Sri Lanka takes action towards a target of zero rabies death by 2020

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ABSTRACT
Rabies is a 100% vaccine-preventable and 100% fatal zoonotic, viral disease. It is usually spread to humans by saliva, through bites or scratches. Dogs are the source of the vast majority of human deaths from rabies. Political will and leadership have been the main drivers for success of the Sri Lankan effort to reduce the burden of disease attributable to rabies. Post-exposure prophylaxis, which is available in government health facilities, at no cost, to all bite patients, has been a main axis of the rabies-elimination strategy. To attain the last mile in rabies elimination in Sri Lanka by 2020, more will need to be done to scale up dog vaccination, enforce responsible dog ownership, strengthen surveillance for animals and humans and conduct mass awareness programmes. Sri Lanka is the first country in the World Health Organization South-East Asia Region to develop a national strategy for elimination of dog-mediated rabies and is a key country in sharing knowledge, expertise and capacity-building in the region, towards a global target of zero rabies deaths by 2030.

Key words: dog bites, rabies, rabies elimination, Sri Lanka

BACKGROUND
Rabies is a 100% vaccine-preventable and 100% fatal zoonotic, viral disease. It is usually spread to humans by saliva, through bites or scratches. Dogs are the source of the vast majority of human rabies deaths. Each year worldwide, the number of human rabies deaths caused by canine rabies is estimated to be between 35 410¹–² and 59 000 (95% confidence interval [CI]: 25 000–159 000),² many of which are in children. Rabies is also responsible for an estimated 3.7 million (95% CI: 1.6–10.4 million) lost disability-adjusted life years (DALYs) and US$ 8.6 billion (95% CI: 2.9–21.5 billion) in economic costs each year.³ An estimated 95% of human deaths from rabies occur in Africa and Asia, where dog rabies is poorly controlled. Rabies disproportionately affects poor rural communities, where access to appropriate post-exposure prophylaxis (PEP) is limited or non-existent and dog vaccination programmes are rare.⁴

Louis Pasteur discovered the first rabies vaccine over 130 years ago. Although safe, efficacious and life-saving vaccines for humans and animals have been available for a long time, political will and leadership are required to put these tools to use in successfully reducing the burden of rabies.

PROGRESS IN DOG-MEDIATED RABIES IN SRI LANKA
Reaching the target in Sri Lanka of elimination of rabies by 2020 lies within grasp, with only five cases of human rabies recorded in the first half of 2016 compared with 24 in all of 2015.⁵ Human rabies has been a notifiable disease since 1971, with a programme led by the Ministry of Health, Nutrition and Indigenous Medicine (MoH), and rabies in domestic animals became notifiable in 2012. An island-wide comprehensive rabies-control programme was launched in 1975, with support from the World Health Organization (WHO). Progress in reducing rabies in Sri Lanka has been mostly attributable to the MoH setting rabies as a national health priority and making PEP available, free of charge, to victims of animal bites, at government hospitals throughout Sri Lanka. The Public Health Veterinary Services of the MoH are responsible for rabies control in the country. Under the decentralized health system, regional directorates of health implement the control activities island-wide. Mass dog vaccination, female dog sterilization and programmes for the adoption of puppies at community level have been introduced, raising awareness and addressing both the human and animal aspects in coordination with local authorities, in a multipronged approach to combat
rabies. The number of dogs with rabies has remained relatively unchanged, while the number of suspected human rabies cases is decreasing gradually. Currently, the provision of PEP to bite victims is not necessarily linked by default to the animal’s vaccination history, the bite circumstances or observation of whether a biting animal develops rabies.

Sri Lanka is one of the first countries in Asia to have initiated the cost- and dose-saving intradermal administration of PEP, after phasing out the use of nerve-tissue vaccine in 1995. PEP for victims of animal bites has increased from fewer than 100,000 treatments in 1992 to more than 400,000 during 2002–2004. It has now levelled out to about 300,000 PEP treatments annually. The decrease in the number of cases of human rabies can largely be attributed to access to PEP free of charge at public health services. The residual rabies deaths are mostly in adult men who do not seek PEP. Equine-derived rabies immunoglobulin is being increasingly used as an alternative to human-derived rabies immunoglobulin, which is more expensive and difficult to procure. This shift is projected to continue (see Table 1) and the savings could be invested in the weaker parts of the rabies-elimination programme, namely prevention of rabies at source, through, for example, strengthening of large-scale dog-vaccination programmes.

Vaccinating dogs is a powerful and essential public health intervention to break the transmission cycle. Dog vaccination in Sri Lanka has increased gradually, from about 400,000 vaccinations in 1990 to about 1.5 million dogs vaccinated in 2015 (see Fig. 1). To reach the goal of complete elimination of rabies, dog vaccination will need to be scaled up, as vaccination coverage remains uneven, slow and insufficient to break transmission. The MoH forecasts an increase in the number of animal rabies vaccinations from the current 1.8 million to 2.4 million in 2020 (see Table 1). One of the options to increase coverage is to vaccinate puppies aged less than 3 months, and to include cats as much as possible in vaccination campaigns. In addition, a “no kill” policy for roaming dogs was introduced in 2006, supported by a “capture, neuter, vaccinate and release” (CNVR) policy, to stabilize the population of roaming dogs. However, it is acknowledged that in the future, as responsible dog ownership and garbage-disposal practices improve, a significant reduction in populations of stray dogs can be expected.

