CHAPTER 7.7.

DOG POPULATION MANAGEMENT

Article 7.7.1.

Introduction

Dog Population Management (DPM) refers to the holistic approach that aims to improve the welfare of dogs, reduce problems they may present and create harmonious co-existence with people and their environment. Dogs are present in every human society around the world and are valued for the range of roles they fulfil. However, they can present public health and safety, and animal health and *animal welfare* issues, especially when free to roam.

DPM supports effective and sustainable rabies control programmes and the control of other zoonoses. Recognising that mass culling of dogs is ineffective and may be counterproductive, reducing dog population size is not an effective means of reducing rabies *prevalence*. However, DPM can contribute to rabies control by reducing population turnover, therefore supporting maintenance of herd immunity within a vaccinated dog population. The components of population turnover most relevant for rabies control are the reduction in the birth of puppies that would be at risk of remaining unvaccinated and the improvement of welfare and life expectancy of vaccinated dogs.

Reproduction control as part of DPM also reduces breeding behaviours which may increase the *risk* of rabies transmission due to increased contact rates between dogs.

Promotion of *responsible dog ownership* as part of DPM strengthens owner motivation, knowledge and therefore behaviour in caring for their dogs, including timely rabies *vaccination* of *owned dogs* to maintain immunity.

It is important to manage dog populations without compromising *animal welfare*, in accordance with Chapter 7.1.

Article 7.7.2.

Definitions

For the purpose of this chapter the following definitions apply:

Dog Population Management programme means a combination of measures that enhance the care of dogs and influence dog population dynamics to sustainably improve dog health and welfare, public health and safety, and the environment, while taking into consideration related economic benefits and costs.

Rabies means dog-mediated rabies.

Article 7.7.3.

Scope

The scope of this chapter is to provide recommendations for the management of dog (*Canis lupus familiaris*) populations to improve human health and safety, animal health and *animal welfare* and to minimise their potential negative socio-economic and environmental impacts. The recommendations will also assist Members in the implementation of dog-mediated zoonotic disease control programmes, in particular *infection* with rabies virus, in accordance with Chapter 1.1.

Article 7.7.4.

Guiding principles

Building upon the guiding principles described in Chapter 7.1., the following apply:

– DPM has direct benefits to public health and safety, and to animal health and welfare.

– Dogs are a domesticated species and therefore dependent on human communities, thus there is an ethical responsibility to ensure their health and welfare even in the absence of ownership.

– Recognising the diversity of stakeholders in the management of dog populations, it is crucial to clarify roles and responsibilities.

– Dog ecology is linked with human activities. Therefore, effective management of dog populations should be accompanied by changes in human behaviour, including promotion of *responsible dog ownership*.

– Acknowledging that the *owned dog* population is a common source of *free-roaming dogs*, DPM programmes should consider all dogs.

– Understanding local dog population dynamics and community attitudes is a key element in determining whether and how DPM programmes might contribute to rabies control and which tools would be most successful.

– Considering that sources and drivers of *free-roaming dogs* and management goals differ across communities, DPM should be individually tailored to local and national contexts.

– DPM programmes should be designed to be sustainable, aligned with legislative requirements, evaluated and adaptable.

Article 7.7.5.

Dog Population Management programme objectives

DPM programmes may include the following objectives:

– promote and establish *responsible dog ownership*, in accordance with Article 7.7.17.;

– improve health and welfare of dog populations;

– reduce the number of *free-roaming dogs*;

– stabilise the dog population by reducing turnover;

– reduce *risks* to public health and safety including dog bites, traffic accidents, and zoonotic diseases such as rabies, leishmaniosis and echinococcosis;

– contribute towards eradicating dog-mediated human rabies;

– reduce nuisance caused by *free-roaming dogs*;

– prevent harm to livestock and other animals;

– prevent illegal trade and trafficking of dogs.

Article 7.7.6.

Roles and responsibilities

As a cross-sectoral subject, DPM requires a high level of engagement and collaboration among *Competent Authorities* responsible for animal health and welfare, food safety, public health and environment, in line with the One Health approach.

DPM activities performed by *Veterinary Services* or relevant *Competent Authorities* should be integrated, to the greatest extent possible, with the activities of all other responsible agencies.

Articles 7.7.7.and 7.7.8.describe the roles and responsibilities of different organisations in the development of DPM programmes, at the local and national levels.

Article 7.7.7.

Competent Authority for Dog Population Management

The development of DPM occurs at the local level through specific DPM programmes, whose success requires a supportive and enabling environment created by the *Competent Authority* at the national level. As DPM is relevant to several governmental agencies and various stakeholders, a multi-sectorial group should establish governance and coordinate actions across relevant stakeholders, governmental agencies and programmes, including those focusing on zoonotic diseases where dogs play a role, such as rabies.

1. Governance

   DPM is the responsibility of a *Competent Authority*, which may be the *Veterinary Authority*. A national action plan provides the details of actions which support the implementation of DPM programmes and coordinate with other action plans, such as those focused on dog-related zoonoses. These plans are led by this *Competent Authority* and developed in collaboration with the multi-sectorial group.

