One Health in action: Effective collaboration between human and animal health sectors to eliminate Neglected Zoonotic diseases

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Summary of Findings:

- Zoonoses are diseases transmitted between animals and humans.
- Many zoonoses are classified as neglected zoonotic diseases (NZDs) due to the low priority given to them by governments, the international public health community and aid groups.
- NZDs debilitate people and limit work productivity while also decreasing the productivity and welfare of the livestock on which most poor rural communities depend.
- NZDs can be a serious drain on a country’s economy, which can have wider repercussions, trapping citizens in a cycle of poverty and disease.
- The success of Rabies control efforts through evidenced-based strategies in Bangladesh, South Africa, the Philippines, and Tanzania demonstrate the feasibility of eliminating important NZD in under-resourced settings.
- Investment and aligned political will at national and sub-national levels is critically important to: promoting coordination between health sectors; continuing development of surveillance, diagnostics, and treatment methods; and to build local capacity for long term sustainability.

Background

According to the World Health Organization (WHO), there are more than 200 zoonoses— infectious diseases transmitted between people and animals. Nearly two-thirds of all human diseases are zoonotic. Many zoonoses disproportionately affect poor urban and rural communities. The rural poor represent over 900 million people, of which just over 400 million are livestock-keepers (almost half are in south Asia and one-third in sub-Saharan Africa).

What are Neglected Zoonotic Diseases?

There are seven zoonotic pathogens that have been classified as Neglected Zoonotic Diseases (NZDs). They are classified as ‘neglected’ as a result of their low profile and the fact that they are largely preventable and treatable diseases. NZDs largely affect poor communities due to more regular contact between people and animals, animal access to human waste, non-existent preventive health practices for domestic livestock (i.e. cattle, pigs, sheep and goats), and limited access to human health services. In contrast to emerging infectious diseases like Ebola virus that gain high international visibility and investment efforts, NZDs are of lower profile and not recognized as a threat. A well-known example of an NZD is Rabies.

What impact do NZDs really have on the global community?

- **Rabies** is a viral disease causing death in over 55,000 people each year in Asia and Africa. The total cost of rabies post-exposure prophylaxis accounts for a substantial fraction of per capita Gross National Income in these countries (3.9% in Asia and 5.8% in Africa). In many affected low income countries, costs of receiving a single dose of treatment are equivalent to several months of living expenses.
• **Cysticercosis/Taeniasis** is caused by worms acquired by humans through the ingestion of larval cysts in undercooked pork and beef, contaminated food, or water. It is the cause of 30% of epilepsy cases in many areas where people and pigs live in close proximity. In India alone, the annual societal cost of porcine cysticercosis/taeniasis, in terms of animal production losses and human illnesses, is estimated at about US$150 million.

• **Food borne trematodiases** are a group of parasitic infections acquired through ingestion of contaminated food and causing liver, lung and intestinal complications. It is estimated to affect more than 56 million people throughout the world, mostly prevalent in East Asia and South America.

• **Echinococcosis** is a parasitic disease that causes cysts to develop in organs of the body. It is acquired through direct contact with animal hosts or through the ingestion of contaminated food, water, or soil. It requires expensive and complicated treatment. More than 1 million people worldwide are affected with *echinococcosis*.

**Why is there an urgent need to improve NZD surveillance and control?**

The importance of NZDs as drivers of sustained poverty is not readily recognized by the global health community. As the demand for milk and meat in resource-limited countries increases so does the risk of zoonotic disease transmission. Without critical surveillance and control data, the magnitude of NZD impact is widely underestimated.

**One Health in Action**

NZD control requires simultaneous application of veterinary health, human health, and environmental health measures to break the human-animal-environment transmission cycle. In 2008, a global One Health approach was launched to foster intersectoral, interdisciplinary collaboration across all three health sectors. A Tripartite Concept Agreement was established in 2010 between the WHO, the Food and Agriculture Organization of the United Nations (FAO) and the World Organisation for Animal Health (OIE) to achieve global One Health collaboration relevant to zoonotic disease control.

**Rabies as an example: elimination is feasible**

While prompt treatment of people exposed to rabies is key, the role of veterinary services is critical for the ultimate control of rabies. Rabies is an excellent model that demonstrates how One Health actions make elimination of human rabies cases feasible through the control of canine rabies. Rabies elimination programs coordinated by the WHO have resulted in decreased number of human rabies exposures and reported deaths through the application of human and animal vaccines and the availability of web-based training packages.

**Rabies success in KwaZulu-Natal (KZN), South Africa**

In 2007, KZN province had nearly 500 reported canine cases of rabies. In 2009, the implementation of a centralized program involving large-scale dog vaccination aligned with public health dog bite management centres’, resulted in a decrease to 37 canine rabies cases per year by 2014, with no human cases reported.

**Rabies in Bangladesh**

In 2010, there were around 2,000 human deaths due to rabies. Bangladesh launched a canine rabies elimination program through dog population management, mass dog vaccination, and prevention control centres (which assist with dog bite management, and provided anti-rabies and post exposure vaccines). By 2013, rabies deaths decreased by half.

**Conclusion: Why investment in NZD control efforts are needed**

The threats of preventable and treatable NZDs disproportionately burden poor rural communities and contribute to a cycle of sustained poverty and disease. The integration of *One Health* in practice is fundamental to eliminating these diseases. As seen with successful rabies control programs, investment in evidence-based control strategies that utilize One Health efforts hold great promise for control and elimination of NZDs. Global investment efforts could target improved surveillance programs, monitoring progress, continued research, and improved training for local communities to implement and sustain control programs. By ‘lumping’ these 7 preventable and treatable diseases together, their profile as ‘neglected’ can be raised for discussion at the international policy level. Investment in prevention and control through effective collaboration with strategic partners can lead to improved livelihoods for poor and marginalized populations in low-resource settings.