

Managing remaining vaccine and waste disposal

- At the end of the vaccination, all used needles and syringes should be placed in the safety box for correct and safe disposal.
- All unused vaccine that has not been maintained at 2^0C to 8^0C and sharps (needles) should be pooled and incinerated once per week.
- Any unopened vaccine in the small cold box can be returned to the large cold box if the temperature has remained between 2° and 8°C, as shown by the temperature records.
- Any vaccine remaining in the large cold box should be returned to local storage and must be used the following day.

Monitoring vaccine stock

It is important to monitor the vaccine stock to avoid vaccine shortage in the field. Make sure to record the number of vaccines used in the stock ledger and calculate the remaining numbers at the end of each day.

References

World Organisation for Animal Health (OIE), 2013, 'Manual of Diagnostic Tests and Vaccines for Terrestrial Animals'. Retrieved from http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.01.13_RABIES.pdf.

Vaccination Day

Contents

Key Points

- Target roaming / outdoor dogs and puppies as a priority
- Parenteral administration of vaccines are to be used
- Aim to vaccinate all dogs seen
- Once the dog is restrained, vaccinate quickly
- Make sure that you vaccinate correctly – or you must revaccinate
- Use two hands to vaccinate – one to hold up the skin and the other to operate the syringe
- Make sure all vaccinated dogs are fitted with a collar or spray painted

Risks and Precautions

- Avoid getting bitten!
- It is highly recommended that all staff involved in mass vaccination of dogs complete a full course of pre-exposure vaccination. This should be ensured by the relevant line manager of the vaccinator staff.
- Anyone bitten or scratched should wash the wound immediately **under running water** for 15 minutes with soap, then disinfect with ethanol (700ml/l) or iodine (tincture or aqueous solution) if available, and **immediately** go to the nearest approved hospital or bite treatment centre for an assessment of whether post-exposure rabies vaccination is needed – this includes dog owners assisting staff with vaccination and staff that have been previously vaccinated.
- Vaccination team members should not attempt to net or capture a dog without training.
- If dogs are observed to show potential signs of rabies (such as biting behaviour) refer to the guides **Rapid Response to Suspect Rabid Dog Alerts** and **Euthanasia of Rabid or Suspect Rabid Dogs** for identification and recommended action.

Resources: Vaccines, Equipment, Staff & Training

Refer to the guide Preparation for Vaccination.

Related Guides

Preparation for Vaccination

Dog Capture and Handling

Vaccine Storage, Transport & Management

Rapid Response to Suspect Rabid Dog Alerts

Euthanasia of Rabid or Suspect Rabid Dogs

1. Steps on the Day of Vaccination

1. Review the plan for the day:
   a) Meet with the community leader/s to review the plan to check if anything has changed.
   b) Make sure all vaccination team members have assigned roles and clear instructions on moving through the area.

2. Check materials & equipment: Make sure all teams have all the necessary equipment and vaccines (see guide Preparation for Vaccination).

3. Temporary fixed vaccination post: If one or more temporary vaccination post/s are to be used:
   a) Set up a table for local people to register their dogs – choose a location for the table that provides shade for those waiting in line
   b) Provide water for dogs and people if it is a hot day
   c) Make sure you have vaccination forms, registration forms, clipboards and pens.
   d) (*Note:* Mobile vaccinations are also highly recommended to ensure that all dogs are targeted – not just those that are easily handled.)

4. Mobile vaccinations:
   a) Ask for a community leader or assigned representative to accompany the team to ensure that the entire village is covered, and all houses with dogs are visited (if this is part of the plan).
   b) Move through the village according to the plan for the day, ensuring that all streets and places are covered (including mosques/temples/churches, puppy markets, slaughter houses, construction sites, markets, cemeteries, schools, hospitals and beaches)
   c) Target all dogs in the village for vaccination.
   For puppies, vaccinating all over 2 weeks of age is recommended. Repeat vaccination before 6 months of age is recommended for protective cover for those puppies (make sure that owners/carers are informed of this). In areas with low rabies prevalence or where dogs are owned and confined, vaccination of puppies from 3 months onwards is common practice.

(Source: World Animal Protection)

5. **Dog handling:** (Refer to the guide Dog Capture and Handling for further instructions)
   a) For dogs at community facilities or public areas, an intensive but calm approach is needed for dog catching and handling, or dogs will scatter. It is important to notify the person in charge in advance.
   b) **Dogs with owner/carer:** Ideally the community liaison or communication staff should advise people in the designated area to keep their dogs indoors or within a gated area, ahead of your visit. When you approach, ask the dog owners or carers (people who feed and know the dogs but may not claim to own the dog) to present their dogs. Then trained handlers can assist owners to ensure safe handling for vaccination and to reduce stress for the dog. For dogs that are very fearful or difficult to handle (even by the owner or community), explain any catching or muzzling that may be required.
   c) **Free roaming dogs:** If roaming dogs can't be caught by hand, assess the dog's temperament and ease of handling and use methods as advised in the guide. Where nets are used, the dogs can be vaccinated and collared / spray painted through the net (see Dog Collar Video (FAO, 2014) for a guide on applying a collar through a net).
   d) **Nervous or aggressive dogs:** Some dogs may require muzzling to avoid danger to handlers. If no muzzle is available, a bandage or leash tied around the dog's nose and then behind the head (also known as a tape muzzle) can work in the short term (see 'Equipment' in the guide Dog Capture and Handling).

6. **Check temperature of dogs:** Before vaccination, take the temperature of any dogs that appear subdued or distressed. If their temperature is high, let them rest and take their temperature again after 15 minutes (normal temperature is 38–39^{0}C). If it remains high, advise the owner to take the dog to a veterinarian for an examination (if possible), or get the veterinarian from the vaccination team to assess whether vaccination should proceed.
7. **Vaccinate**: Vaccinate the dogs according to '**2. Vaccination Protocol'.**

8. **Mark vaccinated dogs**: Marking vaccinated dogs is vital to distinguish between vaccinated and non-vaccinated dogs, including during post-vaccination counting to ensure that sufficient coverage has been achieved.

Adult dogs: Fitting Collars	The collar should be fitted so that it is comfortably tight for the dog but not so loose that it will fall off. As a guide, you should be able to fit two fingers under the collar. Also, check that it doesn't self-tighten so that the dog doesn't choke.  (Source: FAO, 2014)
	Fitting collars through nets: If dogs are caught using a net, it is possible to fit them with a collar using clamps. For a guide see Dog Collar Video (FAO, 2014).

	If fitting a collar using clamps is not possible, alternative marking can be used (as described for puppies below).
Puppies (dogs under 10 months old): Do not use collars (as they will tighten as they grow).	Instead **use non-toxic paint spray or gentian violet** to put a small spot between the shoulder blades of the puppy. If the puppy has a responsible owner who will change the size of the collar as the puppy grows a collar can be provided as well as a paint spot.

*If for any reason a vaccinated dog is not marked this must be recorded and reported to the Survey Coordinator (see the guide Post-Vaccination) for inclusion in survey data analysis.

9. **Record**: Record all dogs vaccinated on the Rabies Vaccination Worksheet.

10. **Issue Rabies Vaccination Cards** to owners/carers whenever practical.

11. **Confirm and report coverage:** Confirm with the community leader when the village has been completed. Report the total number of dogs that were vaccinated and the village coverage, including any need to return if at least 70% coverage was not achieved.

12. **Complete and submit** the Rabies Vaccination Summary Report. Vaccination Coordinators should submit the forms or the information held on the forms, using SMS or similar, to the district level at the end of each day of vaccination so that it can be put into a central database. This may be best done through a Survey Coordinator who can be made responsible for all data collection, storage and reporting to Provincial/National rabies committees.

13. **Repair, wash and disinfect the nets (plus any other equipment used)** before starting in the next village to prevent disease spread.

2. Vaccination Protocol

Following is a guide on the correct methods for administering of the vaccine.

Syringes and needles

- **Each dog receiving a vaccine must get a new needle.** Used needles must be disposed of safely in a hard plastic box or bottle (safety box).
- Syringes may be reused for 5 to 10 dogs, unless blood is observed in the syringe hub in which case it must be discarded. Syringes must be carefully monitored on each use for such contamination.

Administration of the vaccine

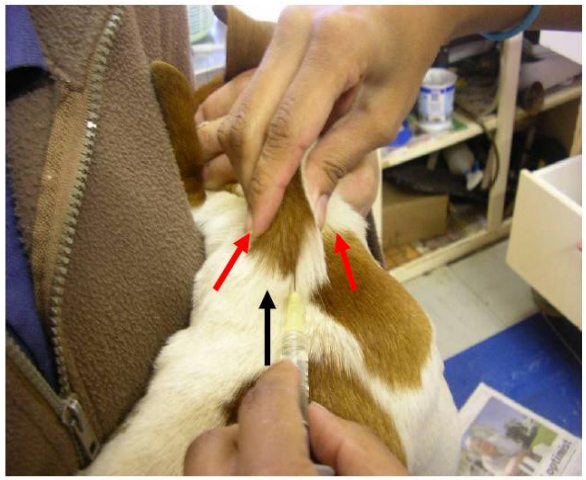
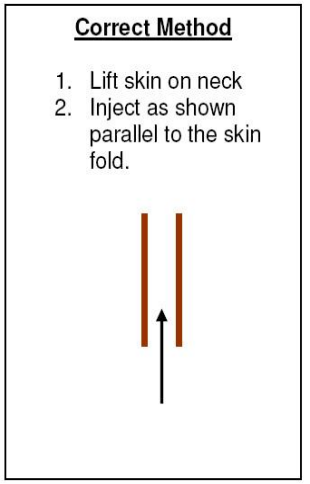
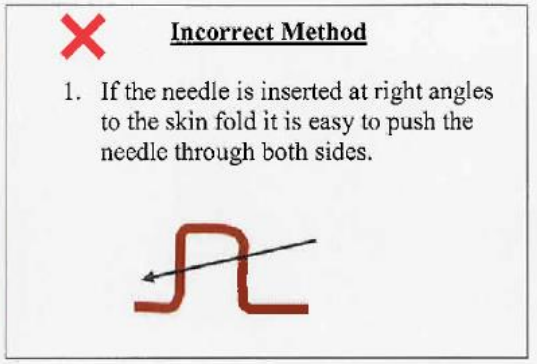
Administration of the vaccine is conducted subcutaneously or intramuscularly preferably by or under the supervision of a veterinarian. Subcutaneous injection is usually easier, while intramuscular injection can provide longer protection though often causes the dog to vocalise, signifying pain. As annual vaccination programs are required (including providing boosters to those previously vaccinated), subcutaneous vaccination of dogs is adequate.

