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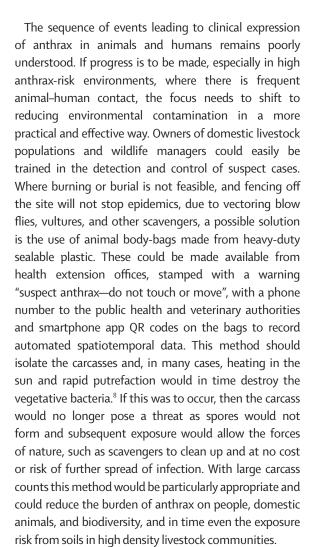


A One-Health lens for anthrax

Outbreaks of deadly zoonotic diseases with epidemic potential have plagued humans for centuries. While global attention is currently focused on the WHO Blueprint list of priority diseases, which include Crimean-Congo haemorrhagic fever, Ebola, Marburg, Lassa fever, Middle East respiratory syndrome, Rift Valley fever, Nipah and henipaviral diseases, there are other, neglected, zoonoses, which also need attention. A good example of this neglect is anthrax, caused by the bacterium *Bacillus anthracis*. Anthrax is frequently fatal in domestic and wild animals and large outbreaks can occur in both groups. Anthrax can also be lethal in humans, causing overwhelming gastrointestinal or pulmonary disease.

B anthracis is ubiquitous and can survive as a viable spore under extreme weather conditions in the soil for a 100 years,3 and thus cannot be eradicated. Anthrax remains a severely under-reported disease in Africa, Asia, and South America, where humans frequently butcher and eat animals infected with B anthracis.^{4,5} It is unlikely that this situation will change in the mediumterm because public health services in these regions are inadequately prepared and resourced to address the recurrent, widespread, sporadic anthrax outbreaks according to best public health practice.⁶ In livestockdependent communities, survival is closely linked to the health of their animals. When sickness prevails, decisions on disposing of animals are sometimes in conflict with the need to use or consume this precious resource, putting the community at risk of anthrax exposure. Anthrax in wildlife is neglected because of the absence of legal or economic incentives to promote wildlife health.

WHO recommendations⁶ for disposal of carcasses do not fully appreciate practical context and resource barriers to employ these measures in anthrax-endemic communities. Destroying carcasses by burying or incineration is costly, and frozen, flooded, treeless, or rocky ground can make this virtually impossible. Consequently, carcasses are often left to rot or are discarded into flooding rivers.⁵ Billions of *B anthracis* spores are released into soil and the environment as a result. Furthermore, domestic animals now dominate the global mammal biomass⁷ on a shrinking rangeland. This dominance is leading to high densities of livestock in some regions, and persistent anthrax hotspots.



Effective control and management of human anthrax outbreaks are well described and there is low risk in countries where there are sufficient resources available to follow WHO operating procedures and protocols. For example, in 2016, in Yamal autonomous region, Russia, there was an anthrax outbreak among migratory Nenet indigenous peoples. This outbreak resulted from thawing and exposure of old anthrax burial sites, in unprecedented hot weather, leading to a reindeer anthrax outbreak. Rapid prophylaxis and control measures were able to prevent spread to humans. For medical science to break the cycle of anthrax and other zoonotic outbreaks, increased investments into One-Health—an approach that promotes communication between different disciplines



For the WHO Blueprint list of priority diseases see https://www.who.int/blueprint/priority-diseases/en/

For more on **One-Health** see http://neoh.onehealthglobal.net/

to achieve optimal health of people, animals, and the environment—are required. Scrutinising anthrax through a One Health lens is long overdue. More integrative approaches are needed to show that the environment is a key neglected area for control and prevention of Anthrax.

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