EFFECTIVE SURVEILLANCE STRATEGIES
FOR HUMAN AND CANINE RABIES ELIMINATION PROGRAMS

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ABSTRACT

Global elimination of rabies has become a priority of major international organizations including WHO, FAO and OIE. Although rabies control is often not among the disease priorities of the public health and agriculture ministries, it is a disease that crosses different sectors of society and diverse fields of discipline. Multisectoral disease control programs benefit from combined human and animal health resources from varied sectors and levels of society.

Particularly for diseases in the elimination phase such as canine-mediated rabies, information on the number and distribution of animal and human rabies cases and deaths is essential for successful disease elimination. It is needed to determine which areas or population groups are most affected, so that resources can be targeted to the populations most in need. Information on the incidence of disease is needed to alert program about outbreaks, so that control measures can be intensified. Data trends in disease incidence and mortality are also needed in order to judge the success of a program and to determine whether it is performing as expected or whether adjustments in the scale or blend of interventions are required. The outcomes of timely disease control and response strategies, the probability of elimination, and the certainty of declaring freedom from disease depends on it.

Traditional and innovative approaches to detecting and understanding communicable disease outbreaks have been attempted to overcome constraints such as high operational cost, wide coverage areas, and labor intensity. Applying innovative surveillance tools complements traditional surveillance methods. Community engagement through enhanced participatory surveillance such as mobile-phone based reporting systems help shorten the time to disease detection. Innovative surveillance and the use of non-traditional sources can provide a wealth of information about the public’s health.

Surveillance is often poorly resourced but there are important institutional drivers and enablers to sustain the system in both animal and public health. The overarching objective is to advocate for continued better targeted funding to strengthen capacities for immediate and effective surveillance, prevention, response and preparedness for infectious disease outbreaks and similar major threats. Synergistic investment mechanisms and integrative efforts must be enabled by the government and community partners. Global freedom from the threat of dog-mediated rabies is feasible given political will, adequate resources and diligent program management.

Keywords: Rabies, Surveillance, Zoonoses, Emerging Infectious Diseases, Disease Control and Elimination
INTRODUCTION

Effective surveillance provides information on the number and distribution of rabies cases and deaths. It contributes to early detection of new outbreaks, tracking spread of disease and gives early warning to human and animal health officials nationally and internationally for follow up and timely response (WHO, Keusch). It is critical for the design and implementation of rabies control and elimination programs. Globally, the capacity of rabies surveillance systems to provide information on the disease distribution and trends in rabies varies widely, and unfortunately many disease surveillance systems operating around the world are not very effective in alerting officials to emerging diseases particularly those that are transmitted between humans and animals (Keusch, Lembo). Methodologies for disease surveillance include the traditional surveillance, innovative surveillance that utilize tools that facilitate communication regarding potential disease outbreaks among human and animals, and participatory disease surveillance. Once interventions are implemented, surveillance is also essential to generate data on the progress and cost-effectiveness of such programs, which are essential for their sustainable implementation.

Active and passive surveillance

Rabies surveillance, both passive and active should be backed up by laboratory diagnosis as much as possible to be effective (WHO TRS 2013, Banyard, Rupprecht). It is recommended that countries that lack or have inadequate diagnostic facilities improve their capacity through OIE laboratory twinning projects and links with WHO Collaborating Centers (WHO TRS 2013). Passive surveillance is useful because it provides continuous monitoring and requires lesser resources. In contrast, active surveillance particularly for international reference, national, and subnational laboratories disseminate information about notifiable diseases like rabies. While the active surveillance is more costly and labor intensive, it provides a more complete trend of disease occurrence. Since rabies is zoonotic, human and animal rabies surveillance systems should be unified through a One Health approach among surveillance professionals on the ground (Zinstagg, Lechenne). The reporting of disease data from different sectors need to be multisectoral, integrated and interdisciplinary in approach. Such strategies must involve the collation of animal disease data that must be shared with public health authorities, to enable them to develop and implement effective policies. The OIE World Animal Health Information System (WAHID) reporting system depend on consistent disease reporting, backed up by confirmatory laboratory diagnosis by participating countries. Reliable systematic surveillance of human rabies deaths and animal prevalence at the national level is an urgent issue.

Field implementers and partner communities may face constraints such as high operational cost, wide regions of coverage and labor intensity. Many innovative approaches have been attempted to overcome these problems. There are numerous lessons of good practices learnt from experience. Community-led disease reporting was maximized in implementing a bottom-up intersectoral program to eliminate human and canine rabies in Bohol, Philippines (Lapiz et al., 2013). Another example is the mobile phone-based surveillance system that was used to support the rabies control program across southern Tanzania (Mtema et al 2016).

Outbreak detection and response

Effective surveillance systems allow early detection and reporting of cases, vital for initiating timely responses and enabling informed decisions about when and where to intensify control efforts. Increased speed of early detection of outbreaks leads to more efficient resource mobilization and disease control measures. Weak surveillance may therefore result in delayed control interventions and complacency and can jeopardize chances of disease elimination. The work of Townsend et al. in 2013 estimated that
detection probabilities of <0.1 are broadly typical of rabies surveillance in endemic countries and areas without a history of rabies. Using outbreak simulation techniques the probability of detection affects outbreak spread, and outcomes of response strategies such as time to control an outbreak, probability of elimination, and the certainty of declaring freedom from disease was investigated. Assuming realistically poor surveillance (probability of detection <0.1), it was shown that proactive mass dog vaccination is much more effective at controlling rabies and no more costly than campaigns that vaccinate in response to case detection. Control through proactive vaccination followed by two years of continuous monitoring and vaccination should be sufficient to guarantee elimination from an isolated area not subject to repeat introductions. It was recommended that rabies control programmes should be able to maintain surveillance levels that detect at least 5% (and ideally 10%) of all cases to improve their prospects of eliminating rabies, and this can be achieved through greater intersectoral collaboration. The approach illustrated how surveillance is critical for the early outbreak detection, control and elimination of diseases such as canine rabies and can provide minimum surveillance requirements and technical guidance for elimination programmes under a broad-range of circumstances.

Maintenance of rabies-free status

Surveillance is a critical element in the control and elimination of infectious diseases. Exhaustive epidemiologic investigations have to show that rabies has been eliminated in an area. Surveillance should be maintained even in countries that have successfully eliminated canine rabies because of the risk of re-emergence. Successful control, ultimate disease elimination, and maintenance of disease-free status, depends highly on effective surveillance.

CONCLUSION

Eliminating rabies can progress once concerted efforts are made. This is despite perceptions that poor accessibility of dogs and low community compliance might compromise success. The impetus for control is hampered by a lack of awareness of its true impact. Effective rabies surveillance is critical to quantifying the disease impact relative to other diseases to set priorities for public health interventions (Coleman). As control efforts progress towards elimination, surveillance becomes even more critical in order to detect new incursions. It is critical to advocate for continued better targeted funding to strengthen capacities for immediate and effective surveillance, prevention, response and preparedness for infectious disease outbreaks and similar major threats. There must be synergistic investment mechanisms and integrative efforts by the government and community partners. Global freedom from the threat of dog-mediated rabies is feasible given political will, adequate resources and diligent program management.

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