2. Legislation

   Implementation of DPM programmes requires the support of a suitable regulatory framework (see Article 7.7.9.). Further secondary regulations provide customisations to suit local requirements.

3. Enforcement

   The *Competent Authority* can support enforcement of legislation through guidelines on enforcement procedures/practices, training and funding of enforcement agencies, and defining penalties.

4. Funding

   To establish sustainable DPM with long-lasting impacts, the *Competent Authority* and multi-sectorial group should establish a policy and legislative basis for sufficient funding of national action plans and DPM programmes. The One Health concept strengthens the argument for increasing the priority of DPM across the animal health, environmental and public health sectors.

5. Training and support

   To support DPM programmes, the relevant *Competent Authority* should lead on the training of professionals, including *veterinarians*, and ensure they have access to appropriate *veterinary medicinal products* for the implementation of DPM measures. The *Competent Authority* should support DPM through national level communication and education initiatives.

Article 7.7.8.

Other organisations and actors involved in Dog Population Management

The following may have a role in the development of DPM programmes:

1. Veterinary Authority

   The *Veterinary Authority* plays a lead role in preventing zoonotic diseases and ensuring *animal welfare* and should be involved in DPM, coordinating its activities with other relevant *Competent Authorities*.

2. Veterinary Services

   Veterinary Services should play an active role and coordinate their activities with relevant *Competent Authorities* or, and may be responsible for the organisation, implementation and supervision of DPM programmes.

3. Other governmental agencies

   The responsibilities of other governmental agencies will depend on the *risk* being managed and the objective or nature of the DPM measures implemented.

   a) Public health

      Governmental agencies responsible for public health usually play a leadership role and may have legislative authority in dealing with zoonotic diseases and regarding other human health *risks* (e.g. *free-roaming dogs* on roads; dog bites).

b) Environmental protection

Environmental protection agencies may take responsibility for problems associated with *free-roaming dogs* when they present a *hazard* to the environment (e.g. control of dogs in national parks; prevention of predation on *wildlife* or transmission of diseases to *wildlife*) or where a lack of environmental controls encourage dogs to roam.

c) Education

Governmental agencies responsible for education may play a key role in promoting *responsible dog ownership* and dog bite prevention programmes in schools.

d) Local authorities

In many countries, local authorities are responsible for the implementation of DPM programmes and the enforcement of legislation relating to dog ownership (e.g. *registration*, identification, *vaccination*, leash laws, animal abandonment). This should be done with the support and enabling environment created by the *Competent Authority*.

4. Civil Society

The responsibilities of civil society stakeholders will depend on their involvement with the DPM measures implemented.

a) Dog owners

When a person takes on the ownership of a dog, there should be an immediate acceptance of responsibility for that dog, and for any offspring it may produce, for the duration of its life or until a subsequent owner is found. The owner's responsibilities should include providing for the health and welfare of the dog and mitigating negative impacts on public health and the environment, in accordance with Article 7.7.17.

b) Dog breeders and sellers

Dog breeders and sellers have the same responsibilities as dog owners and in addition should comply with the recommendations, in accordance with Article 7.7.15.

5. Advisory group

The development of DPM programmes and a national action plan should also benefit from the support of advisory groups, which should include *veterinarians*, experts in dog ecology, dog behaviour and zoonotic diseases, and representatives of relevant stakeholders (local authorities, public health services or authorities, environmental control services or authorities, non-governmental organisations and the public).

Article 7.7.9.

Regulatory framework

Legislation that addresses DPM is a key element for the sustainability and efficiency of DPM programmes. It ensures that DPM programmes are carried out with respect to *animal welfare* guiding principles (see Chapter 7.1.).

Regulations related to the following areas may support successful DPM programmes; these may be found in a DPM regulatory framework or other regulatory frameworks:

– owners' obligations regarding the principles of *responsible dog ownership*, including *animal welfare*;
– *animal welfare* obligations of authorities;
– *registration* and identification of dogs in an *animal identification system*;
– *registration*, or authorisation and licensing of dog breeders and sellers;
– *registration*, or authorisation and licensing of dog shelters, rehoming centres and holding facilities;
– licensing of *veterinarians*;
– licensing preparation, use and sale of *veterinary medicinal products*;
– preventive measures against rabies and other zoonotic diseases;
– dog movements and trade at international and national levels;
– waste management.

This regulatory framework must be designed with both incentive measures for compliance and penalties for non-compliance and should be adapted to the national context.

Article 7.7.10.

Evidence-based DPM programme development

Development of DPM programmes should include an initial assessment and ongoing adaptation based on continued monitoring and evaluation using objective methods. This evidence-based approach improves programme effectiveness and informs responses to changes in the wider context that influence dog population dynamics.

Recognising the different needs of communities and the multi-sectorial roles in DPM, it should be conducted with the involvement of advisory groups and relevant authorities.

