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# Livestock and Zoonotic Disease

**Of emerged human disease epidemics, have 75% been of animal origin? And overall, are 60% of human pathogens zoonotic?**



*Photo courtesy of Supporting Evidence-Based Interventions (SEBI)*

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Figures that highlight the incidence of zoonotic diseases (transmittable between animals and humans) and associated risks to human health, are commonly used to encourage improved control and maintenance of livestock health<sup>1-3</sup>.

### Where do these facts originate?

The suggested proportions of both human emerging infectious disease (EID) epidemics that are of animal origin, and the human pathogens of zoonotic nature (75% and 60% respectively), were calculated by Taylor and co-authors in 2001<sup>4</sup>. They recognised that previous human EID studies had largely been descriptive and lacking of quantitative assessment. Using a literature review of 39

previous texts concerning human pathogens (dating from 1975 to 2000), 1415 species of infectious agents reported to cause human disease were identified; 868 (61%) of these were understood to be zoonotic. In addition, animal populations were the main disease reservoir of 97% of the zoonotic pathogens identified; and 132 out of the 175 pathogens associated with EIDs were zoonotic (75%)<sup>4</sup>.

### Is the fact up-to-date and relevant?

These figures are now 17 years old and based on information potentially 43 years old. Further literature review by Woolhouse and Gowgate-Sequeria<sup>5</sup>, in 2005, updated the database used in 2001, and reported similar figures. Of human pathogenic species 58% were zoonotic; 177 pathogens associated with EIDs were identified, of which 73% were zoonotic<sup>4,5</sup>.

Both of the previous literature reviews considered species of infectious pathogen rather than specific diseases or outbreaks. Conversely, in 2008 Jones and co-authors investigated EID events within literature from 1940 to 2004 (including 747 references to 335 EID events)<sup>6</sup>. Zoonoses were found to cause 60% of human EIDs; however, 72% of the zoonotic EID events were found to be of wildlife origin. This suggested a diminished role played by livestock in zoonotic disease transmission<sup>6</sup>. The study by Jones and co-authors<sup>6</sup> was further developed to predict the likely conditions for future emergence of zoonotic disease. Low to Middle Income Country tropical forests, with high mammalian biodiversity, were identified as being high risk<sup>7</sup>.

### The future of this fact

The initial literature review<sup>4</sup> highlighted the significant risks to human health from zoonotic diseases, with updates and further research strengthening this position<sup>5</sup>. From the information reviewed, no global trends in zoonotic disease can be stated. However, the growing 'One Health' paradigm (promoting collaboration between human and veterinary healthcare, whilst recognising environmental issues) is likely to increase the respect and investigation of this human-animal link<sup>8,9</sup>. In particular, the role livestock play, as opposed to wildlife populations, in zoonotic disease transmission needs to be understood<sup>3,10</sup>. This would assist allocation of responsibilities and resources for future improvements to animal health control, and the realisation of associated benefits to human populations.

#### LD4D Livestock Fact Check Series

This series of factsheets aims to clarify the provenance of popular livestock facts often used in environmental, economic and social discussions. We support the use of evidence-based facts, by revealing the data, methods and context behind the numbers.

The factsheets are produced by the Livestock Data for Decisions (LD4D) community of practice. We thank collaborators for their assistance. Every effort has been made to trace and report this fact, and related information, accurately. LD4D welcome any comments or further questions (email [ld4d@ed.ac.uk](mailto:ld4d@ed.ac.uk)).

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The series of factsheets, and additional information, are available to download at:

<http://ld4d.org/portfolio/livestock-fact-check>

### References

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- 3 Cunningham, A. A. et al. 2017.
- 4 Taylor, L. H. et al. 2001.
- 5 Woolhouse, M. E. J. & Gowtage-Sequeria, S. 2005.
- 6 Jones, K. E. et al. 2008.
- 7 Allen, T. et al. 2017.
- 8 One Health Initiative. 2018.
- 9 FAO. 2011.
- 10 Daszak, P. et al. 2000.

For full references scan the QR code or visit:  
<http://hdl.handle.net/1842/30116>



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