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Rabies : A Zoonotic Disease

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Abstract **– Zoonotic infections pose a significant public health challenge for low- and middle- income countries. The Roadmap to Combat Zoonosis in India (RCZI) initiative conducted an exercise to systematically identify and prioritize research options needed to control zoonoses in India.**

Keywords **– RCZI Roadmap to Combat Zoonoses in India, Zoonosis.**

I. INTRODUCTION

Rabies (*Family Rhabdoviridae*) is a disease that is caused by a virus. It affects the brain and spinal cord and can cause death if left untreated. Rabies in people is very rare in the United States, but rabies in animals - especially wildlife - is common in most parts of the country including Maine. An animal with rabies is called a "rabid" animal.

How is rabies spread?

The rabies virus lives in the saliva, brain and spinal cord (neural tissue) of infected animals. It is spread when a rabid animal bites or scratches a person or animal, or if a rabid animal's saliva or neural tissue comes in contact with a person or animal's mouth, nose or eyes, or enters a cut in the skin. Rabies is **not** spread by petting or touching dried saliva, blood, urine, or faeces of a rabid animal.

What animals can carry rabies?

In Maine, the most commonly infected animals are skunks, raccoons, bats, and foxes. Rabies can infect any animal that has hair, but is very rare among small rodents like squirrels, rats, mice, and chipmunks. Bat exposures are often difficult to detect, especially in the cases of a sleeping person awakening to a bat in the room or an adult witnessing a bat in a room with a previously unattended child, mentally disabled person, or intoxicated person.

Zoonoses have been defined as diseases and infections that are naturally transmitted between vertebrate animals and humans. Globally, zoonosis are said to account for 60% of all infectious disease pathogens and 75% of all emerging pathogens (WHO, 2010) . The effects of zoonosis are accentuated among marginalized groups since the poor tend to have closer interactions with animals and are further removed from accessible health services. Additionally, zoonosis provides a common route for emerging infections. An analysis of recent 'EID events' demonstrated the increased risk of emergence of zoonotic pathogens in the Indian subcontinent. Large parts of the country were demonstrated to be global "hot spots" at high risk for emergence of pathogens from wildlife as well as domestic animals. It is suggested that human population density, human population growth, wildlife host species richness, and low latitude are predictors for the emergence of zoonotic diseases (Jones et al 2008). With the world's second largest human population, two biodiversity hotspots (Myers et al 2000), and one of the world's greatest densities of tropical livestock (Thornton et al 2002), India possesses a favourable environment for the transmission of both known and novel diseases between animals and people (Jones et al 2008). Available information in India suggests zoonotic diseases are responsible for a large burden on the public health, livestock economies, and wildlife of the country. For example, India is estimated to have the highest rabies burden in the world with more than 20,000 human deaths annually (Knobel et al 2005); outbreaks of anthrax contracted from wild and domestic animals have led to hundreds of reported deaths (Thappa et al 2001); the emergence of diseases from wildlife such as Nipah and Hendra viruses may be increasing (Harit et al 2006); and many other endemic zoonoses have been documented (Mantur et al 2008) , most of which disproportionately affect India's poor and marginal communities .

The Roadmap to Combat Zoonosis in India (RCZI) initiative was launched in June 2008 with the vision of supporting and promoting integrated zoonotic disease prevention and control as a "one health" United Nations (2008) . The RCZI initiative aims to both identify key research areas for zoonosis and facilitate the linkages between the veterinary, wildlife, and public health sectors necessary to investigate them.

Human health is inextricably linked to animal health and production. This link between human and animal populations, and with the surrounding environment, is particularly close in developing regions where animals provide transportation, draught power, fuel and clothing as well as proteins (meat, eggs and milk). In both developing and industrialized countries, however, this can lead to a serious risk to public health with severe economic consequences. A number of communicable diseases (known as zoonosis) are transmitted from animals to humans. Veterinary medicine has a long and distinguished history of contributing to the maintenance and promotion of public health.

II. ZOONOSIS AND PUBLIC HEALTH

About 75% of the new diseases that have affected humans over the past 10 years have been caused by pathogens originating from an animal or from products of animal origin. Many of these diseases have the potential to spread through various means over long distances and to become global problems.

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In addition a number of well known and preventable animal diseases that can be transmitted to humans (i.e. zoonosis) such as rabies, brucellosis, leishmaniasis and echinococcosis continue to occur in many countries especially in the developing world where they mostly affect the poorest segment of the human population. They cause a serious amount of deaths and millions of affected people every year.

All major zoonotic diseases prevent the efficient production of food of animal origin, particularly of much-needed proteins, and create obstacles to international trade in animals and animal products. They are thus an impediment to overall socioeconomic development. From way back veterinary medicine played a major role in the preventing of and interventions against animal diseases including zoonosis.

The VPH include the following: diagnosis, surveillance, epidemiology, control, prevention and elimination of zoonosis; food protection; management of health aspects of laboratory animal facilities and diagnostic laboratories; biomedical research; health education and extension; and production and control of biological products and medical devices. Other VPH core domains may include management of domestic and wild animal populations, protection of drinking-water and the environment, and management of public health emergencies. Veterinary public health is an essential part of public health and includes various types of cooperation between the disciplines that link the health triad, people-animals-environment, and all of its interactions.

Disease	Pathogen	Animals involved	Mode of transmission
Rabies	Rabies virus	commonly - dogs, bats, monkeys, raccoons, foxes, skunks, cattle, wolves, coyotes, mongooses and cats	through saliva by biting, or through scratches from an infected animal

III. Signs and Symptoms

The incubation period of rabies varies from nine days to more than a year. The delay in some cases is because the virus has to migrate from the site of initial entry into the body to the spinal cord or the brain. The average length of time for clinical signs to appear is four weeks after infection and can be seen in three phases:

Phase First: Local irritation of the entry site, followed by fever, mild changes in demeanour, behaviour and temperament. Pupils will be dilated and eye reflexes slow. The sound of an animal's bark or meow may alter.

Phase Second: Aggression, lack of co-ordination, disorientation, seizures and fits, increased salivation and photophobia.

Phase Third: Paralysis, excessive salivation, respiratory failure, coma and then death.

IV. Prevention and Control

The requirements of the Pet Travel Scheme (PETS) are very strict regarding rabies boosters and if a pet owner wishes to keep their animal registered, its vaccinations must be kept up-to-date.

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