Steps

1. Filling the syringe
   i. Attach a new, disposable needle to the nozzle of a new, disposable syringe (or one that has been used on less than 5 dogs that day), and then insert into the bottle containing the vaccine for filling.
   ii. To prevent a vacuum forming in the bottle, you may need to first inject an amount of air equal to the volume of drug to be used into the bottle.
   iii. Fill the syringe with the correct dose.
   iv. Remove the needle and syringe from the bottle and replace the cap on the needle for safety.

2. Site of injection

Use two hands to vaccinate – one to hold up the skin the other to operate the syringe. Any of the following sites are suitable:

Site – Subcutaneous	Description / Method	
Neck (RECOMMENDED)	The skin of the neck is loose and easy to lift, and well supplied by blood vessels. The skin needs to be held in preparation for the penetration of the needle. Inject parallel to the skin fold (to avoid piercing right through the other side).	    (Source: WSPA, n.d.)

Ribs	This is often another convenient and safe area if the animal is held well. Find a location on the ribs with some loose skin. See **Neck** for correct method for subcutaneous vaccine injection.	 (Source: World Animal Protection)
Skin flap on the flank	This is an alternative site due to the loose skin. Make sure the dog is held well. See **Neck** for correct method for subcutaneous vaccine injection.	 (Source: World Animal Protection)

		Vaccination through nets  (Source: World Animal Protection)
Site – Intramuscular	**Description / Method**	
Hind leg	This is a good option for dogs that are difficult to handle and netted dogs. *Risk:* Damaging the sciatic nerve and leg bones. To avoid this, use experienced injectors only using a short needle injecting in the cranial (forward) muscles of the upper hind leg.	

3. Recording and reporting the vaccinations

Make sure that each vaccination is recorded on the Rabies Vaccination Worksheet.

References

Food and Agriculture Organization of the United Nations (FAO), ECTAD, (2014). 'Dog Collar Video' (in Bahasa Indonesia). Retrieved from https://www.youtube.com/watch?v=1a4EOTZwt8k.

World Society for the Protection of Animals (WSPA) (Africa), 'Animal Welfare Aspects: Rabies Elimination Project, Kwa-Zulu Natal'. Unpublished document.

Post-Vaccination: Estimation of Vaccination Coverage

Contents

Key Points

- A post-vaccination survey of the area **must** be conducted to ensure that the vaccination coverage is greater than 70% of the total dog population for that area.
- The survey needs to occur within 72 hours (3 days) of the conclusion of vaccination.
- If at least 70% coverage is not achieved, re-vaccination **must** occur until this target is reached.

Risks and Precautions

- It is strongly recommended that all staff involved in mass vaccination of dogs complete the full course of pre-exposure vaccination. This should be ensured by the relevant line manager of the vaccinator staff.
- Anyone bitten or scratched should wash the wound immediately **under running water** for 15 minutes with soap, then disinfect with ethanol (700ml/l) or iodine (tincture or aqueous solution) if available, and **immediately** go to the nearest approved hospital or bite treatment centre for an assessment of whether post-exposure rabies vaccination is needed – this includes staff that have been previously vaccinated.
- Vaccination team members should not attempt to net or capture a dog without training.
- If dogs are observed to show potential signs of rabies refer to the guides Rapid Response to Suspect Rapid Dog Alerts and Euthanasia of Rabid or Suspect Rabid Dogs.

Related Guides

Preparation for Vaccination

Vaccination Day

1. Introduction

After all vaccinations have been completed, a survey of the vaccination area **must** be conducted to ensure that the vaccination coverage is greater than 70% of the total dog population for that area. This needs to occur within 72 hours (3 days) of the conclusion of vaccination, otherwise collars may have disappeared or paint may have washed off and survey results will be unreliable.

The survey needs to be conducted correctly so that an accurate estimate of coverage is achieved. If it is not done correctly, a village with coverage below 70% may not be identified and revaccination not conducted, leading to an ineffective program.

*Note: Some dogs can become flighty after vaccination and may be difficult to find.

2. Materials & Personnel

The following materials and personnel are recommended for the survey:

Materials/equipment	Quantity
Motorcycle (if available) or 1 bicycle (if skilled counter)	1 per team
Helmets	1 per person
Reporting forms, pens and clipboard	1 per team
Mobile phone (and credit vouchers if required)	1 per team
Human First-Aid box including soap, water, towels, band aids, cotton wool, bandages, antibacterial cream, antiseptic	1 per team
Rabies Post-vaccination Survey Worksheet	1 per team
Rabies Post-vaccination Survey Summary Form	1 per team

Personnel

- Each team should consist of one officer to record and one motorcycle driver (unless on bicycles).
- Survey Coordinator: one recommended for every 5–10 survey teams. The coordinator should be responsible for:
  - scheduling surveys, preparing and resourcing teams
  - ensuring prompt data collection and feedback to vaccination teams on coverage achieved
  - analysing patterns in coverage – including whether some vaccination teams are consistently achieving low or high coverage and amending/learning from their strategies to improve vaccination coverage overall

Note: If one key data coordinator for the program is preferred, this coordinator may also be responsible for the collection, storage and reporting of data received from the Vaccination Coordinator.

3. Preparation

Calculating minimum number of dogs to be surveyed

The minimum number of dogs to be surveyed in order to achieve a reliable estimate of coverage needs to be calculated. This would usually be done by the survey coordinator.

i) Using the estimated number of dogs in the local population, N (see 'Methods for estimating population size' in the guide Preparation for Vaccination), the following formula can be used:

$$S = 96/(1+ (96/N))$$

Where:

N = estimated dog population in the area
S = Minimum number of dogs to be surveyed

For example, for an estimated population size of 150 dogs, the minimum number of dogs to be surveyed is: 96/(1+(96/150)) = 58.5 (round up to 59).

ii) Give this estimate to the survey teams the day before the survey so they know the minimum number of dogs to be surveyed in the village.

Meet with the community leader

- Take a map of the village to ensure that the survey teams cover the entire area.
- Establish the transect for the survey and mark this on the map.
- Confirm the survey schedule with the community leader.
- Ask the community leader or a representative to accompany the teams so that they can assist in finding as many dogs as possible. It would be best if this was **not** the same person who accompanied the vaccination teams to eliminate potential bias.

Survey Data Form

Fill in the relevant information on the Rabies Post-vaccination Survey Worksheet before starting the survey including; name of village, date, date of the previous vaccination and the target sample size to be surveyed.

4. Surveying

Time: Surveys are best carried out during the cooler hours of the day when the dogs are active and their owners are likely to be at home (for example, early morning and late afternoon / early evening). Survey the village for a **minimum of 3 hours.**

Method

- Only one person should count for each village.
- Move through the village making a **zig-zag across the length and width of the village** to ensure there is no bias for certain parts.
- Use a method of travel to allow them to **move at a reasonable rate of progress** to reduce the number of times a dog is seen more than once but also allow a **thorough search**. Walking will allow for a thorough count but is slow. Cycling and walking the bike, when needed, is a good compromise.
- **Move quietly and inconspicuously** so as to not scare off dogs.
- Move down every street, counting each dog they see and searching for dogs in potential hiding places (e.g. under cars, in drains).
- Access all roads and avoid recounting the same street
- Visit all areas along the transect including beaches, small streets, markets, slaughterhouses, mosques/temples/churches, hospitals, construction sites and cemeteries.
- For open public areas such as parks or waste ground, it is usually possible to scan effectively from a vantage point or by walking across them.
- Stop to talk to local people to ask about their knowledge of both roaming and confined dogs in the area.

Recording: **All dogs seen** must be recorded as either **vaccinated** (as indicated by a collar or paint spray / gentian violet) or **not vaccinated** on the Survey Worksheet. (Note: Puppies under 9 months of age will have paint not collars).
If it is easier for recording, simple and cheap hand-held counters can be used and final figures tallied on the sheet at the end of the survey.

- **Do not leave the village until the minimum number of dogs has been counted,** according to the figure calculated.
    - If the required number of dogs cannot be found, the village must be recounted at the next convenient time. If the required number still cannot be counted, send both results to the Survey Coordinator.
- Ensure that the Survey Worksheet is filled in correctly and submitted to the Survey Coordinator by submitting it in hardcopy and/or by SMS or calling in the results. The Rabies Post-vaccination Survey Summary Form can be completed for this purpose.

Calculate the percentage of dogs vaccinated

The following calculation should be used by the **Survey Coordinator** to calculate the vaccination coverage;

$$\frac{\text{Number of marked dogs seen on survey}}{\text{Total number of dogs seen with and without marks}} \times 100$$

Note: If some dogs were reported by the vaccination team as vaccinated but not marked, add these to the number of marked dogs to calculate the true vaccination coverage.

Report coverage

The coverage (%) achieved must be *reported to the Vaccination Coordinator* and then to the *Vaccination Teams* to ensure feedback on their performance.

- **If 70%** *or more of the dogs have been vaccinated* the village is considered complete.
- **If less than 70% have been vaccinated,** the Vaccination Team must return to the village within one week of the first vaccination, to vaccinate any unvaccinated dogs. Following the second round of vaccination the survey team needs to return to conduct a survey again within 3 days. This process should continue until at least 70% has been reached.

