SIN BIO SE
SYNTHESIS CENTRE ON BIODIVERSITY AND ECOSYSTEM SERVICES

Redes socioecológicas
Biodiversidade e Saúde


Photo: Fabiana Lopes Rocha

WILDLIFE HEALTH:
REDUCING ZOONOTIC RISK AND PROMOTING ONE HEALTH

POLICY BRIEF

HIGHLIGHTS

- The emergence of diseases transmitted between animals and humans (zoonoses) relies on ecosystem disturbances and biodiversity loss;
- Megadiversity, high social vulnerability, and increasing environmental degradation increase the risk of zoonoses in Brazil;
- Two-thirds of Brazilian states are at medium to high risk of zoonotic disease outbreaks. The probability of outbreaks tends to be higher and higher;

Reservoir: an organism that harbors and sustains infectious agent(s). They may be asymptomatic carriers or develop the disease triggered by the pathogen.

Zoonotic outbreak: a local increase in the number of cases of a disease of zoonotic origin (zoonosis).

Sentinel animal: a free-living animal used to monitor disease presence, chosen for its susceptibility to specific pathogens of concern to human health.


Photo: Fabiana Lopes Rocha

SOCIAL VULNERABILITY AND DEFORESTATION

In developing countries, human settlement in environmentally degraded areas and the social vulnerability of the population facilitate the rapid geographic spread of infections. Settlements in natural areas often amplify contact with wildlife, increasing the risk of zoonotic diseases.

For example, the incidence of malaria and leishmaniasis is directly linked to deforestation. In contrast, the prevalence of hantavirus and yellow fever is associated with agricultural and forestry activities in newly deforested areas.

In the case of Chagas disease (American trypanosomiasis), it is already known that the increase in the number of mammalian **reservoirs** combined with the low environmental quality of the landscape leads to a higher risk of transmission. However, approaches to biodiversity conservation and restoration based on integrating social inclusion and human well-being reduce the overall risk of transmission.


Photo: Fabiana Lopes Rocha

RISK OF ZOONOTIC OUTBREAK EMERGENCE

Eighteen Brazilian states have a medium to high risk of zoonotic outbreaks. Only eight Brazilian states are at low risk: Ceará, Rio Grande do Norte, Paraíba, Alagoas, Sergipe, Goiás, Paraná, and Rio Grande do Sul. Vulnerable human populations living in remote areas closer to wildlife, with great natural vegetation amounts but also experiencing high loss rates, are the most susceptible.

All Amazonian states are considered to have a medium to high risk of **zoonotic outbreaks.** Along with the high biodiversity - including zoonotic parasites - deforestation is a vector that increases the risk of outbreaks.

Isolated human settlements with poor health infrastructure can lead to the displacement of sick patients to large urban centers. Sometimes, this situation is the gateway for disease transmission to densely populated areas. Another aspect that increases the risk of zoonotic outbreaks is hunting. In certain regions of Brazil, hunting is a valuable source of protein, although being illegal . There is a need for a thorough and science-based debate that considers food safety, wildlife health surveillance, and the risk of zoonotic outbreaks.


Photo: Carlos Durigan

HUNTING NEGLIGENCE: WHAT'S AT STAKE?

Hunting is illegal in Brazil. Exceptions comprise the subsistence activity for traditional communities and native peoples, although the game meat trade can be easily found in the country. This is worrying for both wild species management and conservation and public health since its consumption represents a gateway for parasites.

Especially in the Amazon region, hunting is a complex issue that involves cultural, ecological, and economic aspects. Hunting is an essential activity for many traditional communities and indigenous peoples, who depend on it as a source of protein and subsistence. However , it has a negative impact on the environment when practiced in a predatory mode . Fishing and hunting can unbalance ecosystem dynamics, leading to biodiversity loss and increasing the prevalence of parasites, facilitating disease outbreaks.

It is necessary to balance the culture and livelihoods of communities with protecting the environment. This can be done by adopting sustainable hunting and fishing practices, monitoring and combating illegal hunting, and promoting ecotourism that values nature without damaging it.

Currently, few zoonoses have a surveillance program that reports disease incidence in wildlife. Monitoring wildlife health is essential to better map the risks of zoonotic outbreaks, such as the yellow fever surveillance program that monitors monkeys as **sentinel animals**. However, this issue is currently in an institutional limbo in the country. It is not properly covered either by the environment, health, or agriculture agendas.

