

PharmaBat:

Investigating Bat-Mediated Transfer of Aquatic Pharmaceuticals to Terrestrial Ecosystems and Implications for Bat Health

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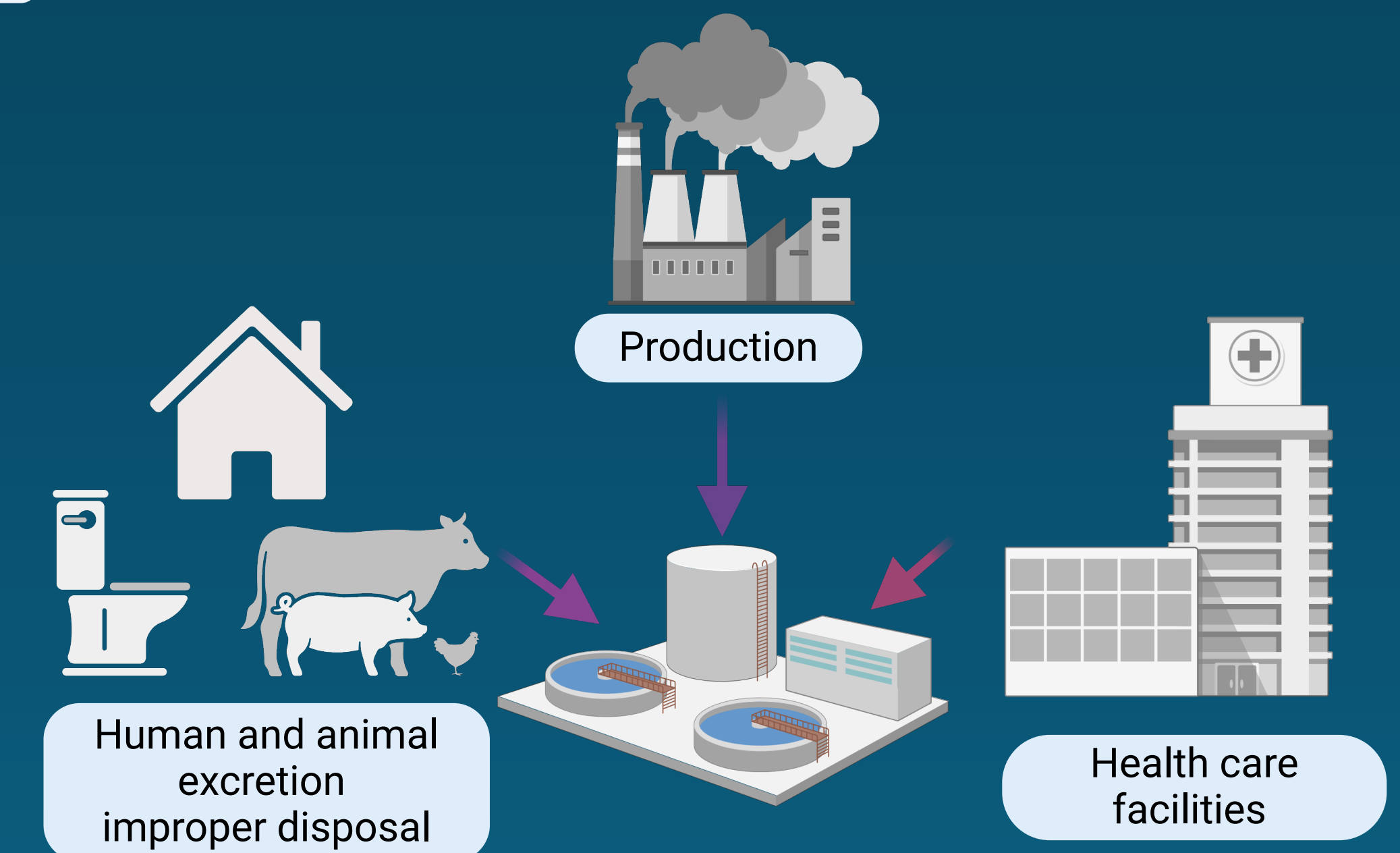
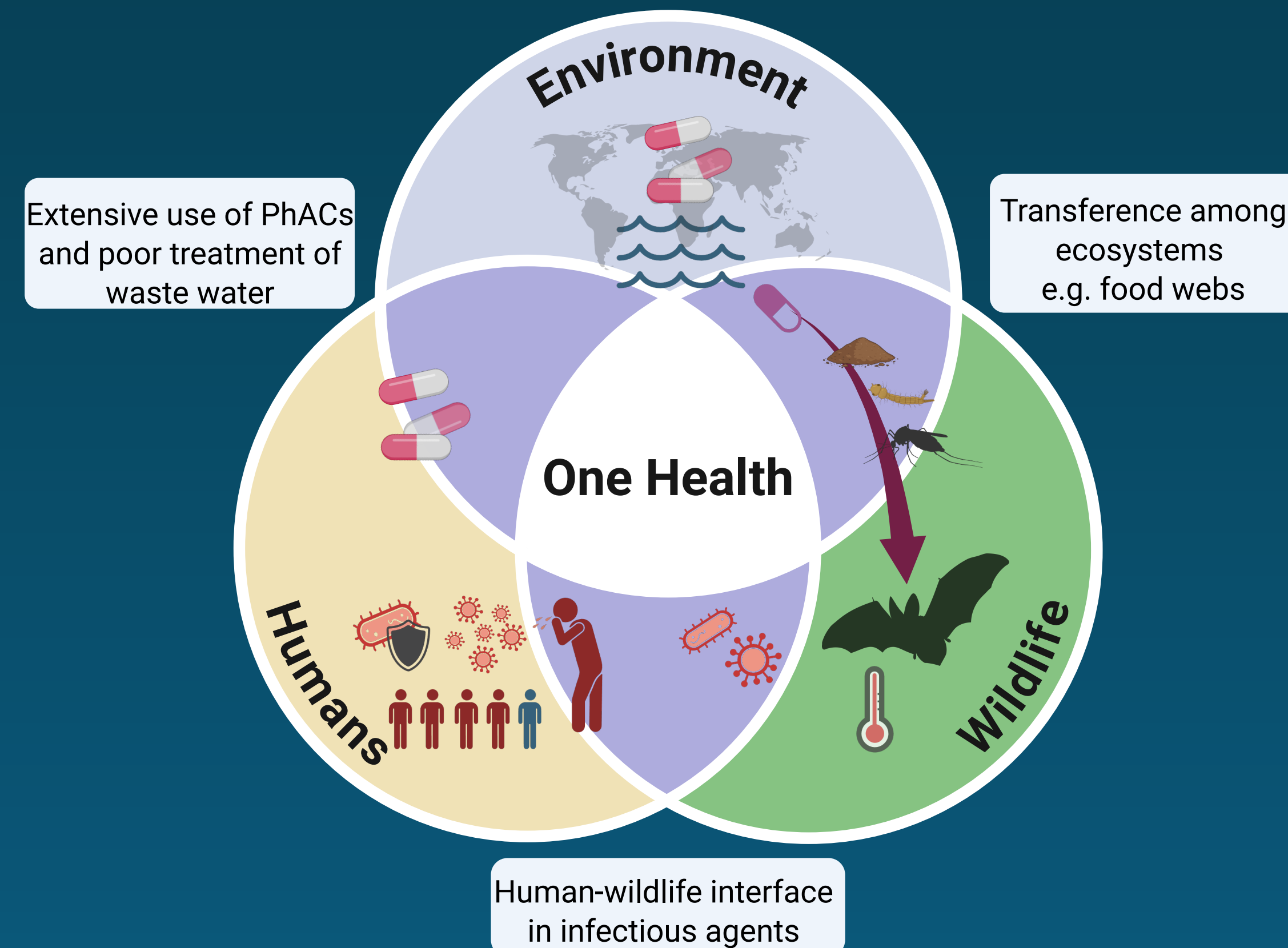
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- Bats could play an important role in **transferring pharmaceuticals** from water to land by **eating contaminated insects and water**.
- These contaminants can adversely **affect bat** physiology and behavior, for example, by **compromising their immune** response and potentially facilitating pathogen transmission.
- Given bats' role as **reservoirs for various pathogens**, including zoonotic ones, understanding the exposure risk and effects of pharmaceutical pollution on these species is urgent.

