

How human cognition can affect the spreading of diseases like Ebola

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The Ebola virus, isolated in November 2014 from patient blood samples obtained in Mali. The virus was isolated on Vero cells in a BSL-4 suite at Rocky Mountain Laboratories. Credit: NIAID

If you were bitten by a bird, would you be concerned about getting sick? How likely would you be to seek medical attention? As it turns out, those

answers may depend on your knowledge of other animals' susceptibility to disease.

In psychology, it's called inductive reasoning - that's the process of generalizing information to novel scenarios. And according to a new study from the University of Sydney and Texas Tech University, inductive reasoning can play a big role in how people perceive the risks involved with [animals](#) and [infectious diseases](#).

Dr Micah Goldwater from the University of Sydney's School of Psychology collaborated with Texas Tech assistant professors Tyler Davis, Molly Ireland and Jason Van Allen and independent research consultant Nicholas Gaylord.

Their paper, "Can you catch Ebola from a stork bite? Inductive reasoning influences generalization of perceived zoonosis risk," appears today in *PLOS ONE*.

Co-author at the University of Sydney, Dr Goldwater, explained that the World Health Organisation and the Centre for Disease Control had different approaches to communicating about Ebola, with different results; while the CDC only listed bats and non-human primates, the WHO also listed porcupines and forest antelope.

"We showed that people reading the WHO inspired warning generalised further, and for example, judged that eating "bushmeat" (i.e., meat from wild animals) had greater risk," Dr Golwater said. "This is a crucial result as eating bushmeat is a frequent root of new emerging diseases."

The idea behind inductive reasoning is simple. Suppose you are bitten by an animal - maybe a bird, maybe a bat or maybe a dog. If you know that other similar animals are susceptible to communicable diseases, such as Ebola or rabies, you are likely to be more concerned about the possibility

of getting infected by the bite. This happens because you generalize your knowledge from other animals to the one that bit you, even though that may not be entirely accurate.

"We've been interested for a while in how everyday people reason about risks associated with animal contact," said Assistant Professor Davis, the lead author.

"An overwhelming number of new emerging diseases come from animal sources and get introduced to the human population as a result of animal contact.

"Thus, everyday people without expertise in infectious diseases or how to interact with animals are at the frontlines of potential future pandemics, yet very little is known about how they reason about the risks of animal contact."

While a person may not know much about the risks posed by a specific animal, they likely have beliefs about which animals in general may be susceptible to disease.

Assistant Professor Davis highlighted that this study tested whether people use knowledge about the range of animals that are susceptible to a disease when judging their own risks of contact with a specific type of animal. The researchers measured this in a variety of ways, including the likelihood of reporting animal bites to a health professional and the perceived safety of eating different animals' meat.

The study found that risk perception increases in two different scenarios. First, if the animal you encountered is similar to a type of animal you believe may carry a disease - for instance, encountering a coyote when you know that local foxes can carry a disease - you may perceive a greater risk to your own health.

Second, if you know that a particular disease is found in a wide variety of animals, you may perceive a greater likelihood that the animal you encountered could carry it - for example, if bats, cats and birds all carry a disease, then the coyote you encountered may well pose a risk, as well.

"Although there has been a lot of research on inductive reasoning, this research has not been widely applied to health behaviors in general and perception of [disease](#) risk from animals in particular," Assistant Professor Davis said.

"We're also very hopeful that this work can inform better public health messaging in the developing world, where awareness of risks can be very low and responses to outbreaks are often slow and costly."

Dr Goldwater said small changes to the message, informed by cognitive psychology, may have a big impact. "The next steps in our research are examining messages about food-borne illnesses in developed western countries, and bringing the research on bushmeat to the developing world," he said.

More information: *PLOS ONE* (2017). [DOI: 10.1371/journal.pone.0186969](https://doi.org/10.1371/journal.pone.0186969)

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