Competent Authorities, in collaboration with the multi-sectoral group, should support evidence-based DPM programmes by:

– identifying qualified personnel and developing training and tools to help with implementing data collection (assessment and *monitoring*) and use (planning and evaluation);

– ensuring the budget of DPM programmes includes not only the costs for the initial assessment but also for *monitoring* and evaluation activities;

– establishing standardised indicators with feasible and repeatable methods of measurement that can be used across locations and over time, to support subsequent evaluations and compare performance between different DPM programmes. It should be expected that DPM programmes will also use and benefit from their own context-specific indicators and methods of measurement;

– encouraging the use of *monitoring* data for evaluation, learning and subsequent amendments of DPM programmes.

Article 7.7.11.

DPM programme assessment and planning

The initial DPM programme development stages of assessment and planning should provide the evidence required for planning and include:

1) Review of the current regulatory framework and evaluation of the efficiency and effectiveness of DPM control measures used historically and currently.

2) Identification of the priority issues related to dogs from the perspective of all relevant stakeholders. The resolution of these issues will form the objectives of DPM programmes. Establishing baselines and *monitoring* methods for indicators reflecting each objective allows for later evaluation of efficiency and effectiveness. Identifying which dogs are associated with the priority issues may include *owned dogs*.

3) Exploration of dog population dynamics in the whole dog population (not limited to the current *free-roaming dog* population) to identify the sources of *free-roaming dogs*:

   – *owned dogs* that roam freely;

   – dogs that have been lost or abandoned, including puppies resulting from uncontrolled breeding of *owned dogs*;

   – unowned dogs that roam freely and reproduce.

4) Identification of people's knowledge, attitudes and practices regarding dog care and responsibility for *owned dogs* and unowned dogs. Citizens' attitudes towards potential control measures should also be explored. This information can be used to ensure the acceptability of the DPM programme to local communities and its effectiveness at changing human behaviours.

5) Estimation of dog population size and demography. Dog population size estimates can help with planning DPM programmes. Accuracy of estimates is typically improved with more time-consuming methods and greater local engagement. Where resources are limited, a rough estimate may be sufficient at the outset. This estimate may be refined by *monitoring* population coverage achieved by the implementation of measures and comparing this to the number of dogs receiving these measures (e.g. rabies *vaccination* and sterilisation in 'Catch, Neuter, Vaccinate and Return') (see Article 7.7.19.).

   For evaluation of DPM programme effectiveness, *monitoring* changes in population trends (e.g. changes in the density of *free-roaming dogs* along routes designed to traverse areas of high *free-roaming dog* density, proportion of lactating females and presence of puppies) may be sufficient, rather than investing in repeated estimates of population size. Methods to estimate population size may also measure demographic factors such as age, sex,

sterilisation and reproductive status (lactation and pregnancy in females) to allow for refinement of estimates to sub-populations of relevance.

Available methods for population size estimates include the following:

a) *Owned dogs*: dog *registration* databases, household questionnaires (to estimate proportion of dog-owning households and mean number of dogs per dog-owning household), post-*vaccination* campaign coverage and animal ownership surveys as part of human census.

b) *Free-roaming owned dogs*: household questionnaires including questions or visible inspection of whether *owned dogs* are confined or allowed to roam unsupervised.

c) All *free-roaming dogs*, including both owned roaming and unowned:

– Direct observation of *free-roaming dogs* during surveys along routes designed to be representative of the area of interest and unbiased with regard to *free-roaming dog* density can provide the mean number of *free-roaming dogs* per km of street surveyed. This can be extrapolated by the estimated total street length within the area of interest to estimate the total number of *free-roaming dogs* on the street at the time of survey; some *free-roaming dogs* will not have been visible during the survey and so this is an underestimate of the total free roaming dog population.

– Mark-resight is a method that aims to estimate population size, considering that not all animals are visible to direct observation on a survey. This is achieved by first marking dogs with temporary marks such as paint, or photographs for individual recognition. The survey can opportunistically make use of marks applied as part of control measures to indicate a dog's treatment status, such as collars or paint applied to identify a dog as vaccinated and ear notches or tags applied under anaesthetic to identify a dog as sterilised during neutering in 'Catch, Neuter, Vaccinate and Return' measures (see Article 7.7.19.). In subsequent surveys, the proportions of marked and unmarked dogs are noted. Mark-resight methods rely on assumptions that may not hold true in dog populations, such as equal resighting probability for marked and unmarked dogs, lack of immigration/emigration and no or measurable mark loss.

  Mark-resight is a relatively resource intensive method when compared with direct observation which may limit the extent of the area that can feasibly be surveyed.

  Mark-resight and direct observation may be done concurrently in a sample of areas to estimate the proportion of *free-roaming dogs* visible during direct observation. This proportion can be used to correct the data regarding those dogs missed during direct observation over a larger geographical area.

Article 7.7.12.