5. Estimating dog population post-survey: First round vaccinations

At the conclusion of the first round of vaccinations, the estimated dog population for the village should be retrospectively calculated using the following formula that combines data from the vaccination and survey teams:

$$\frac{\text{Number of vaccinated dogs x total number of dogs seen on survey}}{\text{Number of marked dogs seen on survey}}$$

Data regarding coverage and dog population estimates must be submitted to the provincial/national rabies committee by the Survey Coordinator. This figure is required for estimating the minimum number of dogs to vaccinate for the second round of vaccinations (see the guide Preparation for Vaccination).

Rapid Response to Rabid and Suspect Rabid Dog Alerts

Contents

Key Points

- Positive rabies cases alert that the area needs to be re-vaccinated (assuming that vaccination has previously been conducted) and monitored.
- Highly suspect dogs should be humanely euthanized immediately and the head sent to a competent laboratory for diagnosis.
- Suspect rabid dogs should be quarantined whenever possible for observation, but humanely euthanized in any case where rabies symptoms further develop.
- If quarantine is not possible, the dog must be euthanized.

Risks and Precautions

- All persons dealing with suspect rabies cases or entering a field situation where there may be rabid animals should have received the full course of pre-exposure rabies vaccination.
- Anyone bitten or scratched should wash the wound immediately **under running water** for 15 minutes with soap, then disinfect with ethanol (700ml/l) or iodine (tincture or aqueous solution) if available, and **immediately** go to the nearest approved hospital or bite treatment centre for an assessment of whether post-exposure rabies vaccination is needed – this includes staff that have been previously vaccinated. There must be a follow-up system to ensure that all post-exposure vaccinations are received.

Related Guides

Euthanasia of Rabid and Suspect Rabid Dogs

Dog Capture and Handling

Vaccination Day

Vaccine Storage, Transport and Management

Weblinks

World Health Organization (WHO), 'Current strategies for human rabies pre and post-exposure prophylaxis'

1. Introduction

It is vital to the success of the Mass Dog Vaccination (MDV) program, and all rabies control efforts, that rabies suspect cases are correctly recognised and that euthanasia is carried out when necessary to prevent further suffering for the dog and to minimise risk to humans and the rest of the dog population. In addition, any animals that this suspect or primary case has bitten or nursed and thus that are likely to be infected must also be carefully managed. These animals would be considered possible secondary cases. In fact, not all secondary cases are immediately identified and any animal in the vicinity of the suspect rabid dog is at possible risk.

Rapid report and removal of a suspect and clinical rabies case is crucial to reducing the spread of rabies and impact on the community.

Positive rabies cases alert that the area needs to be re-vaccinated (assuming that vaccination has previously been conducted) and monitored.

Any suspect rabid dog must be investigated and assessed to avoid the possibility that a rabid dog remains or re-joins the community. This suspect may be identified; during a planned MDV program when dogs are being captured or brought in by their owners / carers, through a report by a member of the community outside of a program, or during a follow up on a bite-case report from the human health sector. In the latter cases, a Rapid Response Team will be required for the follow-up.

Refer to the guide Euthanasia of Rabid & Highly Suspect Rabid Dogs for euthanasia procedures and management of controlled drugs. Refer also to The Merck Veterinary Manual (Merck & Co. Inc.) for more veterinary details if needed.

2. Personnel and Equipment

Rapid Response Team

A Rapid Response Team is required to respond to any reports of suspect rabid dogs in the community. Initial assessment and reporting will determine the level of risk and hence response required in the field, and alert the closest bite treatment clinic.

This team should ideally consist of at least 2 competent catchers and 1 veterinarian.

Material & Equipment

- Access to double-walled isolation cages
- Vaccine and vaccination materials
- Dog catching and restraint equipment, plus spare netting
- Euthanasia kit
- Cold box and cool bricks for vaccine
- First aid kit, plus human vaccines
- Information, Education and Communication (IEC) materials

Protective clothing

All operators handling suspect rabid dogs **must:**

- cover all exposed skin, with a minimum of closed shoes, long pants and shirt to minimise the chance of injury from a random dog bite
- wear eye goggles or a face shield (to prevent dog saliva being sprayed into the human eye)
- wear robust gloves (full length where needed to cover skin) of a material that cannot be readily pierced by the teeth of a dog (e.g. leather, synthetic material or thick clothe)
    - Gloves can make handling difficult, but once an animal is sedated or anaesthetised double layered, thinner, disposable gloves can be used.

Any person with wounds on their hands or arms should not handle any dogs. (Note: Animals infected with rabies can shed virus in their saliva for several days before the onset of clinical signs.)

3. About Rabies

Progression of the rabies disease

The clinical course of the disease in dogs is usually 10 days long during which time the animal is highly infective to others with the rabies virus present in the saliva. (Some animals will shed the virus in the saliva before rabies is identified).

The clinical signs may progress through the following stages (Adapted from The Merck Manual, Merck & Co. Inc.) though some animals die rapidly without marked clinical signs:

- **Initial signs are non-specific** – Fever, malaise, apparent headache
- **Within days** – Encephalitis (furious rabies; in ~ 80%) or paralysis (dumb rabies; in ~ 20%) develops:
    - Encephalitis causes biting at random, restlessness, confusion, agitation, bizarre and hyperactive behaviour, hallucinations, and insomnia. Salivation is excessive, and attempts to drink cause painful spasms of the laryngeal and pharyngeal muscles (often conveyed indirectly as 'hydrophobia').

  - In the paralytic form, depression and ascending paralysis (rear end paralysis progressing to full quadriplegia) develop without delirium and hydrophobia.
- Finally – Either rapid death or general paralysis, difficulty in swallowing and excessive salivation then death occur.

Rabies risk to other animals and people

During this important 10 days, a rabid dog poses a very high risk to other animals and people.

Incubation period: The time between exposure and the appearance of clinical signs in dogs varies from a few days to 6 months. Dogs cannot transmit rabies during the incubation period and generally behave normally. This is crucial knowledge for cases when an animal may have been bitten by the suspect case. *Note* – If dogs are incubating the virus when vaccinated or they are bitten by a rabid dog when the vaccine has not taken full effect, they can still incubate and develop clinical rabies in due course.

Using clinical signs to identify clinically rabid dogs

Clinical signs of rabies include (1 or more of the following):

- Biting other animals, humans or objects
- Abnormal behaviour (such as not responding to the owner, being scared)
- Abnormal vocalisations
- Chewing objects other than food
- Hyper-salivation
- Wandering aimlessly
- Hypersexuality
- Abnormal licking of water / urine
- 'Fly biting' (where the dog appears to be biting imaginary flies)
- Choking sounds (the dog appears to have something stuck in its throat) or regurgitation
- Drooping jaw
- Aggression
- Incoordination / imbalance / stiffness when moving
- Paralysis, including limping due to leg paralysis
- Convulsions
- Death

(Source: Adapted from the FAO 'Integrated Bite Case Management'; Tepsumethanon, Wilde & Meslin, 2005)

Stray dogs: Not a criterion for rabies suspects!

Stray dogs (dogs that have no obvious owner or carer) should not be assumed as rabies threats. If they are properly vaccinated they will help build a stable resistance barrier to protect the community from rabies.

4. Response to Reported Suspect Rabid Dogs

Steps

1. Receiving reports of a suspect rabid animal

Reports of suspect rabid dogs can come to the local authority in a number of ways, such as directly from a community member or leader, a government department, the bite-victim, veterinarian, doctor, or person observing the dog if already isolated or quarantined.

1.1 Collect a careful history and observational record on the dog

The following information (where applicable) should be collected:

- Date of incident
- Location(s) of suspect animal
- Signs observed in the biting animal
- Location, names and phone number of any people bitten; including nature of bite/contact, where they were bitten on the body
- Number and location of any other animals bitten (if known)
- Name and phone number of person giving the report
- Name and phone number of owner of suspect animal(s) or a community person in the vicinity where the dog seen (if a community dog).

1.2 Advice for any human bite victim/s:

The bite victim (Category II or III, WHO Rabies Fact Sheet) must immediately wash the wound **under running water** for 15 minutes with soap, then disinfect with ethanol (700ml/l) or iodine (tincture or aqueous solution) if readily available, and go to the nearest approved hospital or bite treatment centre to be assessed for post-exposure rabies vaccination and wound treatment. There must be a follow-up system to ensure that all post-exposure vaccinations are received.

2. Identify rabies suspects

2.1 For biting dogs: Use the provided decision trees (Figures A–D) to identify suspect and highly suspect rabid dogs and appropriate action (see Scenario 1 for when a human is bitten; Scenario 2 for when a dog is bitten).

For other clinical criteria for identifying rabies suspects and recommended responses refer to the Annex 'Six clinical criteria for rabies diagnosis' (Tepsumethanon, Wilde & Meslin, 2005).

2.2 Dog acting strangely but not biting: Visit within 1 day and gain full history. Use clinical signs of rabies to identify level of risk.

3. ACTION for suspect rabid dogs

See Figures A, B, C (Scenario 1) and Figure D (Scenario 2) for appropriate decision making and action.

In summary:

A **highly suspect rabid dog** is one that:

- shows more than one sign of rabies
- has bitten multiple persons or animals in a short time
- is the puppy of a rabid mother
- is found dead

A **suspect rabid dog** only shows one sign.

3.1 For rabies suspects

Highly suspect rabid dogs:
Should be immediately humanely euthanized and the head sent to a competent laboratory for diagnosis.

Suspect rabid dogs:
Quarantine *and observe for 10 days*:

- If symptoms develop / further progress – **Euthanize** (see Guide Euthanasia of Rabid or Highly Suspect Rabid Dogs)
- If symptoms don't progress and the dog is still alive after 10 days, the dog is rabies free –vaccinate and release.

Notes:

- If quarantine at an official facility (such as a Municipal Pound), or restraining and isolating (such as caging) by the owner, is not possible then euthanasia must be performed.
- It is possible for vaccinated dogs to develop a mild form of rabies if they were incubating the disease at the time of vaccination or if they did not mount an appropriate immune response. Hence, vaccinated dogs showing signs of rabies should be euthanized.