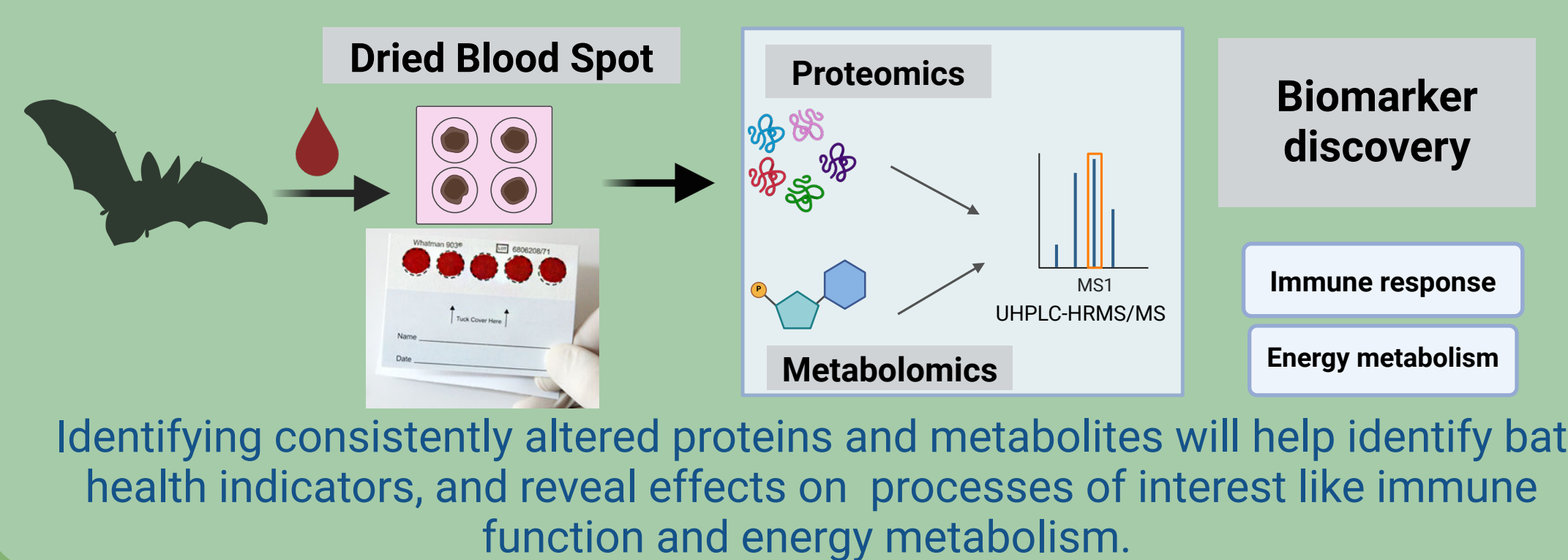
Project objectives

- Quantify pharmaceutical pollution in riparian ecosystems.
- Characterize exposure of riparian bats to pharmaceuticals via food web transfer.
- Evaluate how pharmaceuticals (PhACs) affect bat physiology and health.
- Describe the relationships between pharmaceutical exposure, bat health, and parasite load.