DPM programme monitoring and evaluation

Later stages of DPM programme development should include monitoring and evaluation. *Monitoring* aims to check the progress of DPM programme measures against targets and support performance management. It should allow for regular adjustments of implementation of measures and collection of data on indicators of objectives. It should also include *monitoring* of costs associated with measures and costs or savings relating to objectives, to support cost-benefit analysis.

Evaluation is a periodic assessment of progress using data collected through *monitoring*, usually carried out at milestones to assess whether the DPM programme is achieving the desired objectives and to adapt the DPM programme to improve effectiveness and efficiency. Where methods of *monitoring* are equivalent – clearly defined, repeatable and consistent –, evaluation can compare effectiveness and efficiency across DPM programmes.

Indicators are the measurable results of objectives. Indicators of DPM objectives may include:

– *Owned dog* population size, demographics and whether there is *responsible dog ownership* (can include their *vaccination* status, sterilisation, *registration*, identification, level and method of confinement and how they were acquired).

– *Free-roaming dog* population density, demography (age, sex, sterilisation, lactating females and puppies) and welfare (e.g. body condition score, presence of a skin problem) recorded by direct observation of *free-roaming dogs*.

– *Prevalence* of zoonotic diseases in both the animal and human populations, for example rabies or echinococcosis.

– Knowledge, attitudes and practices of communities relating to the *free-roaming dog* population, and dog owner knowledge, attitudes and practices regarding *responsible dog ownership*.

– Dog population movements from owned to unowned dogs or from confined to *free-roaming dogs* (based on investigations and monitoring).

– Adoption or reuniting facility performance including intake, adoption rates, welfare state of dogs in their care, mortality and *euthanasia* rates.

– Dog bites reported to health centres or number of rabies post-exposure prophylaxis courses provided to exposed individuals, or the cost incurred by the public health authorities for provision of post-exposure prophylaxis.

– Number and nature of complaints about dogs to local government authorities.

– Compensation costs relating to dog-related damage to people, livestock or property.

Article 7.7.13.

Recommendations for DPM measures

A combination of the following measures should be used for a successful DPM programme:

– *registration* and identification of dogs;

– regulation of commercial dog breeding and sale;

– control of national and international (export and import) dog movements;

– promoting *responsible dog ownership*;

– reproductive control;

– 'Catch, Neuter, Vaccinate and Return';

– reuniting and adoption;

– access to veterinary care;

– environmental controls;

– education on safe dog-human interaction.

These recommendations for DPM measures are described in detail in Articles 7.7.14. to 7.7.24. and should be implemented in accordance with the national context and local circumstances.

Article 7.7.14.

Registration and identification of dogs

Outcomes of *registration* and identification of dogs include the following:

– support for the enforcement of legislation through proof of ownership;

– improvement of the success rate in reuniting lost dogs with their owners;

– enabling traceability in commercial breeding and sale;

– encouragement of responsible ownership behaviours;

– support for an animal health programme, e.g. mandatory rabies *vaccination* and traceability.

These outcomes require widespread adoption of *registration* and identification.

Competent Authorities should ensure that an *animal identification system* is established for dog *registration* to allow reuniting of identified dogs with registered owners across the territory. *Competent Authorities* should ensure there is an enforcement system in place with the capacity to deliver appropriate methods of identification to all dogs (such as microchipping or Quick Response tags [QR tags]), read identification when a dog is found (using scanners or other devices) and access the *registration* database to retrieve owner details. Such databases may be developed and operated on a public-private partnership basis.

Owners need to be informed and, under conditions to be defined by *Competent Authorities*, able to access identification services and the *registration* system both initially to enter each dog and to update information when required.

Article 7.7.15.

Regulation of commercial dog breeding and sale

Outcomes of regulating commercial breeding and sale as a DPM measure include:

– protection of dog health and welfare;
– avoidance of abandonment;
– transparency in dog breeding and sales.

Competent Authorities should require mandatory *registration* of all breeders and sellers. For commercial breeders and sellers, where the number of litters produced per year exceeds a threshold set by regulations, a further requirement for licensing may be imposed, including the requirement for inspection before trade can begin.

Advertisements for dog sales should be required to carry the *registration* or licence number of the breeder and seller.

To ensure dog traceability, the breeder should be established through identification and *registration* as the first owner.

The seller should ensure that *registration* details of the dog are updated with those of the first buyer following transfer of ownership.

Regulations of breeding practices should include limits on number of litters, minimum breeding age (to protect the health and welfare of the dam), good health of both parents and avoidance of selective breeding that leads to inherited diseases and extreme conformations. Regulations for both breeders and sellers should also outline specific requirements for accommodation, veterinary care, husbandry, puppy socialisation and habituation to their environment, minimum puppy age before leaving the dam and training of staff. Sales of dogs should be limited to adult buyers, and unregulated sales should be banned.

Article 7.7.16.

Control of national and international (export or import) dog movements

International movements of dogs (import and export) should comply with trade measures, import or export procedures and veterinary certification in accordance with Chapters 5.11., 7.2., 7.3., 7.4.and 1.1.