If in any doubt, confer with an experienced colleague or hold the animal in quarantine for 10 days.

3.2 For secondary cases (dogs that have been in contact with a rabies suspect and hence are at risk of developing rabies):

3.2.1 Dogs bitten by a suspect rabid dog: See Scenario 2.

3.2.2 Puppies of a suspect rabid dog
All puppies of a rabies suspect mother should be regarded as a rabies suspect and quarantined and observed for 6 months. If quarantine is not available, the puppies must be euthanized.

3.2.3 Puppies of a confirmed rabid dog
All puppies of a confirmed rabid dog must be euthanized.

3.2.3 Puppies bitten by a suspect rabid dog
If puppies between 1 and 3 months have had only one or no vaccination and have been bitten by a suspect rabid dog, they are still at risk of developing rabies and should be euthanized (if quarantine is not possible).

4. Laboratory confirmation

The head of any euthanized suspect rabid dog must be sent for laboratory diagnosis to confirm clinical cases and ensure accurate national notification*. The ***fluorescent-antibody test (FAT)*** is highly recommended (OiE, 2013).

* If this is a first or new rabies case in an area previously free of rabies for some period, then immediate notification to the relevant authorities is important upon urgent confirmation of the case. They will then decide what vaccination of dogs is required. See GARC Rabies Blueprint: Contingency Planning.

5. Reporting

Fill in a Rabies Rapid Response and Sample Submission Form, and a surveillance form including the GPS coordinates of the outbreak. Send the report to the local authority.

Scenario 1: Human Bitten by a Dog or Exposed (Primary Dog Cases)

Figure A

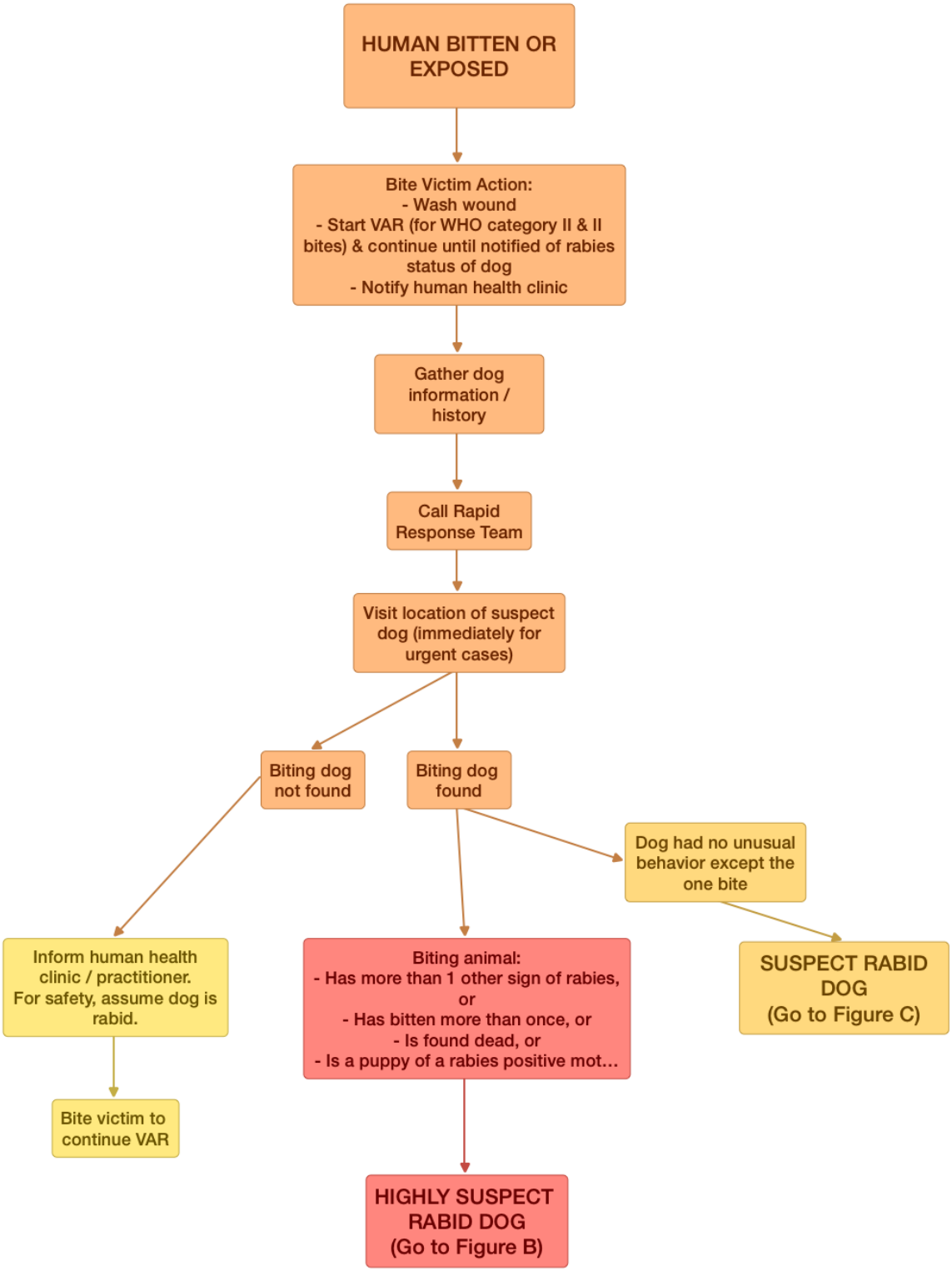


Figure B: Highly Suspect Rabid Dog

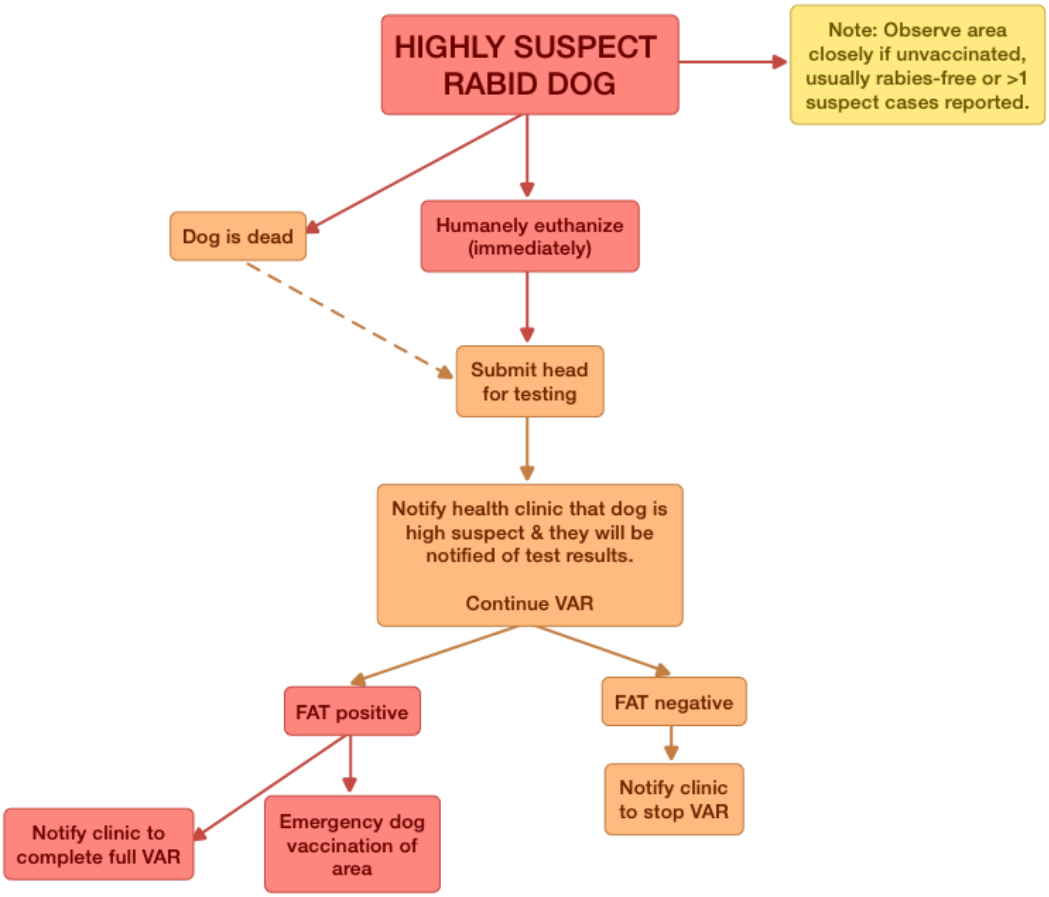
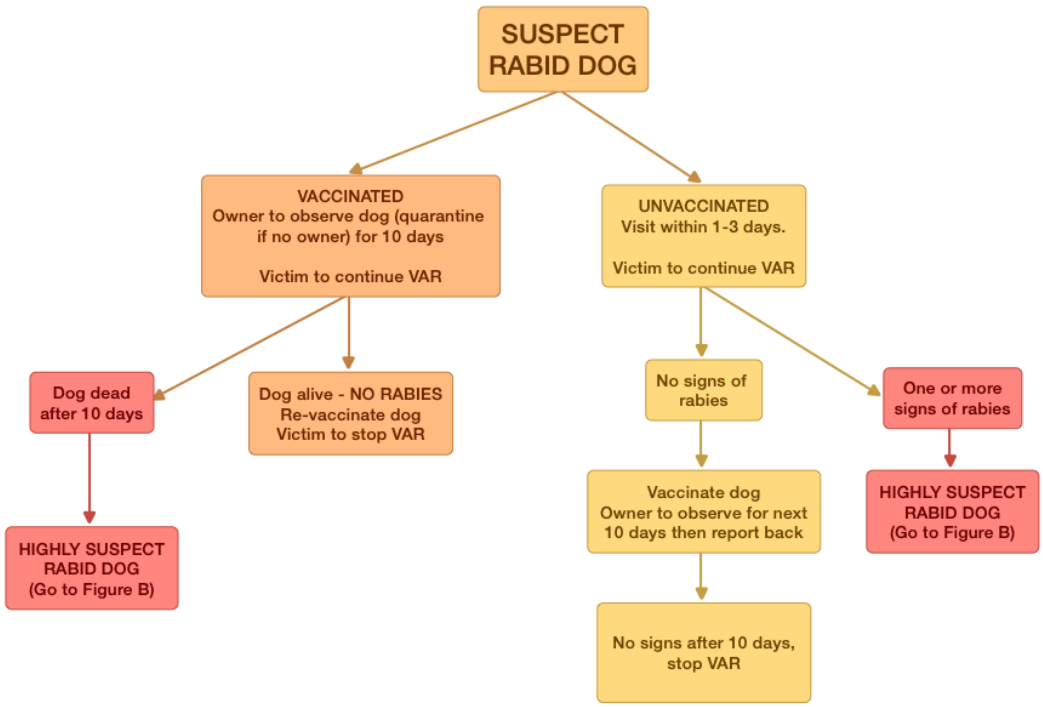
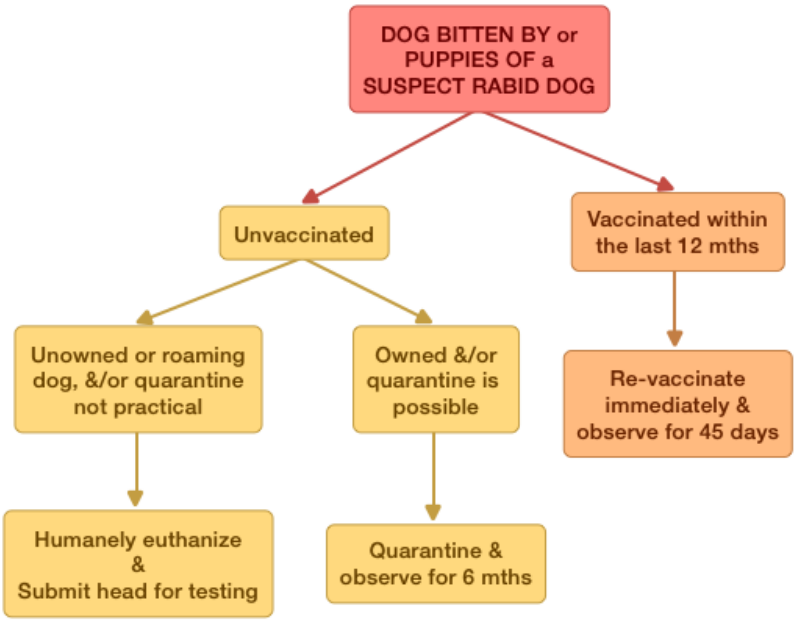


