

### **National programmes for the control of rabies in dogs:**

Canine rabies can be eliminated, as has been demonstrated in North America, western Europe, Japan and many areas in South America. During the last two decades, a significant reduction in human rabies associated with dog rabies has been achieved in Mexico, South America and the Caribbean by the programme for the elimination of canine rabies initiated and coordinated by the Pan American Health Organization/WHO Regional Office for the Americas. In contrast, over the past two decades rabies has been increasing in parts of sub-Saharan Africa and Asia, attributed to rapidly growing dog populations and increasing urbanization, density and mobility of human populations. However, canine rabies is still widespread, occurring in over 80 countries and territories, which are predominantly in the developing world. In more than 99% of all human rabies cases, the virus is transmitted from dogs; half of the global human population lives in canine rabies-endemic areas and is considered at risk of contracting rabies.

Effective animal vaccines that provide a considerable duration of immunity have been developed and mass parenteral vaccination programmes remain the mainstay of canine rabies control. Dog destruction alone is not effective in rabies control.

The principal challenge is effective delivery of vaccines to ensure adequate vaccination coverage in the reservoir dog population. Studies coordinated by WHO on dog populations have shown that, in many communities in Africa, Latin America and Asia, a substantial proportion (at least 60–75%) of the total dog population is accessible for parenteral immunization. In communities where dogs are less accessible (for example, in areas with large populations of ownerless dogs), oral rabies vaccination may provide a potential supplementary strategy. Vaccination coverage of 70% has been sufficient to control canine rabies in several settings, but the exact level of coverage required is likely to vary according to the demographic, behavioural and spatial characteristics of the dog population.

To ensure effective coverage, vaccination programmes should consider the local ecology of the dog population, involve coordination of related sectors and incorporate culturally appropriate education efforts. Key to the success of campaigns in Latin America has been the central role played by the public health sector as a lead agency and community/involvement/empowerment in rabies control activities.

### **Epidemiological surveillance**

Rabies should be a notifiable disease within national health and veterinary systems. Rabies surveillance is still inadequate in many countries and this deficit should be addressed by national authorities, with the support of international agencies. Rabies can only be reliably diagnosed by laboratory tests and it is strongly recommended that, in countries where diagnostic facilities are inadequate or lacking, laboratory capacity be developed to permit effective rabies surveillance.

Epidemiological data should be collected, processed, analysed and disseminated rapidly between sectors and different administrative levels. Surveillance of rabies is the basis for any programme of rabies control. Veterinary surveillance of rabies and laboratory submission of reports of suspected animal cases is also essential for management of potential human

exposures and for veterinarians to adopt appropriate measures towards animals in contact with a suspected animal case.

The emphasis of surveillance should be on the laboratory confirmation and effective reporting of human and animal rabies cases. Surveillance of areas in which laboratory-confirmed cases in animals are reported should be encouraged. Attempts should be made to isolate viruses for characterization of prevalent strains. This work should be carried out in designated and well-equipped provincial, national or regional laboratories.

Reporting of laboratory-confirmed human rabies cases alone may lead to a severe underestimation of the true number of human cases, resulting in a low priority being given to rabies control. Therefore data on the number of humans suspected as being rabid based on clinical evaluation should also be reported. The number of people seeking and receiving post-exposure prophylaxis should be reported in order to provide additional epidemiological information on disease burden and to evaluate the effectiveness and cost-benefit of rabies control programmes. These data can be compiled from information in the case-record form for human exposure to rabies.

Countries are urged to adopt or establish systems of rabies reporting, especially for the investigation of rabies outbreaks and identification of the rabies virus strains involved, in view of increased international travel and transfer of animals.

### **Canine mass parenteral vaccination campaigns**

Mass canine vaccination campaigns have been the most effective measure for controlling canine rabies. Since the 1980s, national mass canine vaccination campaigns have been conducted generally on an annual basis in Latin America, with high coverage (around 80%) achieved in a short period of time (no more than 1 week). Over the region, approximately 45 million dogs a year have been vaccinated, resulting in significant declines in canine and human rabies. The organization of the campaigns is based on intersectoral collaboration, community participation and strong media support. Three committees (national, subregional and local) have been established to deal with technical and logistical aspects of the campaigns. The success and sustainability of these campaigns in Latin America have been due to political commitment, acquisition and supply of canine vaccines by the ministries of health, free delivery of these vaccines, local-level commitment in the planning and execution of the campaigns and effective coordination and supervision of the campaigns by the health services.

At least 70% of the dog population in each community should be vaccinated in areas where canine rabies is endemic. High vaccination coverage (70% or higher) can be attained through strategies consisting of well-designed educational campaigns, intersectoral cooperation, community participation, local commitment in planning and execution, availability of recognized quality vaccine, media support and effective general coordination and supervision of the activities by the health services.