Movement of dogs within a country should be under the responsibility of the owner, with the following outcomes:
– reducing the *risk* of contagious diseases spread;
– protecting public health and safety;
– protecting *wildlife* and livestock;
– protecting dog *welfare*.

Article 7.7.17.

Promoting responsible dog ownership

1) Owning a dog is a choice and should result in a mutually beneficial relationship. The benefits of dog ownership come with responsibilities. Promoting *responsible dog ownership* through education and enforcement of national and local regulations is a core component of a DPM programme to achieve the following outcomes:
   – improving the health and welfare of dogs;
   – supporting the human-animal bond;
   – minimising the *risk* that dogs pose to household members and the community;
   – reducing the number of dogs allowed to roam.
2) Education on *responsible dog ownership* (for the currently *owned dog* and any offspring it produces for its lifetime or until the responsibility is passed to the next owner) should address the following:
   – provide appropriate care to ensure the welfare of the dog and any offspring according to the dog's five welfare needs (suitable environment, suitable diet, housed with or apart from other animals, ability to exhibit normal behaviour and protection from*pain*, suffering, injury and disease) in order to meet the internationally recognised 'five freedoms' (see point 2 of Article 7.1.2.);

- encourage appropriate behaviours, reducing unwanted behaviours (including dog bites) and supporting the dog's ability to cope with its environment through attention to socialisation and reward-based training and recognition of dog behavioural signs;
- ensure the *registration* and identification of dogs (see Article 7.7.14.);
- ensure access to preventive and therapeutic veterinary care (see Article 7.7.21.);
- prevent negative impacts of dogs on the community, via pollution (e.g. faeces and noise), *risks* to human health through bites or traffic accidents and *risks* to other dogs, *wildlife*, livestock and other companion animal species;
- control dog reproduction (see Article 7.7.18.);
- arrange for dogs to be cared for when the owner is unable to do so.

3) Achieving sustained and widespread responsible ownership requires an understanding of barriers and motivations for responsible behaviour and taking action to address these. This is likely to require a combination of legislation, public awareness and enforcement, behaviour change campaigns, formal education in schools and encouragement through the building of social expectations. It may also be necessary to improve availability and accessibility of resources supporting responsible ownership, such as veterinary care, identification and *registration* services and measures for control of zoonotic diseases.

Article 7.7.18.

Reproductive control

1) Outcomes of controlling reproduction in dogs include the following:
   - preventing the birth of unwanted puppies;
   - helping address the imbalance between reproduction and demand for dogs;
   - reducing the size of the *free-roaming dog* population.
2) Efficient use of reproduction control does not require a limit on overall population size. To ensure best use of resources, focus should be on controlling reproduction of females most likely to be the source of unwanted and *free-roaming dogs*.
3) Methods of controlling reproduction will require direct veterinary input to individual animals. Involvement of both private and public veterinary sectors may be required to meet demand for services. Subsidisation of sterilisation programmes by government or other organisations may be considered to encourage uptake. The control of reproduction in *owned dogs* is essentially the responsibility of owners and should be incorporated in promotion of responsible ownership (see Article 7.7.17.).
4) Methods for controlling reproduction in dogs include:
   - surgical sterilisation;
   - non-surgical fertility control, i.e. the prevention of reproduction without the use of surgery, including chemical and immunological approaches;
   - confinement or separation of female dogs during oestrus from unsterilised males.
5) Surgery has the primary advantage of being permanent. Surgical sterilisation must be carried out by a *veterinarian* and must include good animal handling, good surgical technique, a good standard of asepsis, appropriate anaesthesia and proactive, multi-modal *pain* management maintained throughout and adjusted to the individual animal as needed. This requires *monitoring* during surgery and post-operatively for the whole recovery period. It requires suitably trained *veterinarians* and *veterinary paraprofessionals* and access to appropriate drugs and equipment. *Competent Authorities* are responsible for ensuring access to training and authorised drugs that are not counterfeit, to ensure surgical sterilisation can be performed safely.
6) Castration of male dogs is preferred over vasectomy because, unlike castration, vasectomy does not reduce sex hormone levels and therefore has no mechanism to reduce specific behaviours such as roaming, territory marking and fighting due to hormonal aggression. Females may be surgically sterilised by ovariohysterectomy or ovariectomy. Tubal ligation and hysterectomy are not recommended because the female will be under ovarian hormonal influence and will continue to show sexual behaviour, increasing susceptibility to diseases such as transmissible venereal tumours and pyometra where uterine tissue remains. However, effects of sterilisation on non-hormone related behaviours cannot be generalised; hence, just as with any surgical procedure, the *veterinarian* should use their professional judgement when recommending gonadectomy for individual patients.
7) Any chemicals or drugs used in controlling reproduction should be shown to have appropriate safety, quality and efficacy for the function required and be used in accordance with the manufacturer's recommendations and *Competent Authority*'s regulations. In the case of non-surgical sterilants and contraceptives in the research phase, trials will need to be completed before use.

Article 7.7.19.