Figure C: Suspect Rabid Dog



Scenario 2: Dog bitten by a suspect rabid dog, or puppies of a suspect rabid dog (secondary cases)

Figure D



Additional Resources

Global Alliance for Rabies Control (GARC), Rabies BluePrint 'Contingency Planning'. Retrieved from http://canineraliesblueprint.org/IMG/pdf/canine_rabies_blueprint_v2_-_contingency_planning.pdf

Tepsumethanon, V., Wilde, H. and Meslin, F. X. (2005). 'Six criteria for rabies diagnosis in living dogs'. Journal of the Medical Association of Thailand. 88, 419-422.

Merck & Co. Inc. 'The Merck Veterinary Manual'. Retrieved from http://www.merckmanuals.com/vet/zoonoses.htmlGuides.

References

Food and Agriculture Organization of the United Nations (FAO), 'Integrated Bite Case Management', unpublished document.

Merck & Co. Inc. 'The Merck Veterinary Manual'. Retrieved from http://www.merckmanuals.com/vet/zoonoses.htmlGuides.

Tepsumethanon, V., Wilde, H. and Meslin, F. X. (2005). 'Six criteria for rabies diagnosis in living dogs'. Journal of the Medical Association of Thailand. 88, 419-422.

World Health Organization (WHO), 'Current strategies for human rabies pre and post-exposure prophylaxis'. Retrieved from http://www.who.int/rabies/human/WHO_strategy_prepost_exposure/en.

World Organisation for Animal Health (OIE), 2013, 'Manual of Diagnostic Tests and Vaccines for Terrestrial Animals'. Retrieved from http://www.oie.int/fileadmin/Home/eng/Health_standards/tahm/2.01.13_RABIES.pdf.

Annex: Six clinical criteria for rabies diagnosis

(Tepsumethanon, Wilde & Meslin, 2005)

1) *Age of the dog?*
   a) Less than 1 month ——————> not rabies
   b) One month or more or not known —> go to 2)
2) *State of health of the dog?*
   a) Normal (not sick) or sick more than 10 days –> not rabies
   b) Sick less than 10 days or not known —> go to 3)
3) *How did the illness evolve?*
   a) Acute onset from normal health ——> not rabies
   b) Gradual onset or not known ———> go to 4)
4) *How was the condition during the clinical course in last 3-5 days?*
   a) Stable or improving (with no treatment) –> not rabies
   b) Symptoms and signs progressing or not known –> go to 5)
5) *Does the dog show the sign of "Circling"?*
   (It stumbles or walks in a circle and hits its head against the wall as if blind.)
   a) Yes ————————————> not rabies
   b) No or not known ——————> go to 6)
6) *Does this dog show at least 2 of the 17 following signs or symptoms during the last week of life?*
   a) Yes ————————————> Rabies
   b) No or showing only 1 sign ———> Not rabies

1. Drooping jaw
2. Abnormal sound in barking
3. Dry drooping tongue
4. Licking its own urine
5. Abnormal licking of water
6. Regurgitation
7. Altered behavior
8. Biting and eating abnormal objects
9. Aggression
10. Biting with no provocation
11. Running without apparent reason
12. Stiffness upon running or walking
13. Restlessness
14. Bites during quarantine
15. Appearing sleepy
16. Imbalance of gait
17. Frequent demonstration of the "Dog sitting" position.

Euthanasia of Rabid and Highly Suspect Rabid Dogs

Contents

Key Points

- For a guide to identifying rabid and highly suspect rabid dogs, and where euthanasia is recommended, refer to the guide Rapid Response to Rabid and Suspect Rabid Dog Alerts.
- For other reasons for Euthanasia see 'Annex'.
- Quarantine and observe all suspect rabid dogs for 10 to14 days where possible.
- Use only euthanasia drugs recommended here and use pre-euthanasia drugs where instructed.
- Only a qualified veterinarian should diagnose rabies, carry out euthanasia and confirm death.
- Pentobarbitone solution (drug used for euthanasia) should be administered only by a qualified veterinarian by intravenous injection, preferably once an animal is anaesthetised, using the recommended pre-euthanasia drugs. Intrahepatic or intraperitoneal injection is also valid if the animal is anaesthetised.
- Dogs and their owners should be treated with compassion. Euthanasia should occur in a quiet environment – sudden sounds or movements around the animal should be avoided.

Dog Capture and Handling

Refer to the guide Dog Capture and Handling. Also, please contact World Animal Protection for assistance with finding suitable trainers in dog capture and handling.

Risks and Precautions

- Anyone bitten or scratched should wash the wound immediately **under running water** for 15 minutes with soap, then disinfect with ethanol (700ml/l) or iodine (tincture or aqueous solution) if available, and **immediately** go to the nearest approved hospital or bite treatment centre for an assessment of whether post-exposure rabies vaccination is needed – this includes dog owners assisting staff with vaccination and staff that have been previously vaccinated.
- All staff involved in mass vaccination of dogs should have completed the full course of pre-exposure vaccinations.
- A human First Aid Kit should be taken on every response trip.
- Any person with wounds on their hands or arms should not handle any rabid or suspect rabid dogs.
- Hands should be kept free of dog saliva at all times.

Related Guides

Rapid Response to Rabid and Suspect Rabid Dog Alerts

Dog Capture and Handling

Vaccination Day

1. Introduction

1.1 Criteria for Euthanasia

Definitions:

The term Euthanasia comes from the Greek terms 'eu' meaning good and 'thanatos'' meaning death. World Animal Protection uses the commonly understood meaning of euthanasia, which is also the definition used by the World Organisation for Animal Health (OIE, 2014): **the act of inducing death in a humane manner.**

The OIE (2014) also states that regarding euthanasia: 'The general principles in the Terrestrial Code should be followed, with the emphasis on using the most practical, rapid and humane methods and ensuring operator safety.'

World Animal Protection demands euthanasia methods that:

1. are as painless as possible
2. achieve rapid unconsciousness followed by death
3. minimise animal fear, discomfort and distress
4. are reliable and irreversible.

To meet these criteria, the method should take into account the species, age and health of the animal. In addition the method should be accessible, simple to administer, safe for the operator and as psychologically acceptable to the operator as possible (World Animal Protection, 2014).

Euthanasia and rabies

When deemed the most appropriate action, according to the guide 'Rapid Response to Rabid and Suspect Rabid Dog Alerts', the euthanasia of highly suspect rabid dogs, unvaccinated dogs bitten by highly suspect rabid dogs or puppies of rabid mother dogs is an act of kindness in preventing animal suffering, and protects human health and reduces the risk of the disease spreading.

For a guide to identifying rabid, suspect rabid, and highly suspect rabid dogs, and appropriate action, please refer to the guide Rapid Response to Rabid and Suspect Rabid Dog Alerts.

Also see other potential reasons for euthanasia in 'Annex: Criteria for Euthanasia Unrelated to Rabies'.

1.2 Personnel and Training

The OIE (2014) states that, ''Regardless of the method used, it is important to minimise distress, anxiety and pain (of the dog) by ensuring that operators are appropriately trained''.

Only a qualified veterinarian should diagnose rabies, carry out euthanasia and confirm death.