Surveillance is an important pillar to inform understanding of trends and to guide action in rabies elimination, including identification of risk areas and providing assurance of absence of disease as elimination targets are reached. Surveillance in humans and animals remains an area for further strengthening. The Department of Rabies Diagnosis and Research, Medical Research Institute, in Colombo Laboratory, provides the necessary national capacity for diagnosis and surveillance of rabies for animals and humans. The Medical Research Institute has also provided other countries in the WHO South-East Asia Region with opportunities for technical capacity-building. Additional capacity is being developed at the University of Peradeniya and Department of Animal Production and Health of the Ministry of Livestock and Rural Community Development.

### Towards Ending Human Deaths Globally from Dog-Mediated Rabies by 2030

A multi-sector rabies-elimination advisory committee has been established to guide the national rabies programme under the leadership of the Director-General of Health Services, including representation from the Public Health and Veterinary Services, Environmental Health, Health Promotion and Epidemiology sectors of the Ministry of Health; the Medical Research Institute; the Ministry of Education; the Ministry of Livestock and Rural Community Development; the Faculty of Veterinary Sciences; the Department of Police; the Veterinary Council for Sri Lanka; municipalities; provincial councils; local government; and the media. The MoH is now progressively trying to hand over responsibility for the dog component of rabies control to the veterinary sector and to scale up human resources by subcontracting to the private sector. Supporting the activities of nongovernmental organizations can thus be better coordinated and harnessed to scale up efforts in rabies elimination.

Sri Lanka is the first country in WHO South-East Asia Region to develop a national strategy for elimination of dog-mediated rabies and is a key country in sharing knowledge, expertise and capacity-building in the region; the most recent collaborations have been with Bangladesh, Bhutan, Indonesia, Iran, Myanmar and Thailand. Upcoming exchange will be on policy advice and

### Table 1. Projected requirements for rabies-related biologicals in Sri Lanka, 2016–2020

<table>
<thead>
<tr>
<th></th>
<th>Number of vials required</th>
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<tbody>
<tr>
<td></td>
<td>2016</td>
</tr>
<tr>
<td>Human anti-rabies vaccine (1 mL vials)</td>
<td>310,000</td>
</tr>
<tr>
<td>Human rabies immunoglobulin (300 IU)</td>
<td>15,000</td>
</tr>
<tr>
<td>Human rabies immunoglobulin (700 IU)</td>
<td>10,000</td>
</tr>
<tr>
<td>Equine rabies immunoglobulin (1000 IU)</td>
<td>100,000</td>
</tr>
<tr>
<td>Animal rabies vaccine (10 mL vials)</td>
<td>1,800,000</td>
</tr>
</tbody>
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IU: International Unit.

training in intradermal administration of rabies vaccine in humans in Myanmar and Nepal, planned for the third quarter of 2016.

The momentum has been building, and in August 2015 Sri Lanka hosted a meeting on rabies, leading the countries in the WHO South-East Asia Region and the South Asian Association for Regional Cooperation to reinforce the target of zero rabies deaths by 2020, as a next step of the Strategic framework for elimination of human rabies transmitted by dogs in the South-East Asia Region. Some of the successes in the region can be highlighted as follows:

- in Bhutan, the National Centre for Animal Health has taken a strong lead and has implemented a successful CNVR programme, significantly reducing rabies in animals and humans, while building a buffer zone to the highly porous and rabies-endemic national border of India;
- the Bangladesh Ministry of Health provided leadership in the country not only to introduce intradermal PEP in 65 districts of the country but also to lead intensive dog-vaccination campaigns;
- Thailand has world-class expertise in rabies control and has pioneered intradermal techniques for rabies vaccination;
- India made rabies a priority disease for control for the first time in 2014, in its 12th national programme of work.

Subsequently, in December 2015, WHO, the World Organisation for Animal Health, the Food and Agriculture Organization of the United Nations, and the Global Alliance for Rabies Control, noting that reaching zero rabies deaths is feasible, hosted a global meeting attended by public health and veterinary government representatives of countries affected by rabies, and other stakeholders. The meeting agreed on a strategic framework to end human deaths globally from dog-mediated rabies by 2030. Dr Margaret Chan, WHO Director-General, addressed the meeting to lend her support to ending this horrific, yet preventable disease, stating that “Rabies belongs in the history books”. The WHO Regional Office for South-East Asia is leading the way and, with champion countries like Sri Lanka setting the pace, success is on the horizon.

Fig. 1. Human rabies deaths, dog rabies vaccinations and human anti-rabies vaccinations in Sri Lanka, 1970–2015

ARV: anti-rabies vaccination.
Source: Public Health Veterinary Services Ministry of Health.
References


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