'Catch, Neuter, Vaccinate and Return'

'Catch, Neuter, Vaccinate and Return' provides an approach to controlling the reproduction of unowned dogs as a source of *free-roaming dogs*. This is not a stand-alone solution to DPM and must be used in combination with other measures addressing other sources of *free-roaming dogs*. It can be considered a method of managing the current *free-roaming dog* population *in situ* on the streets and hence an alternative to removal for reuniting and adoption (see Article 7.7.20.).

In collaboration with the local community, identified unowned dogs are caught, provided with health care (including rabies *vaccination*), evaluated for adoption and, if adoption is not feasible, sterilised, and released to their local community at or near the place of capture. This method is more likely to be accepted in the situation where the presence of *free-roaming dogs* is widespread and well tolerated by the local community.

This method is not applicable in all situations and may be illegal in countries or regions where legislation prohibits the abandonment of dogs and authorities perceive the release of sterilised dogs as a form of abandonment. Problems caused by dogs, such as noise, faecal pollution, bite injuries and traffic accidents, would not be alleviated as dogs are returned to the local community and their movements are not restricted. Where owners have limited access to affordable reproduction control for their dogs, consideration should be given to the risk that 'Catch, Neuter, Vaccinate and Return' could encourage owners to access free sterilisation by allowing their *owned dogs* to roam. To avoid this risk, promoting *responsible dog ownership* (Article 7.7.17.) and ensuring access to reproduction control for *owned dogs* (Article 7.7.18.) should be implemented alongside 'Catch, Neuter, Vaccinate and Return'. In the situation where many *free-roaming dogs* are owned, a DPM programme that focuses on sterilisation and responsible ownership may be more appropriate.

It is recommended that, before adopting this approach, a cost-benefit analysis is conducted. Factors such as the monetary costs, impact on culture of ownership and public safety should be assessed as well as the benefits for disease control and *animal welfare*, and any societal benefits.

If this measure is implemented, the *Competent Authority* should ensure the following are addressed:

– engaging local communities to understand, support, design and be an active part of 'Catch, Neuter, Vaccinate and Return' activities and *monitoring* of released dogs, in particular in the case of dogs cared for by the community;
– use of humane methods for catching, transporting and holding dogs;
– correct surgical technique with a good standard of asepsis, anaesthesia and analgesia, followed by post-operative care (see Article 7.7.18.);
– disease control may include *vaccination* (e.g. rabies) and treatments and testing for diseases (e.g. leishmaniosis) followed, as appropriate, by treatment or *euthanasia* of the dog;
– 'Catch, Neuter, Vaccinate and Return' is not suitable for all dogs and should be applied on an individual basis. Health assessment and behavioural observation may be used to assess whether dogs are suitable for release; if they are not suitable for release or adoption, *euthanasia* should be considered;
– permanent marking (e.g. tattoo or microchip) to indicate that the animal has been sterilised; individual identification also allows for tracking of *vaccination* status and treatment history. A visible form of identification (e.g. collar, tag or ear notch) may also be used to prevent unnecessary recapture. As with surgical sterilisation, the same principles of asepsis, anaesthesia and multi-modal *pain* management are relevant to the application of tags and notches because these are also surgical procedures. *Monitoring* of released dogs should include issues of mark loss, *infection* and *infestation*;
– the dog should be returned to a place that is as near as possible to the place of capture;
– the behaviour and welfare of dogs after release should be monitored and action taken if required.

Article 7.7.20.

Reuniting and adoption

Free-roaming dogs can be removed to housing facilities for reuniting with their owners, or adopted. This addresses only the current free-roaming population and not the source of these dogs, hence must be used in combination with other measures to prevent replacement of removed dogs. These facilities can also offer the option for owners to relinquish dogs they can no longer care for, as an alternative to abandonment. Evidence collected about dogs and dog owner practices during DPM programme development must confirm that reuniting and adoption are probable and achievable before developing reuniting and adoption facilities. Without sufficient adoptive homes or systems for reuniting, facilities quickly fill to capacity, creating an ineffective and expensive measure. The *Competent Authority* should establish and

enforce regulations for facilities providing reuniting and rehoming services to ensure capture, transport and holding of dogs are done humanely.

Dogs that are removed from a community may be reunited with the owner or adopted. There should be provision for holding the dogs for a reasonable period to allow for reuniting with the owner and, as appropriate, for rabies observation. Reuniting and adoption provide an opportunity to promote responsible ownership and good animal health care (including rabies *vaccination* and sterilisation). The suitability of dogs should be assessed and matched with available owners. The effectiveness of adoption may be limited by the number of adoptive homes.

Efforts should be made to transport animals for the shortest distance and least amount of time possible. Relocation for adoption should first be considered locally, then expanded to the nearest available locations. This minimises the stress associated with transportation of dogs and reduces the risk of spreading zoonotic or other pathogens to new areas. If transport is needed, it should be done in accordance with Chapter 7.1.

Dogs that are removed from a community may be too numerous or may be unsuitable for adoption. If acceptable to the local community, 'Catch, Neuter, Vaccinate and Return' may provide an alternative approach. If *euthanasia* of these unwanted animals is the only option, the procedure should be conducted in accordance with Article 7.7.27.