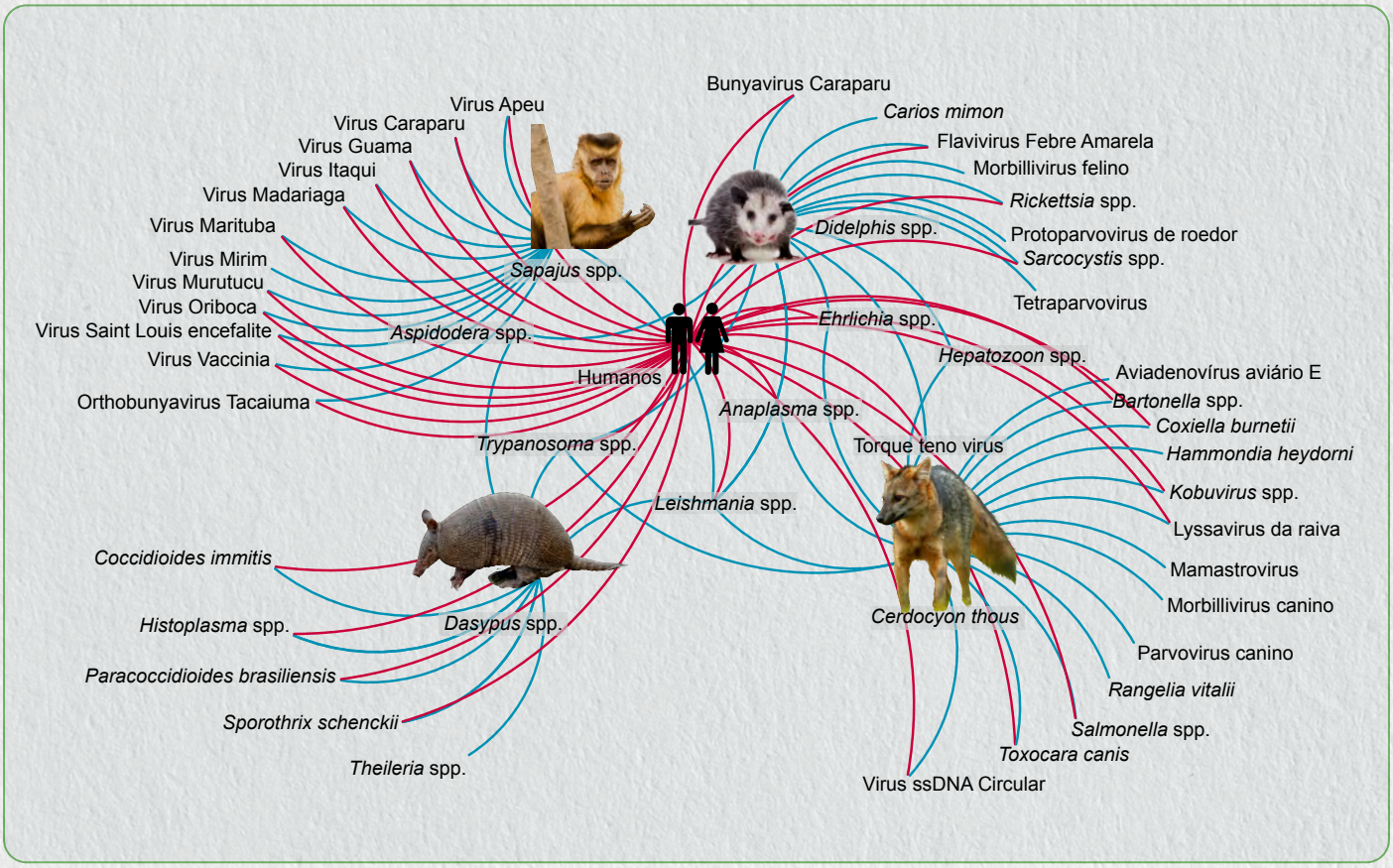

Figure: Simplified network of interactions between the four most frequently hunted species in the country, humans, and their major parasites.

The close relationships between people, domestic animals and wildlife in rural areas of the state of Amazonas (Brazil).

Photo: Gisele Winck.

