Commentary: Zoonotic potential of emerging animal diseases

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Palmer and colleagues have proposed an algorithm for early qualitative risk assessment of the emerging zoonotic potential of animal diseases,1 a vital problem since more than half of all new or emerging infectious diseases agents in humans are zoonotic in origin.2

Human infections due to agents such as the coronaviruses responsible for severe acute respiratory syndrome (SARS), avian influenza A viruses, and HIV pose enormous problems because they (a) are difficult to manage clinically, (b) prohibitively expensive to treat in resource-poor areas, (c) capable of rapid global spread, and (d) virtually impossible to eliminate once stable transmission among humans has been established, or (e) capable of inducing fear and substantial economic losses. Therefore, prior knowledge and public health preparedness are essential for their prevention and control. The bottleneck for this control effort lies in discovering and characterising these agents. Once identified, these should be followed by systematic analyses of the risk of the agents causing human diseases.

Using porcine hepatitis E virus, porcine circovirus, bovine norovirus, Borna disease virus, and Clostridium difficile as examples, Palmer and colleagues systematically analysed the available scientific and clinical data on the microbes and the microbe-host interactions, and gave recommendations on the level of confidence of their risk of zoonotic transmission.3 Their work exposed the fact that current knowledge is often insufficient to exclude the possibility of human infections.

In many disease syndromes where the aetiological agents cannot be defined or when the syndrome is conventionally regarded as idiopathic, clinicians often fail to explore the history of animal exposure and do not order microbiological tests for zoonotic agents. Many of these tests are not routinely available in local hospital laboratories, and serological tests for animal diseases are generally not standardised for testing human samples.

When zoonotic transmission occurs, some mutations might have occurred which could impair the sensitivity of rapid tests such as nucleic acid amplification. Most scientists agree that the mechanisms of interspecies jumping between viruses are poorly understood. It is theoretically possible that a subclinical or related viruses could be discovered once a family of viruses is known to exist by a comprehensive virological search in animals. This should, of course, be followed by regular monitoring of its evolution and spread in animals. Coupled with the surveillance in occupationally exposed people, it might give us a better idea of the zoonotic risk of these agents.


References