EcoHealth – a dialogue between ecology and infectious diseases

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The ongoing COVID-19 pandemic is a stark reminder of the role that wildlife reservoirs may play in global public health. As human populations grow, expand, and transform landscapes, contact with wildlife increases and disease emergence has been an important consequence of this acceleration in interaction. Nearly 70% of all emerging infectious diseases in humans currently arise from wildlife reservoirs, yet most research on infectious diseases has been focused on the clinical setting. A 'Eco-Health' approach is urgently required to interpret the complex ecological mechanisms underlying disease ecology. We have been using wild ungulates as sentinels and bioindicators of some infectious diseases as these animals: i) are ubiquitous, ii) have been increasing in number and geographical range, iii) have considerably large home ranges, iv) are widely hunted, being the source of food-borne diseases, and v) overlap their habitat and distribution with livestock and humans, serving as a link between human-influenced settings and natural areas. We have implemented a national epidemiological surveillance network directed to wild ungulates to identify populations at risk, high risk areas, and to design a proactive management agenda. Additionally, the ecological analysis will allow the detection of geographical clusters of diseases outbreaks. Our results have revealed that wild ungulates are reservoirs of important diseases (e.g. bacteria and genes resistant to antibiotics, Hepatitis E virus, Porcine circovirus, Blastocystis sp.) and potential vehicles of food-borne diseases. Further steps will allow the evaluation of anthropogenic activities on the occurrence of infectious diseases in wild ungulates and determine how landscape features influence the dissemination of diseases by these species. This will contribute to unravel our understanding of the potential role that natural ecosystems play in the emergence, maintenance and dispersal of infectious diseases by wild animals.

FIGURE 1
Wild ungulates are reservoirs of zoonotic diseases and can be used as strategic sentinel species in terrestrial environments, providing early warning of potential risks to human, animal and environmental health.