Bat health

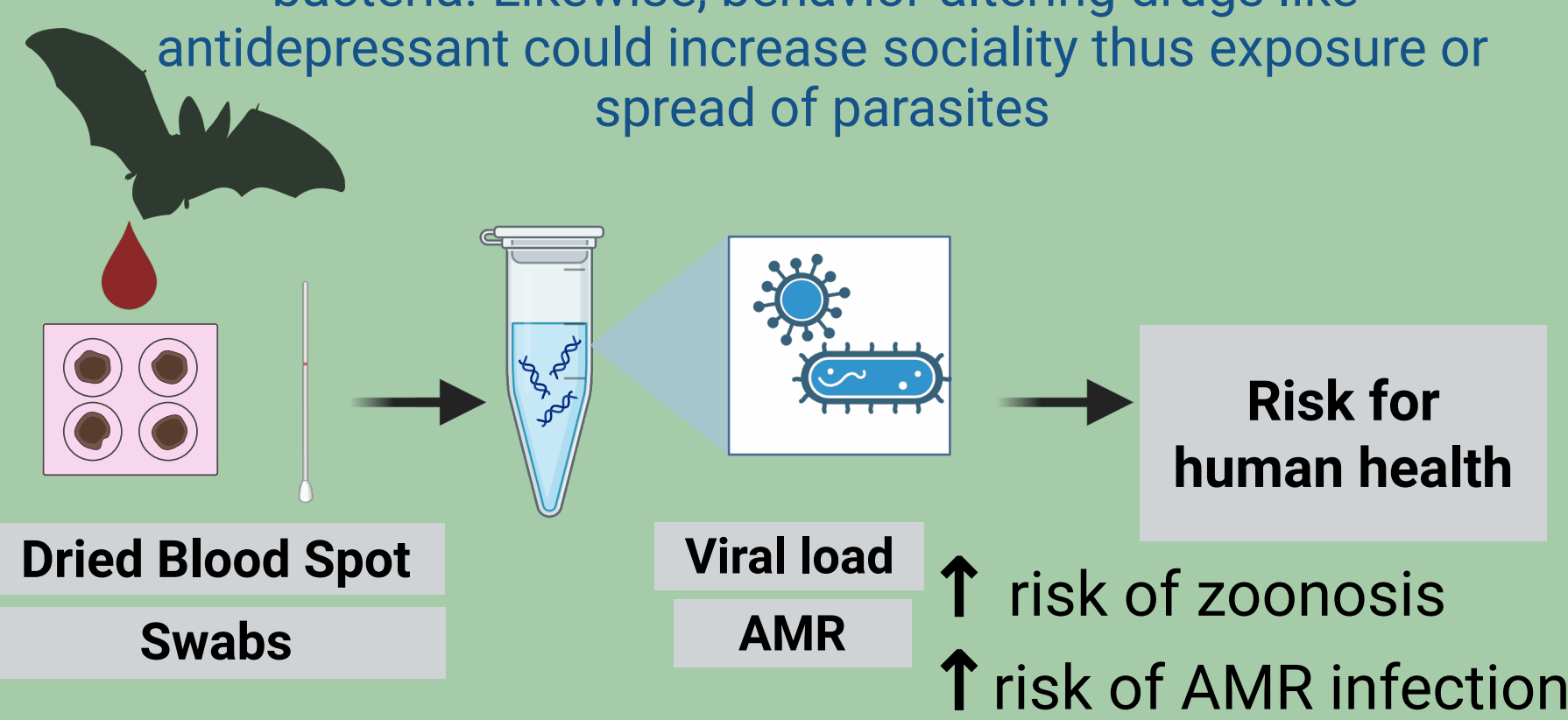
How does pharmaceutical exposure affect bat physiology and health?



Human health

Does pharmaceutical exposure influence bats as reservoirs for infectious pathogens?

Anti-inflammatory drugs and antibiotics may increase bat susceptibility to infectious agents like viruses and bacteria. Likewise, behavior-altering drugs like antidepressants could increase sociality thus exposure or spread of parasites



*AMR: Antimicrobial resistance; AMRGs: Antimicrobial resistance genes
*Ability of microorganisms like bacteria to survive previously effective treatment

Bats are reservoirs for various pathogens many transmissible to humans like SARS, Ebola, Nipah