Article 7.7.21.

Access to veterinary care

Access to veterinary care positively impacts animal health, *animal welfare* and public health through provision of preventive and therapeutic veterinary care to dogs in a community. Increased interactions with *Veterinary Services* provide additional opportunities to educate dog owners on *responsible dog ownership* (see Article 7.7.17.). From a DPM perspective, the prevention and control of disease, treatment of illness and injury, and *euthanasia* to end suffering where treatment is not feasible potentially reduce abandonment of sick or injured dogs.

Veterinary care should be part of DPM programmes and contribute to disease control by creating healthier populations of dogs with reduced population turnover. Herd immunity for rabies control is supported by DPM through improvement in the survival of vaccinated dogs and reducing birth of unvaccinated puppies through surgical sterilisation. Guidance on implementing dog rabies *vaccination* campaigns is provided in Chapter 1.1.

Preventive veterinary care is central to zoonotic disease control and *surveillance*. DPM programmes should encompass or align with all disease control measures relevant to dogs. This includes rabies *vaccination*, deworming (in particular for *Echinococcus granulosus*) and prevention and control of other pathogens.

Veterinary Services should identify 'at *risk*' populations of dogs that do not have reliable access to basic veterinary care. *Competent Authorities* should facilitate access to veterinary care. Potential solutions may include subsidising costs and organising outreach veterinary services.

Article 7.7.22.

Environmental controls

Actions can be taken to exclude dogs from uncontrolled sources of food (e.g. protecting rubbish dumps and *slaughterhouses/abattoirs* and installing animal-proof rubbish containers). Environmental control should be linked to other DPM measures, to avoid *animal welfare* problems and reduce public health risks from a sudden reduction in food sources.

Article 7.7.23.

Education on safe dog-human interaction

The most effective means of reducing the occurrence of dog bites are education on safe interaction with dogs and owner responsibility for training and managing dogs as part of *responsible dog ownership*. Young children are the group at highest *risk* for dog bites. Public education programmes focussed on appropriate dog-directed behaviour have been demonstrated to be effective in reducing the occurrence of dog bites and these programmes should be encouraged. *Competent Authorities* should seek advice from dog behaviour experts in developing dog safety education programmes.

Education programmes in appropriate bite treatment, including post-exposure prophylaxis where rabies is a risk, are encouraged for all ages.

Article 7.7.24.

Specific considerations for Dog Population Management activities

The following activities may be required as part of the implementation of the DPM measures described in Article 7.7.13.:

– Dog capture and handling;
– Dog housing;
– *Euthanasia*.

Article 7.7.25.

Dog capture and handling

Humane capture and handling aim to prevent animal suffering and *distress*. They can also bring other benefits, including reduced injuries to handlers, easier handling of dogs in future and modelling positive handling to owners and the public.

Competent Authorities should develop appropriate legislation and training to promote humane handling and enforce regulations against cruel methods, such as the use of tongs and uncovered wire loops. *Animal welfare* and operator safety outcomes are improved when the personnel conducting capture and handling have a complete understanding of, and proficiency in, the capture and handling method to be used.

Competent Authorities and *Veterinary Services* should ensure their staff and volunteers expected to handle dogs have received rabies pre-exposure *vaccination* where appropriate and are provided with clear protocols for treating injuries, including dog bites.

The least aversive method of capture and handling should be used to minimise harm and discomfort to the dog, while also considering safety of the handler. Further, handlers should strive to make the handling experience as positive as possible from the perspective of the dog; this includes looking for ways to reward the dog during handling.

Handlers should use minimum *restraint* to provide the dog with opportunities to exert choice and control, so that they cope better with the handling.

Article 7.7.26.

Dog housing

Competent Authorities should develop minimum standards for the housing (physical facilities) and care of dogs by providing a suitable environment, a suitable diet, a house which keeps them with or apart from other animals, allows them to exhibit normal behaviour and provide protection from *pain*, suffering, injury and disease in order to meet the internationally recognised 'five freedoms'. Enforcement of these standards is supported by licensing and inspection of facilities. The following minimum standards should be considered:

1. Facilities
   – sustainable finances to cover ongoing running costs;
   – site selection: access to drainage, waste disposal, water and electricity is essential and environmental factors such as noise and pollution should be considered;
   – kennel size, design and occupancy, taking into account exercise, expected length of stay and sufficient area for dogs to separate the functions of eating or drinking, resting, urinating and defecating, as well as maintaining acceptable environmental temperatures;
   – disease control measures including isolation and *quarantine station*;
   – maximum capacity of the facility.