Note: World Animal Protection recognises that some communities and countries lack the resources to carry out euthanasia in a way that meets the criteria outlined in this guide. For example, the correct drugs, adequate equipment and trained personnel may not be available. In such circumstances it is important for those responsible for animals to do their utmost to minimise animal pain, distress and suffering whilst working to obtain the necessary resources to facilitate the use of humane killing methods (World Animal Protection, 2014).

All methods of euthanasia have the potential to be poorly performed if operators are untrained and unsupported.

All personnel involved with euthanasia should receive training covering:

- behaviours associated with rabies in dogs
- risks and precautions (e.g. use of protective clothing, pre-exposure vaccinations)
- correct dog handling techniques to avoid animal distress and risks to staff
- how euthanasia drugs work
- sedation / anaesthetic procedures
- signs of death

Protective clothing

Extreme care should be taken when handling and euthanizing animals suspected of having rabies.
All operators handling rabid or highly suspect rabid dogs **should:**

- cover all exposed skin, with a minimum of closed shoes, long trousers and long shirt (to minimise the risk of a random dog bite)
- wear eye goggles or a face shield (to prevent dog saliva being sprayed into the human eye)
- wear robust gloves, when practical, of a material that cannot be readily pierced by the teeth of a dog (e.g. leather, synthetic material or thick cloth).
  Note: Gloves can make handling difficult, but once an animal is sedated or anesthetized double-layered, thinner, disposable gloves can be used. Always keep hands clean of saliva.

Dog Capture and Handling

All rabid or highly suspect rabid dogs must be handled in a way that:

- minimises any pain, fear and distress experienced by the dog,
- prevents handlers from being bitten and minimises human contact with animal body fluids.

Rabid dogs respond to sound and sudden movement more than a healthy dog – this can be used to assist the handler in catching or restraining the dog but also emphasises the importance of providing a quiet environment for the euthanasia procedure. (D. Stewart, personal communication, 25 September 2014).

For comprehensive instructions, refer to the guide Dog Capture and Handling and Vaccination Protocol in the guide Vaccination Day.

It is highly recommended that dogs are caught using a net. Where sedation / anaesthesia is to be used, this can be administered through the net. A catch pole can be used if an anaesthetised dog needs to be moved from the net to a transport cage or other.

Professional and sympathetic conduct

All personnel involved with euthanasia should show professionalism and respect for animal welfare, the value of animal life, and the safety and care of all people involved. Possibly the most important aspect during euthanasia is the handling of the animal. The animal about to be euthanized should be treated with dignity and in a humane manner.

It is also important to recognise the effect of euthanasia on the owner / carer. It is vital to carefully and sympathetically explain why the euthanasia of their dog is needed and the details of the procedure (emphasising that drugs will be used to ensure that death is painless).

Signs of pain and distress in dogs (also possible clinical signs of rabies)

Handlers should be taught how to detect and alleviate fear, pain, anxiety and distress.
The following behaviours or physiological responses may be signs of fear, pain, anxiety and distress (Note: Some of these signs could also represent underlying clinical rabies):

- Aggression towards humans or redirected aggression towards self or inanimate objects e.g. snapping, biting, growling
- Vocalisation – whining, whimpering, high pitched barking, howling, or growling
- Attempting to escape or withdraw from the situation, struggling
- Panting
- Hyperventilating
- Salivating
- Pupils becoming dilated
- Pilo-erection (hair standing on end)
- Increased heart rate (tachycardia)
- Shivering, muscle tremors and spasms
- Immobility or freezing
- Urination / Defecation
- Anal sacs are emptied (foul smelling liquid is evacuated)

Confirmation of death

Those performing euthanasia must be able to identify when death has occurred. Indicators of death are detailed in Table 1 (Note: Most of these indicators must be present to confirm death).

Table 1

Indicator	Description
No movement of the chest / No signs of rhythmic respiration/breathing	DO NOT rely on this sign alone as the animal's heart may continue to beat for some time after it has stopped breathing. Agonal, 'last gasps' are a sign the animal is in the process of dying.
No heart beat	Check for this with a stethoscope or by palpating the animal's chest wall.
No pulse	Check for this by palpation over the medial aspect of the animal's hind limb (femoral artery).
Loss of colour from the mucous membranes in the animal's mouth (*Note: Be careful with an contact with saliva)*	Mucous membranes become pale and there is no pink colour if pressure is applied (no capillary refill). With time the mucous membrane becomes dry and sticky. Capillary refill is frequently still evident for prolonged periods after an animal has died.
Corneal reflex (blink reflex) is lost	After death, the animal's eyes remain open and the lids do not move when the eyeball is touched.
Glazing of the eyes	This occurs rapidly after death. The cornea loses its clear, moist appearance and becomes opaque, dry and wrinkled.
Rigor mortis (Note: does not occur immediately after death)	Limbs of the corpse become stiff and difficult to move or manipulate. If death cannot be confirmed by a veterinary surgeon, or there is any doubt, operators should wait until rigor mortis has set in before disposing of the animal's carcass

2. Methods for Euthanasia

All procedures for euthanasia must comply with veterinary legislation for the region.

2.1 Preparation

Appropriate preparation should always occur to ensure safe and humane handling of animals for euthanasia. Firstly, personnel should ensure that all materials are available at hand and the environment is practical for the procedure.

Environment

Recommended

- A quiet room away from other animals and other people (including a secure area for pre-euthanasia drugged animals)
- An examination table approximately 90cm in height, with a non-slip surface, to facilitate handling and accurate injecting
- Good lighting.

For field euthanasia

- A quiet area away from other animals and other people
- An examination table (as above). If a table is not available, use a flat clean surface, such as a large towel on the ground.
- Good lighting

Owner / Carer Education

It is recommended that you have a flyer / brochure available to give to all owners/carers of dogs to be euthanized, explaining the importance of vaccination, rabies symptoms, bite prevention and treatment. Please contact World Animal Protection for more information.

Recommended Materials & Equipment

Note: Please check the availability of drugs in your region and regulations regarding controlled drugs. To minimise stress and maximise safety while handling, it is suggested that all dogs in a rabies endemic area are at least sedated or, where needed, anaesthetised before euthanasia (see 2.2 Methods for Administering Pre-euthanasia Drugs).

Table 2

Materials & Equipment	Quantity per 25 dogs
Pre-euthanasia drugs preferred and used together: • Xylazine 20mg/ml. Dose rate: see below • Ketamine 100mg/ml Dose rate: see below A quiet, secure area for pre-euthanasia procedures.	 50ml 50ml
Euthanasia drug: Sodium Pentobarbitone	Recommended: Intravenous (IV) injection of 20% Pentobarbitone solution (see Table 4 for quantity per kg dog weight)
Disposable syringes (with off-centre nozzles): 3, 5, 10 and 20ml	25 of each size
Disposable needles: 22 gauge and length 1 inch (2.5cm) (convenient for most sized dogs). Some 18 gauge needles for removing pentobarbitone from bottle.	1 box/team (25+) 22 gauge (A new needle for every injection plus spares)
Catheter (only for dogs with fragile, damaged veins)	1 box/set gauge 22
Firm plastic boxes or bottles for storing needles and syringes – one for sterile and one for used needles & syringes	1 of each per team
Disposable gloves	2 packs of various sizes
Protective clothing	
Cotton wool	500g
Curved scissors (medium)	1 per team
Stethoscope	1 per team
Alcohol 70%	250 ml
Large plastic bags (bin liners) for dead dogs for later sampling and disposal	30
Specialist capture and restraint equipment (such as throw nets, pole nets, slip leashes, muzzles (and tools to repair netting)	2 per team
Strong gauze or bandages for muzzling dogs if needed (do not re-use)	2 rolls per team
Education materials explaining vaccination, rabies symptoms, bite prevention and treatment	100+
Human First-Aid box including soap, water, towels, band aids, cotton wool, bandages, antibacterial cream, antiseptic. Telephone number and directions for a range of suitable clinics or hospitals.	1 per team

2.2 Method for Administering Pre-euthanasia Drugs

The use of pre-euthanasia drugs is strongly recommended to facilitate safe and humane handling of animals prior to euthanasia, particularly if they are fractious, aggressive or fearful. Moreover, the prior administration of suitable pre-euthanasia drugs is highly recommended for some euthanasia agents (such as IH and IP Pentobarbitone) to ensure they are humane.

Please refer to '2.3 Methods for Administering Euthanasia Drugs' for further guidance on when to use pre-euthanasia drugs.

Recommended Drugs: Xylazine (sedative agent) and Ketamine (immobilising agent only thus Ketamine must never be used alone).
Where Ketamine is not available, an alternative anaesthetic agent or combination must be used. In some cases, very heavy sedation with higher dosage of Xylazine is acceptable though this may make intravenous injection difficult. In these cases, intrahepatic injection of pentobarbitone is safe and reasonably rapid.

The pre-euthanasia drugs recommended here require minimal animal handling during their administration as they are usually given as an intramuscular injection (unless contraindicated by the manufacturer). Most other pre-euthanasia agents, however, will require intravenous administration.
Note: The use of these drugs can add significantly to the time taken to perform euthanasia and this should be considered in advance to safeguard animal welfare.

Steps

1. Capture and handling

Secure the dog (using a net or lead with muzzle) ready for drug administration according to the guide Dog Capture and Handling. If the dog is aggressive, watch it carefully and attempt to capture it using a net once it has calmed down.

2. Determine dose rate

Where possible, weigh the dog to determine the dose rate. If this is not possible, experienced personnel may be able to estimate the weight of the dog.

Heavily sedate the dog using a mixture of Xylazine 20mg/ml & Ketamine 100mg/ml in a 1:1 solution and then administer according to the dose rates according to Table 3.

Table 3
Xylazine (2mg/kg) + Ketamine (10mg/kg):

Weight (Kg)	Xylazine 20mg/ml	Ketamine 100mg/ml
1	0.1ml	0.1ml
5	0.5ml	0.5ml
10	1.0ml	1.0ml
15	1.5ml	1.5ml
20	2.0ml	2.0ml

For example: For a 10kg dog draw up 1ml of Xylazine and 1ml of Ketamine into the same 3ml syringe with a 22G needle attached.