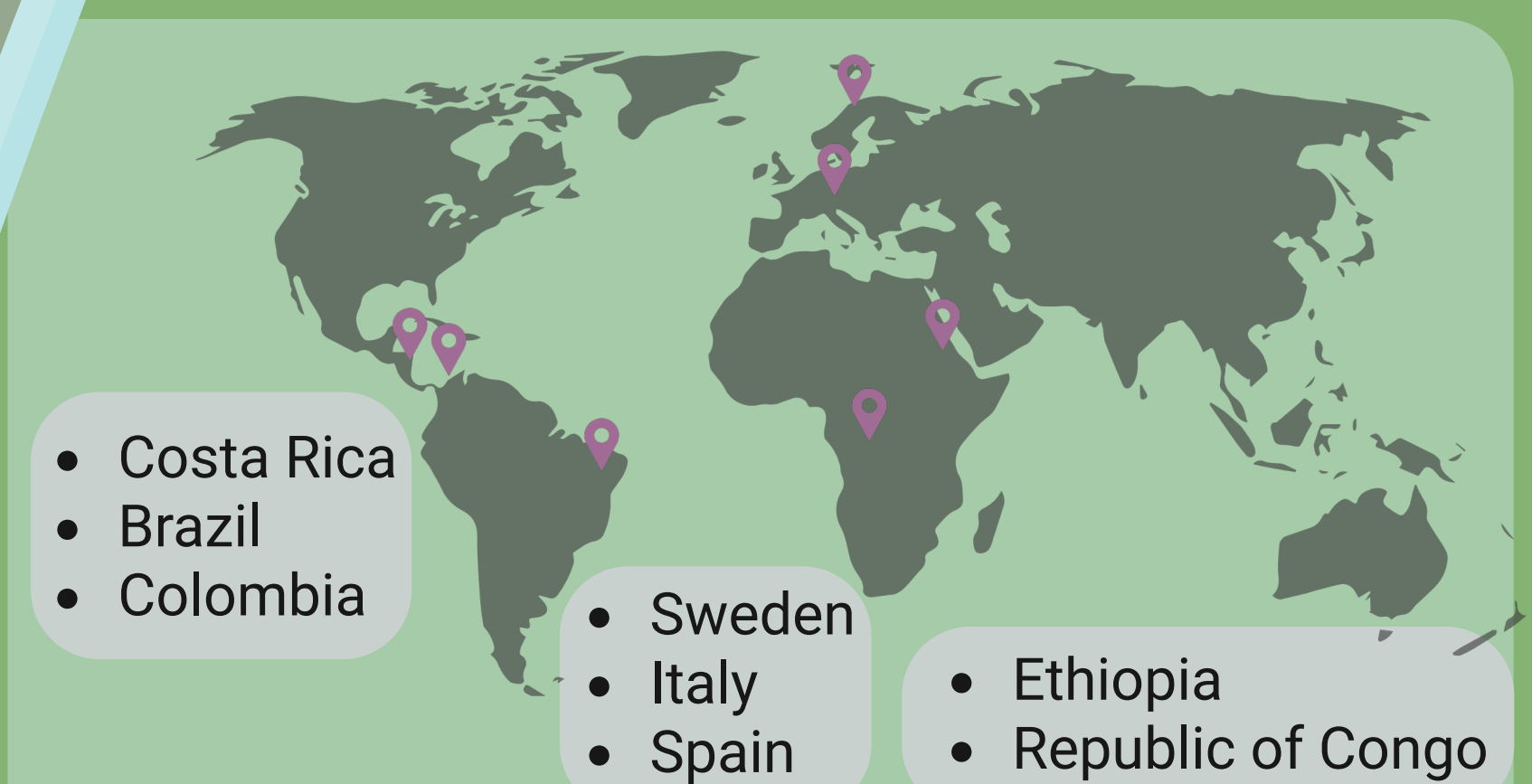
Zoonosis

Antimicrobial resistance is a growing global health threat, compromising our ability to treat infections and posing serious risks to both human and environmental health.

AMRGs

Environmental health

Pharmaceutical pollution in waterways, a global scale problem



Global scale sampling considers countries with differences in population size, healthcare infrastructure, and economic development, all of which correlate with water contamination

Are riparian bats exposed to pharmaceuticals through their diet?

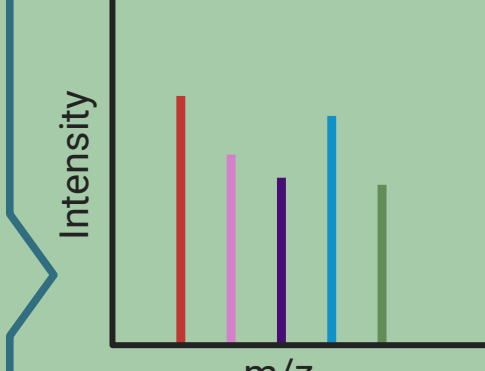


Adult stage

Larval stage

Sediment sample

- Aquatic contaminants can be retained during metamorphosis in flying adults and ultimately transferred to the terrestrial ecosystems.
- Many insectivorous bats feed on aquatic insects.
- Bats are top predators in riparian ecosystems being great bioindicators of environmental contaminants.



Targeted LC-MS 95 pharmaceuticals
Non targeted

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