RECOMMENDATIONS

- Establish a wildlife health monitoring and management system. This involves the creation of a legal framework and cooperation between environmental, health, or agricultural agencies, including the participation of local communities and wildlife experts;
- Develop innovative and sustainable approaches to biodiversity conservation and zoonotic disease prevention through scientific research and technological innovation investments. This includes understanding the interactions between wildlife, the environment, and human health and developing innovative solutions to restore degraded ecosystems;
- Broaden the debate on hunting to prevent illegal trade in wild species and reduce the risk of introducing zoonotic diseases by this means;
- Promote education and awareness programs for health professionals, students, and the general public on the risks of zoonotic diseases and the importance of wildlife health;
- Establish and strengthen cooperation among countries to share information, resources, and best practices related to wildlife health. This is essential for an effective global response.

ABOUT THE PROJECT

The Socioecological Networks Project produces syntheses of knowledge about the diversity of interactions between parasites and wild animals in association with social and environmental drivers of health to understand and predict epidemics and outbreaks of neglected tropical diseases.

ABOUT SinBiose

The Brazilian Synthesis Center on Biodiversity and Ecosystem Services (SinBiose) supports the development of knowledge synthesis to tackle current issues in biodiversity and ecosystem services. The initiative is led by CNPq, with the support from the Ministry of Science, Technology, and Innovation (MCTI) and state research foundations. Learn more at www.sinbiose.cnpq.br.

References

Andreazzi, C. S., Martinez-Vaquero, L. A., Winck, G. R., Cardoso, T. S., Teixeira, B. R., Xavier, S. C. C., Gentile, R., Jansen, A. M., & D'Andrea, P. S. (2023). Vegetation cover and biodiversity reduce parasite infection in wild hosts across ecological levels and scales. Ecography. https://doi.org/10.1111/ecog.06579

Winck, G. R., Raimundo, R. L. G., Fernandes-Ferreira, H., Bueno, M. G., D'Andrea, P. S., Rocha, F. L., Cruz, G. L. T., Vilar, E. M., Brandão, M., Cordeiro, J. L. P., & Andreazzi, C. S. (2022). Socioecological vulnerability and the risk of zoonotic disease emergence in Brazil. Science Advances, 8(26). https://doi.org/10.1126/sciadv.abo5774

Andreazzi, C. S., Brandão, M. L., Bueno, M. G., Winck, G. R., Rocha, F. L., Raimundo, R. L. G., Metzger, J. P., Chame, M., Cordeiro, J. L. P., & D'Andrea, P. S. (2020). Brazil's COVID-19 response. The Lancet, 396(10254), e30. https://doi.org/10.1016/S0140-6736(20)31920-6

Winck GR, Cruz GT, Andreazzi CS, Krempser E, D'Andrea PS. 2022. Integrando dados e modelos de redes eco-evolutivas e socioeconômicas para entender e prever surtos de doenças tropicais negligenciadas. https://doi.org/10.57810/lattedata/ODBRQG, LattesData, V2

Contact Information:

Paulo S. D'Andrea, Socioecological Networks Project Principal Investigator, Oswaldo Cruz Foundation (Fiocruz).
Email: dandrea@ioc.fiocruz.br.

Cecilia S. Andreazzi, Socioecological Networks Project Co-Principal Investigator, Oswaldo Cruz Foundation.
Email: cecilia.andreazzi@ioc.fiocruz.br.

Marisa Mamede, SinBiose manager, Brazilian National Council for Scientific and Technological Development, marisa.mamede@cnpq.br.

To cite this document:
Gisele R. Winck, Fabiana L. Rocha, Paulo S. D'Andrea, Cecilia S. Andreazzi. **Wild Health: reducing zoonotic risk and promoting One Health.** Sinbiose/CNPq, 2023, 4p.

Available at http://www.sinbiose.cnpq.br

Produced by:
Marisa Mamede, Paula Drummond de Castro, and Érica Speglich, in June 2023.

EXECUTORS

SYNTHESIS CENTRE ON BIODIVERSITY AND ECOSYSTEM SERVICES

IOC Instituto Oswaldo Cruz

SUPPORTERS

FAPERJ serrapilheira CNPq MINISTÉRIO DA CIÊNCIA, TECNOLOGIA E INOVAÇÃO GOVERNO FEDERAL BRASIL UNIÃO E RECONSTRUÇÃO