3. Administer pre-euthanasia drug

Administer the injection intramuscularly either in the rear leg or back (through the net if the dog is being restrained in this way). Insert the needle exactly perpendicular to the skin. **Note:** The Ketamine does unavoidably sting on injection. Xylazine may induce some vomiting.

Risk: Rear leg injection risks damaging the sciatic nerve and leg bones. To avoid this, use experienced injectors only using a short needle injecting in the cranial (forward) muscles of the upper hind leg.

4. Confirm sedation

Wait 10 minutes until the dog is sedated. If more sedation is needed, then give another 1/2 dose intramuscularly. Do not release from the net until absolutely sure the animal is heavily sedated.

5. Proceed with euthanasia drug – refer to '2.3 Methods for Administering Euthanasia Drugs'.

2.3 Methods for Administering Euthanasia Drugs

UNACCEPTABLE METHODS include: Poisoning (Strychnine & Cyanide), Electrocution, Decompression, Gassing, Hanging, Drowning, Shooting

Pentobarbitone solution (sometimes called Pentobarbitone sodium or sodium pentobarbital) is a barbiturate specifically formulated for euthanasia. The types of pentobarbitone that you use will depend on what is available and registered in your country (Nembutal is commonly used).

Intravenous (IV) injection of 20% Pentobarbitone solution at the rate of 150mg /kg is considered **'best practice'** because it consistently produces a humane death when used as the sole means of euthanasia.

RECOMMENDED: Intravenous (IV) injection of 20% Pentobarbitone solution

Table 4

Method	Remarks	Use of Pre-euthanasia drugs
Intravenous (IV) injection of 20% Pentobarbitone solution Barbiturate (e.g. Nembutal)	• Rapid acting • Rapid loss of consciousness, followed by cardiac arrest • No distressing side effects • Requires simple training and practice • Relatively cheap • Not licensed for use in all countries. Permit required in some. • Cost and availability may vary from country to country • Sodium Pentobarbitone causes circulatory collapse, respiratory arrest and cerebral death. Combinations of high concentrations of barbiturate with a local anaesthetic may also be available and suitable if given intravenously as a euthanasia agent	• Light sedation highly recommended, unless very experienced vet is administering euthanasia drug. • Heavier sedation or full anaesthesia if dog is fearful, fractious or aggressive

Table 5 Dosages of Pentobarbitone IV (e.g. Nembutal) IV (150mg/kg)

Weight (Kg)	Nembutal (ml) (Strength)	
	50mg / ml	*100mg / ml*
1	3ml	1.5ml
5	15ml	7.5 ml
10	30ml	15ml
15	45ml	22.5ml
20	60ml	30ml

** Dosage for other drugs: As per manufacturers' instructions*

ACCEPTABLE

The following methods also produce a humane death when used as the sole means of euthanasia. However, there are practical limitations to their use (see table).

- Intrahepatic (IH) or intraperitoneal (IP) injection may be practical alternatives when IV injection is difficult due to collapsed or poor venous access precluding IV injection, or in fractious dogs. IH is preferable as it is quicker acting and easier than IP.
- Intravenous (IV) injection of anaesthetic agents, given as an overdose, may be suitable if animals are already anaesthetised for surgery and, on humane grounds, not permitted to regain consciousness.

Table 6

Method	Remarks	Dosage	Use of Pre-euthanasia drugs
Intrahepatic (IH) injection of 20 Pentobarbitone solution Barbiturate (e.g. Nembutal)	• Use when IV is difficult • Quicker and easier than IP • Takes longer to take effect than IV injection: 5-10 minutes (dependent upon the size of the dog) • A larger dose may be required than if given intravenously • Can be combined with local anaesthetic to reduce risk of irritation • Requires simple training (done with dog on back or on side).	300mg/ml (i.e. Twice the IV dosage)	Yes always, unless the dog is unconscious
Intraperitoneal (IP) injection of 20% Pentobarbitone solution Barbiturate (e.g. Nembutal)	• Use when IV is difficult • Slow acting • Takes 15-30 minutes to take effect (dependent upon the size of the dog) • A larger dose may be required than if given intravenously • May not be suitable for the euthanasia of larger animals • The use of pre-euthanasia drugs may prolong the time until death • May cause irritation to the peritoneum, particularly with	300mg/ml (i.e. Twice the IV dosage)	Yes always unless the dog is unconscious

	concentrations >20% • Can be combined with a local anaesthetic to reduce risk of irritation		
Intravenous (IV) injection of anesthetic agents, given as overdose (e.g. Thiopentone or Propofol; Thiobarbiturate or Phenol compound)	• Rapid acting • Rapid loss of consciousness • Relatively large volumes or high concentrations required to euthanase animals, potentially making it impractical for routine use depending upon the commercial availability of the preparation • Under-dosing may lead to recovery • May be used in combination with a pre-euthanasia drug if required • Requires training • Cost may preclude routine use	Given to effect (i.e. signs of death are evident)	Not unless the dog is fractious

2.3 Methods for Administering Euthanasia Drugs

2.3.1 Method for Intravenous (IV) Injection of Pentobarbitone

A minimum of two people are required for intravenous injections: one person to restrain the animal safely and humanely (referred to hereafter as 'the assistant'), and the second to accurately deliver the intravenous injection for euthanasia (referred to hereafter as the 'operator').

Steps

1. Assess the dog's temperament and ease of handling

Dogs that are not used to being handled by humans may experience fear when placed in novel surroundings. Any dogs that are likely to be aggressive or difficult to handle may pose a risk to personnel. In these instances it is both more humane and safer for these animals to be sedated prior to euthanasia, see 'Pre-euthanasia drugs' in this guide.

Some nervous and aggressive dogs may require muzzling to avoid danger to handlers. If no muzzle is available, a bandage tied around the dog's nose and then behind the head (also known as a tape muzzle) can work in the short term (see guide Dog Capture and Handling).

2. Determine dose rate

Where possible, weigh the dog to determine the dose rate. If this is not possible, experienced personnel may be able to estimate the weight of the dog. Determine the dose of Pentobarbitone according to the table above or manufacturer's instructions.

3. Fill the syringe

i. Attach a new, disposable needle to the nozzle of a new, disposable syringe, and then insert into the bottle containing Pentobarbitone for filling. Also have another syringe at hand in case an error occurs in injecting.
ii. To prevent a vacuum forming in the bottle, it is advisable to first inject an amount of air equal to the volume of drug to be used into the bottle.
iii. Fill the syringe with the correct dose.
iv. Remove the needle and syringe from the bottle and replace the cap on the needle for safety.

4. Correct handling and restraint

(Also see guide Dog Capture and Handling, and Vaccination Protocol in the guide Vaccination Day)

When an examination table is available:

- Gently lift the animal on to the examination table Large or difficult dogs may require more than or handler for restraint.
- Where possible the animal should be in the sittir or lying position.
- The dog should be facing the operator who will be giving the intravenous injection.
- If the operator is right handed, the assistant shou stand on the animal's left. The assistants' arm passes over the back of the dog and the other arm holds it under the chin.

(Source: Washington State University, 2014)

When an examination table is NOT available:

a. Normal conditions (Pre-euthanasia drugs not given – placid sick animal posing no danger to handler)

If the owner/carer is willing to be present, it is preferable f them to hold the dog as the dog will trust them (they will nee to be instructed on how to hold the animal).

In most cases the owner will not wish to be present. The assistan and operator should be calm and reassure the animal, working deliberately but not in a rushed panicky way as the dog will sen it. Dogs should be held firmly but not so tightly that it becomes uncomfortable.

(Source: WSPA, n.d.)

5. Prepare site of injection: Cephalic vein

The cephalic vein in the dog's foreleg is the most convenient site for intravenous injection. When the animal is held correctly the cephalic vein is visible on top of the foreleg. It is usually very helpful to clip a small amount of hair on the foreleg where the injection is to be given.

(Source: WSPA, n.d.)

6. Prepare for the injection

i. The image shows the correct method for holding the leg for injecting. The operator is right-handed and the assistant stands to the side of the dog, and uses their thumb to raise the cephalic vein, enabling the operator to insert the needle.

(Source: WSPA, n.d.)

A: Shaved area exposing cephalic vein
B: Raised cephalic vein
C: 'Crook' of the elbow
D: The assistant's thumb and forefinger creates a tourniquet effect. The thumb is rotated outward slightly to raise the vein.

ii. Insert the point of the needle gently through the skin and up into the vein, parallel to the skin surface. (Place the bevel of the syringe against the animal's skin).

iii. Before injecting the Pentobarbitone, it is essential to confirm that the needle is correctly positioned in the vein. In large dogs blood will flow naturally back into the liquid within the syringe. In small dogs you may need to draw the plunger back slightly: if positioned correctly blood should flow back into the syringe.

iv. When the needle is correctly positioned, the assistant needs to release their thumb pressure so that the intravenous injection can be given steadily.

8. Ensuring the injection has been delivered

Inject the dose with care ensuring that the needle remains in the vein. Injection into the surrounding tissues is rare but possible especially if the needle is accidentally moved during injection, and causes swelling around the vein and possible pain and irritation to the dog. Should this occur the procedure should be stopped, the syringe and needle removed and a new attempt made at a different position on the vein or using the vein on the other foreleg.

If the dosage and delivery is correct, the dog will normally become unconscious before the end of the injection and death follows almost immediately with complete freedom from pain or distress.

9. Confirm death

(Source: WSPA, n.d.)

Confirm death using the indicators stated in the 'Introduction' of this guide.

Note: If there is any doubt, operators can wait for rigor mortis to set in before disposing of the dog's carcass (BUT this can take several hours and varies with size of the dog).

2.3.2 Method for Intrahepatic (IH) Injection of Pentobarbitone

Note: When injected into the liver, the absorption rate is faster than intraperitoneal but requires anatomical knowledge.