2. Management

- provision of adequate fresh water and nutritious food;
- regular hygiene and cleaning, including fallowing;
- routine inspection, handling and exercise of the dogs;
- *monitoring* of physical and behavioural health and provision of required veterinary treatments under veterinary supervision, including routine and preventive veterinary care and *euthanasia*;
- policies and procedures to respect the maximum capacity for the facility and action when this is reached, assessment of dog health and behaviour, animal care, intake, treatment, adoption, sterilisation and *euthanasia*;
- provision of sufficient numbers of appropriately skilled staff and training of staff in safe, appropriate and positive handling of dogs;
- record keeping, animal identification and reporting to the *Competent Authority*;
- provision of opportunities for conspecific socialisation, human socialisation, enrichment and locomotory activity as appropriate to the individual.

3. Assessment

Dog housing performance may be assessed using the following measurables:

- body condition score, skin condition, disease *incidence*, injuries and mortality, reaction to humans and conspecifics;
- expression of species-specific behaviours reflecting a positive emotional state;
- housing must provide adequate space appropriate to the age, size, weight and breed of the dog, and allow the dog to engage in normal body movements, including the ability to sit, stand up, turn about freely, or lie recumbent in a natural position, stretch, move their head, hold the tail erect while standing, and comfortably eat, drink, urinate and defecate;
- hygiene, cleaning, drainage and housing materials should prevent an excessive accumulation of faeces and food waste, to prevent soiling of dogs in the enclosure, and reduce disease *hazards*, insects, pests and odours;
- ventilation should allow dogs to maintain normal body temperature comfortably and provide good air quality;
- protection from harmful extremes of temperature, air movement, moisture, light and other climatic elements to ensure proper health and well-being of the dog.

Article 7.7.27.

Euthanasia

Euthanasia of dogs, used alone, is not effective for DPM. If used, it should be done in accordance with Article 7.6.1., and should be implemented in combination with other measures as part of a DPM programme to achieve effective long-term management. Reducing dog population size is not an effective means of reducing the number of rabies cases.

As a process, *euthanasia* involves pre-*euthanasia* and handling procedures, *euthanasia* methods and agents, confirmation of death, and disposal of dead animals. When *euthanasia* is practised, the general principles in the *Terrestrial Code* should be applied, with the emphasis on using practical methods which achieve the most rapid, painless and *distress*-free-death possible while ensuring operator safety. *Euthanasia* should be conducted under the supervision of a *veterinarian*. To ensure *animal welfare* and operator safety, the personnel conducting *euthanasia* should have a complete understanding of, and proficiency in, the *euthanasia* method to be used.

1. Restraint

When a dog needs to be restrained for any procedure, including *euthanasia*, this should always be done with full regard for operator safety and *animal welfare*. Animal handling should also minimise *distress* experienced by the dog prior to loss of consciousness. Some *euthanasia* methods should be used with prior sedation or anaesthesia. Regardless of the *euthanasia* method used, it is advisable to perform pre-*euthanasia* sedation or anaesthesia to minimise anxiety or facilitate safe *restraint*.

2. Euthanasia methods

The following are recommended methods of canine *euthanasia*:

– intravenous barbiturates;
– intraperitoneal barbiturates in small dogs or puppies, to be used only if the intravenous route is not feasible;
– intravenous anaesthetic overdose;
– inhaled anaesthetic overdose in small dogs (not neonates).

If anaesthetised:

– administration of barbiturates by alternative routes (intracardiac, intrarenal, intrahepatic, intraosseous).

If sedated:

– intravenous *euthanasia*-specific formulation of embutramide, chloroquine and lidocaine;
– intravenous *euthanasia*-specific formulation of embutramide, mebezonium and tetracaine.

Methods, procedures and practices that are unacceptable as primary methods of *euthanasia* on *animal welfare* grounds include air embolism, asphyxiation, burning, chloral hydrate, chloroform, cyanide, decompression, drowning, exsanguination, formalin, household products and solvents, pesticides and herbicides, hypothermia, insulin, neuromuscular blocking agents (magnesium sulphate, potassium chloride, nicotine and all curariform agents), manually applied blunt force trauma to the head, rapid freezing, thoracic compression, strychnine, nitrous oxide, ether, kill-trapping, CO from engine fumes, (CO_2) if the required concentration and flow rates are not regulated and monitored, free-bullet without proper anatomical placement at close range by highly trained personnel, penetrating captive bolt followed by pithing, electrocution and *stunning* without a secondary kill method and any other method that could compromise the welfare of the animal.

3. Confirmation of death

For all methods of *euthanasia* used, death should be confirmed before animals are disposed of or left unattended.

A combination of criteria is most reliable in confirming death, including lack of pulse, breathing and corneal reflex, and response to firm toe pinch; inability to hear respiratory sounds and heartbeat by use of a stethoscope; greying of the mucous membranes; and rigor mortis. None of these signs alone, except rigor mortis, confirms death. If an animal is not dead, another method of *euthanasia* should be performed.

4. Disposal of dead animals

Dead animals should be disposed of in a manner that complies with legislation. Attention should be paid to the *risk* of residues occurring in the dead animal. Incineration is generally the safest means of disposing of dead animals (see Chapter 4.13.).

NB: FIRST ADOPTED IN 2009; MOST RECENT UPDATE ADOPTED IN 2024.