Rabies vaccination campaigns are generally conducted annually but more frequent campaigns may be required in areas where population birth and death rates are high. All dogs and cats, when presented, should be immunized, regardless of their age, weight or state of health.

Given the high birth rates of many populations, particular attention should be paid to ensuring adequate vaccination coverage of puppies.

In order to apply strategic planning and management, an estimate of the dog population and evaluation of a mass vaccination campaign is required. WHO has produced guidance for estimating dog population size.

For mass parenteral vaccination campaigns, only inactivated and adjuvanted rabies vaccine should be used.

All personnel handling dogs during vaccination campaigns should receive pre-exposure prophylaxis.

Registration and permanent identification of vaccinated dogs is recommended. However, lack of resources or capacity to permanently identify dogs should not prevent the implementation of a vaccination campaign. The use of temporary coloured tags or plastic collars has proven to be useful in identifying vaccinated dogs and provided motivation for owners to take their pets for vaccination. Identification of dogs is necessary to evaluate the vaccination coverage rate, and to identify unvaccinated dogs for supplementary follow-up measures.

Three basic approaches to mass vaccination campaigns have been adopted, either alone or in combination, to control rabies in canine rabies-endemic areas: house-to-house visits, fixed vaccination posts in well-recognized sites within the community, and mobile teams which set up temporary vaccination posts. Experience has shown that such posts are usually sufficiently attended only from distances of less than 500 m or about 10 minutes' walk. The choice of approach will depend on the specific community and the decision should be taken at the local level. Different strategies may be needed in campaigns designed to control infection in residual foci or to contain new outbreaks.

In some countries, e.g. Sri Lanka, parenteral vaccination campaigns have been combined with the follow-up vaccination of unmarked dogs. Humane killing of unvaccinated dogs after mass vaccination campaigns has been used during campaigns in Malaysia, which succeeded in eliminating dog rabies.

### **Dog population management and animal birth control (ABC) programmes**

The Consultation expressed its appreciation of the long-term engagement of WHO to contribute to developing methodologies related to dog ecology and dog population management. Considerable experience has been gained in projects coordinated by WHO in Ecuador, Nepal, Sri Lanka and Tunisia and other ecological studies conducted in South America and Asia. However, data collection needs to be continued in other areas and in countries with different social and ecological conditions.

There is no evidence that removal of dogs alone has ever had a significant impact on dog population densities or the spread of rabies. The population turnover of dogs may be so high that even the highest recorded removal rates (about 15% of the dog population) are easily compensated for by increased survival rates. In addition, dog removal may be unacceptable to

local communities. However, the targeted and humane removal of unvaccinated, ownerless dogs may be effective when used as a supplementary measure to mass vaccination.

Several methods to estimate dog population densities based on questionnaire surveys and capture/mark/re-observe studies are available. The combination of these two methods allows collection of accurate information on the whole dog population and subpopulations, defined in terms of confinement levels or other parameters. Whereas density estimates based on simple capture/mark/re-observe studies using uniform marking (collars and dyes) are usually adequate in rural areas, more complex study designs involving differential or individual marking are recommended in urban and suburban areas in order to compensate for variations in re-observation probability. Questionnaire surveys conducted in the community can be useful where residents recognize the dogs present in their communities.

Three practical methods of dog population management are recognized: movement restriction, habitat control and reproduction control.

Attempts to control dog populations through culling, without alteration of habitat and resource availability, have generally been unsuccessful. Since the 1960s, ABC programmes coupled with rabies vaccination have been advocated as a method to control urban street male and female dog populations and ultimately human rabies in Asia. The rationale is to reduce the dog population turnover as well as the number of dogs susceptible to rabies and limit aspects of male dog behaviour (such as dispersal and fighting) that facilitate the spread of rabies. Culling of dogs during these programmes may be counterproductive as sterilized, vaccinated dogs may be destroyed.

Based on 1990 WHO guidelines, ABC programmes have been launched in several countries and the results have been encouraging, with a reported reduction in the size of the street dog population and the number of human rabies cases. However, data are limited and independent evaluation of projects has not yet been undertaken.

### **National and international cooperation**

Governments should be encouraged to establish national focal points, multiyear medium-term plans, and national rabies elimination committees. WHO and WHO collaborating centres and affiliated institutions should cooperate with governments and national institutions to achieve the above goals.

National committees should be actively involved in the management of policies pertaining to rabies control. The public health sector should take the leading role in such committees, with close involvement of other government agencies (those responsible for livestock, veterinary services, local government and natural resources), nongovernmental organizations and private sector agencies.

Efforts should be made to fully incorporate rabies control activities in all levels of the health services, aligning them with other public health programmes such as the Expanded programme on immunization and those for tuberculosis and vector-borne diseases. In this manner, synergies between programmes improve logistical use of human, material and financial resources.