Steps

1. Administer pre-euthanasia drugs

Pre-euthanasia drugs must be administered before the IH injection. See '2.2 Method for Administering Pre-euthanasia Drugs'.

2. Dose rate of euthanasia drug

Where possible, weigh the dog to determine the dose rate. If this is not possible, experienced personnel may be able to estimate the weight of the dog. Determine the dose of Pentobarbitone according to the entry for intrahepatic dosage in the table above or manufacturer's instructions.

3. Filling the syringe

i. Attach a new, disposable needle to the nozzle of a new, disposable syringe, and then insert into the bottle containing Pentobarbitone for filling. Also have another syringe at hand in case an error occurs in injecting.
ii. To prevent a vacuum forming in the bottle, it is advisable to first inject an amount of air equal to the volume of drug to be used into the bottle.
iii. Fill the syringe with the correct dose.
iv. Remove the needle and syringe from the bottle and replace the cap on the needle for safety.

4. Positioning of dog

Gently lift the anaesthetised animal on to an examination table (if available). Place the dog in lateral recumbency (on the right side).

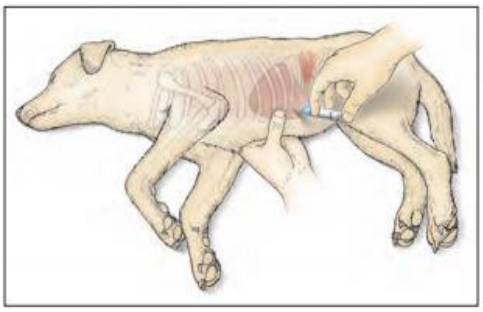
5. Site of injection

Palpate the liver behind the diaphragm and then inject via the abdominal wall into the liver lobes itself.

6. Confirm death

The drug will take effect in 5 to10 minutes. Confirm death using the indicators stated in '1. Introduction'.

Note: If there is any doubt, operators can wait for rigor mortis to set in (this can take several hours and varies with size of the dog) before disposing of the dog's carcass.



(Source: AVMA, 2013)

2.3.3 Method for Intraperitoneal (IP) Injection of Pentobarbitone

Steps

1. Administer pre-euthanasia drugs

Pre-euthanasia drugs must be administered before the IP injection. See '2.2 Pre-euthanasia Drugs'.

2. Dose rate of euthanasia drug

Where possible, weigh the dog to determine the dose rate. If this is not possible, experienced personnel may be able to estimate the weight of the dog. Determine the dose of Pentobarbitone according to the entry for intrahepatic dosage in the table above or manufacturer's instructions.

3. Filling the syringe

i. Select an appropriate gauge and length of needle depending on the size of the animal.

ii. Attach a new, disposable needle to the nozzle of a new, disposable syringe, and then insert into the bottle containing Pentobarbitone for filling. Also have another syringe at hand in case an error occurs in injecting.
iii. To prevent a vacuum forming in the bottle, it is advisable to first inject an amount of air equal to the volume of drug to be used into the bottle.
iv. Fill the syringe with the correct dose.
v. Remove the needle and syringe from the bottle and replace the cap on the needle for safety.

4. Handling and restraint

Restrain the anaesthetised animal in dorsal (on its back) or lateral recumbency (on its side) and elevate animal's hind legs 10 to 15 cm higher than front legs.

5. Site of injection

Insert the needle midway between umbilical and pelvic area just lateral to the mid line (linea alba). Before injecting draw back and observe for blood, urine, or any other fluid entering into the syringe. If there is nothing aspirated inject the drug into the peritoneal cavity.

6. Confirm death

The drug will take 15–30 minutes to take effect (dependent upon the size of the dog). Confirm death using the indicators stated in '1. Introduction'.
Note: If there is any doubt, operators can wait for rigor mortis to set in (this can take several hours and varies with size of the dog) before disposing of the dog's carcass.

2.4 Carcass Disposal

- No animal should be disposed of until death is verified.
- Disposal should take into account local and/or national regulations, including those on disease control and drug residues.

Handling: Special precautions should be taken when handling the carcass of any animal suspected of carrying rabies, including the use of protective clothing as detailed in '1. Introduction'.

Disposal: The carcass should be sealed in a plastic bag, as the external surfaces of the carcass can remain infective for several hours after death, and the internal organs can remain infective for several weeks depending upon environmental temperature. Because of this, and possible drug residues, burial is not recommended. Incineration is recommended when using pentobarbitone (in any form).

Testing: National or local regulations should require that the head or a sample of brain tissue are sent to a public health authority laboratory for testing and surveillance. Extreme care should be taken when cutting any rabid or highly suspect rabid dog with use of full protective clothing and thorough disinfecting of the area post procedure.

2.5 Record keeping

Complete a Euthanasia Form and a Disease Surveillance Form and send these to the local authorities. When Rapid Response is involved, also complete the Rabies Rapid Response and Sample Submission Form.

3. Management of Controlled Veterinary Medicines

Reporting and recording of use of medicines must be done on a daily basis.

The practice of euthanasia uses veterinary medicines that are controlled to avoid any misuse in the field. Controlled medicines include:

- Pentobarbital (e.g. Nembutal, Lethobarb, Valabarb)
- Ketamine
- Xylazine (in some countries)

It is good practice for controlled drugs to be kept separate from other medicines.

All controlled veterinary drugs need to be under the management of a veterinary surgeon at all times as appropriate for the legal requirements of the country. They need to ensure that the drugs are kept in a locked container, which is constructed and maintained to prevent unauthorised access to the drugs and can only be opened by a veterinary surgeon or other persons authorised by her/him.

The veterinary surgeon must keep a Controlled Drug Register (as appropriate for the legal requirements for the country) which must include the following:

- a separate page for each veterinary drug
- entries made at the time of the transaction
- entries made in ink or in a computerised form in which every entry is capable of being audited
- no cancellations, obliterations or alterations; corrections must be made by a signed and dated entry in the margin or at the bottom of the page
- be kept at the premises to which it relates and be available for inspection at any time. A separate register must be kept for each set of premises
- not be used for any other purpose.

For each controlled drug **purchased and received** the following details as a minimum must be recorded in the Register:

- Date & quantity received
- Name and address of sender

For each controlled drug **supplied/used** the following details must be recorded in the Register:

- Date supplied and then used
- Name/address of person supplied
- Quantity supplied/used
- Reason for use of drug

When the Rapid Response teams take these drugs for dog euthanasia, they should be transported in a lockable bag, box or case which should be kept locked when not in use. Storing in a locked car alone does not meet regulations.

- It is good practice for the locked bag not to be left unattended in a vehicle for any length of time (or left in the sun for any period, to prevent deterioration).
- Each veterinary surgeon is responsible for the receipt and supply of controlled drugs from their own bag and a separate Controlled Drugs Register must be maintained.
- All controlled veterinary medicines should be signed in and out daily.

References

AVMA (2013). AVMA Guidelines for the Euthanasia of Animals: 2013 Edition. Retrieved from https://www.avma.org/kb/policies/documents/euthanasia.pdf.

Washington State University, College of Veterinary Medicine. 'Handling, Restraint and Physical Examination of Dogs and Cats'. Retrieved from http://www.vetmed.wsu.edu/resources/restraint/ (Last accessed: 23 September, 2014).

World Animal Protection (2014). 'World Animal Protection Policy Principles: Euthanasia'. Unpublished document.

World Society for the Protection of Animals (WSPA) (Africa), 'Animal Welfare Aspects: Rabies Elimination Project, Kwa-Zulu Natal'. Unpublished document.

World Organisation for Animal Health (OIE), (2014). Terrestrial Animal Health Code, Chapter 7.7. Retrieved from http://web.oie.int/eng/normes/mcode/en_chapitre_1.7.7.htm (Last accessed: 23 September 2014)

Annex: Criteria for Euthanasia Unrelated to Rabies

Injured dogs, dogs with incurable illness, and dogs with prolonged suffering:

- Dogs suffering from broken vertebrae so that they cannot stand, cannot control urination, defecation or walk on all four limbs without significant pain and suffering.
- Roaming / outdoor dogs with bone injuries (legs or jaw). If the owner is available, then the owner must guarantee responsibility for taking the dog to a competent veterinarian to be diagnosed, treated, or to have the infected limb amputated, if necessary. If the owner cannot guarantee responsibility, then euthanasia must be performed.
- Roaming / outdoor dogs missing one part of the body and the wound has attracted maggots etc. If the owner is available, then the owner must guarantee responsibility to provide proper treatments. If no guarantee can be made, then euthanasia must be performed.
- Roaming / outdoor dogs suffering from severe acute or chronic skin diseases (hemorrhage, major hair loss and itching). If an owner is available, then the owner must guarantee responsibility to provide repeated treatments with ivermectin (if a parasitic infection) and to follow proper medication instruction from a veterinarian. If no guarantee can be made or if severe underlying disease is diagnosed, then euthanasia must be performed.

Animals suffering from infectious diseases:

- Parvovirus suspects
- Distemper suspects

Euthanasia of a healthy animal may be justified in circumstances where the animal presents a significant risk to human health and safety, or the safety of other animals and all alternative options have been considered (World Animal Protection, 2014).

Ministry of Agriculture, Republic of Indonesia

Food and Agriculture Organization of the United Nations

Rabies Vaccination Worksheet

Date: .../.../...... (dd-mm-yy)

Province....................... District................................ Sub-district...................................

Village................................ Sub-village (optional).........................

Type of Rabies Vaccine Used

Vaccine Name	Batch No.	Expired date (mm-yyyy)	Used doses	Remaining doses

Vaccinated Dogs

ADULT dogs					PUPPIES *(under 3 months old)*				
Vax no.	Inside	Outside	Owned		Vax no.	Inside	Outside	Owned	
			Yes (include owner's name)	No				Yes (include owner's name)	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No
			Yes	No				Yes	No

Other vaccinated animals

Cats *(tally)*	Monkeys *(tally)*