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## Commentary

## Reducing the global burden of rabies

September 28, 2010 marks the fourth observation of World Rabies Day. This annual event continues to provide a unique platform for individuals, countries and international organizations to highlight educational awareness in their own regions and provides an opportunity to focus on the implementation of national rabies prevention and control programs. During the past three years, World Rabies Day activities have been responsible for sending educational messages regarding rabies prevention to over 100 million people across the world, living in more than 135 countries.<sup>1</sup>

Some basic truths about rabies include the fact that it has the dubious distinction of having the highest case fatality rate of any infectious disease known to mankind and yet it is virtually 100% preventable. Over 99% of all human rabies deaths occur in Africa and Asia and are the result of bites from infected dogs. Approximately 50% of all human rabies deaths occur in children under 15 years of age.<sup>2</sup> It has been proven that when rabies is eliminated in a dog population, most, if not all, of the human rabies deaths in the area will also disappear.<sup>3</sup>

How can the goal of eliminating canine rabies be accomplished? It can be achieved by instituting rabies vaccination programs that reach and protect 70% of the dog population and thus prevent the rabies virus from circulating amongst susceptible animals. Proof of this concept is available from several countries that have successfully eliminated canine rabies within their borders, including Japan, the USA, Canada, the UK and European countries.<sup>4</sup> In fact, by using this vaccination strategy, canine rabies is close to being eliminated in Latin America and, consequently, the number of human rabies deaths resulting from dog bites has been reduced from almost 300 cases reported annually before the program was initiated, to less than 30 reported in 2003.<sup>5</sup> New tools are also being developed to assist in the fight to eliminate canine rabies. Two of these new tools include the direct rapid immunohistochemical test (dRIT), that allows diagnoses to be conducted in the field with less costly equipment,<sup>6</sup> and the freely accessible 'Blueprint for Rabies Prevention and Control' that has been developed by a host of international public health partners. This

tool provides specific stepwise instructions and strategies, with links to official documents, for assisting in eliminating canine rabies and preventing human rabies.<sup>7</sup>

Rabies is not a static disease; it is easily carried to uninfected areas through the practice of importing dogs that are unknowingly infected. When rabies spreads to a new area or re-emerges in an area that has previously been free of the disease, it is often misdiagnosed and is only recognized after several human deaths have occurred. By the time the disease is recognized, rabies has usually become well established within the local dog population and becomes more difficult to eliminate as time passes. All too often the immediate reaction of government officials is to implement a program of mass culling of the existing dog population as a means to eliminate the disease, rather than to utilize effective dog vaccination as a proven strategic method to stop the spread of the disease at its source. It has been shown on many occasions that mass culling of dogs within a community is not the solution to controlling canine rabies.<sup>4</sup> Instead it leads to widespread resentment among the local population as well as increasing global outrage about inhumane killing practices.

In most countries currently living with canine rabies, the ever-increasing dog population is a public health problem and more humane and effective methods to control dog populations are urgently needed. Ongoing field trials investigating the use of chemical contraceptives in dogs have given hope that these products will provide a viable and long-lasting solution to reduce existing dog populations. Such chemical contraceptives may soon be available commercially.<sup>8</sup>

Human rabies is a unique disease in that it can be prevented after an exposure occurs through the use of highly effective vaccines and rabies immunoglobulin, providing the patient seeks postexposure prophylaxis in a timely manner.<sup>9</sup> Therefore, no one need die of rabies if they have access to biological agents for the treatment of rabies infection. Unfortunately, many people still die from rabies, especially in countries where canine rabies is endemic, because they either cannot afford rabies vaccines and rabies immunoglobulin or because these life

saving biological agents are not available where they live. In many cases people must travel long distances to find a clinic where the vaccine might be available. All too often after traveling for many miles to reach a clinic, no vaccines are available and there may not be enough time remaining in which to access life-saving treatment. This highlights the urgency with which solutions to the limitations of biological agents against rabies infection need to be found.

One of the most effective methods by which countries can lower the cost of rabies vaccine for patients that require postexposure prophylaxis is to implement reduced-dose intradermal vaccination regimens in place of intramuscular regimens.<sup>10</sup> Intradermal regimens for postexposure prophylaxis can save up to 80% of the cost of vaccine and have helped to save millions of lives since they were introduced in the 1980s. However, many countries that could benefit from the implementation of intradermal regimens are still not utilizing these vaccination schemes. Increased usage of reduced dose PEP regimens would help alleviate the escalating medical costs incurred by many countries struggling to find financial solutions to treat patients exposed to rabies.

Ultimately, the best solution to prevent human rabies is to implement effective regional rabies control programs through partnerships between a wide variety of organizations and ministries including those focused on animal and human health, education, animal welfare, communications and finance. Successes in the elimination of canine rabies from some areas are proof that rabies serves as a model disease to institute a one health approach to prevention and control. World Rabies Day continues to serve as a focal point for individuals and global organizations working to promote rabies prevention activities and save lives across the globe.

**Conflicts of interest:** None declared.

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