

Challenges to Disease Prevention and Control

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There are emerging and established pathogens (microorganisms that can cause disease) that are rightfully receiving attention for being both highly infectious and highly lethal. Also worthy of attention is the fact that new appearances and epidemics of many of these diseases may have resulted from increasing contact between humans, their domestic animals and wildlife.

Vaccination is commonly employed in disease prevention and control. One goal of veterinary vaccines is to prevent or reduce animal-to-human transmission of diseases from both domestic animals and wildlife. Vaccination of wildlife is usually only considered in the control of diseases that can be transmitted from animals to humans or vice versa. The most successful method of achieving this is through the use of vaccine bait in food, as done in the mass vaccination of foxes in Europe against rabies. A major challenge to this method is the formulation of vaccines that confer immunity via the oral route and are not deactivated by passage through the digestive system of the target animal.

The effectiveness of vaccination as part of the disease control strategy for a pathogen depends on many factors concerning the nature of that pathogen. One challenge to vaccination is mutation that results in many distinct subtypes, some of which are able to infect humans and wild animals, as is the case with Avian Influenza and Swine Influenza viruses. This renders pre-existing vaccines ineffective in outbreaks involving new strains. For this reason vaccines are frequently updated to include new strains.

Another challenge is the mechanism of spread, such as aerosolization (eg. influenza viruses and tuberculosis, a bacterial pneumonia) and exposure to commonly accessible, contaminated sources, such as food and water (eg. Leptospirosis). Reservoirs of infection present another hurdle, where wild animals - or parasites thereof - may serve as hosts from which pathogens may be passed to humans or to domestic animals. Domestic animals may transmit diseases to humans via exposure to secretions, parasites (West Nile Virus) or bites (Rabies). Some control of transmission can be gained through vaccination coupled with improved hygiene and management practices, pest control and barriers to contact with wildlife.