

# Emerging disease and live wildlife trade at markets – a scoping review



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## Introduction

- The pandemic of COVID-19 has focussed global attention on the origin of the SARS-CoV2 virus, and in particular, the potential for emergence of disease from live wildlife sold at markets.
- Our objective was to explore and chart the research knowledge-base about activities and factors that could influence disease emergence associated with the sale of live, terrestrial wildlife at markets.

## Methods

- We conducted a scoping review according to PRISMA guidelines.
- Records were eligible if they were in English, published between 1980–2020 in peer-reviewed literature, theses and dissertations, and included information about live, terrestrial, vertebrate wildlife sold for any purpose at markets at which fresh food (including live wildlife for consumption) was likely to be sold.

## Results

- Of 56 studies identified (Fig. 1), the most frequent market types were ‘general’ in South America, traditional medicine and bushmeat in Africa, food in Southeast Asia and China, and wildlife in Southeast Asia (Fig. 2).
- Wildlife were most commonly sold for food and medicine globally, as well as pets in Southeast Asia and China (Fig. 3).
- The greatest diversity of live species was sold in Southeast Asia and China (>200 species), followed by South America (>50 species) and Africa (>20 species). Species were from classes Aves, Mammalia, Reptilia and Amphibia.
- Several studies reported slaughter of wildlife, poor hygiene, and lack of refrigeration in the market.
- As well as vendors and buyers, people linked to the markets included hunters and trappers, middlemen and brokers, wildlife farmers, restaurant owners, government officials, slaughtermen, traditional healers and drivers.
- Only 12 records identified specific diseases or microbes: Avian influenza viruses (n=3; Africa and Asia), disease due to *Batrachochytrium dendrobatidis* in Amphibia (n=3; Asia and South America), *Blastocystis* in birds (n=1; South America), disease due to *Spirometra* in snakes (n=3; Asia), coronaviruses in racoon dogs, ferret badgers and Asian leopard cats (n=2; Asia).

## Conclusions

- The large diversity of live, terrestrial, vertebrate, wildlife species for sale in markets in Southeast Asia and China could provide a greater variety of potential reservoir—spill-over host interfaces and might increase the risk of disease emergence.
- The network of people involved in live wildlife sale in markets globally is complex. Such networks are resilient to disruption because there are multiple connections between actors; therefore, simple solutions to market regulation such as banning live wildlife at markets are unlikely to be effective at reducing emerging disease risks.
- The focus of research at markets appears to be the impact of wildlife trade on conservation. Currently, there is limited detailed information about interfaces with wildlife that might create opportunity for disease emergence, such as the duration and type of contact with people and domestic animals.

## Acknowledgements

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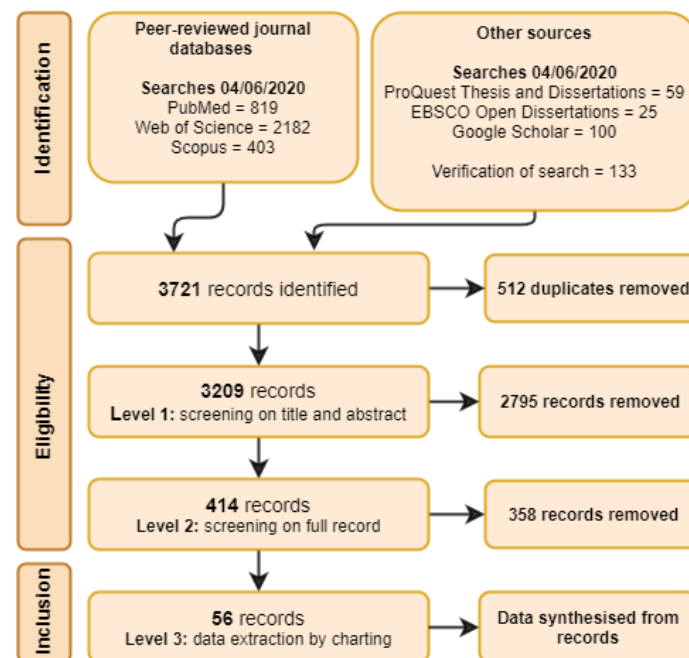


Figure 1: Flowchart of records through each level of the scoping review.

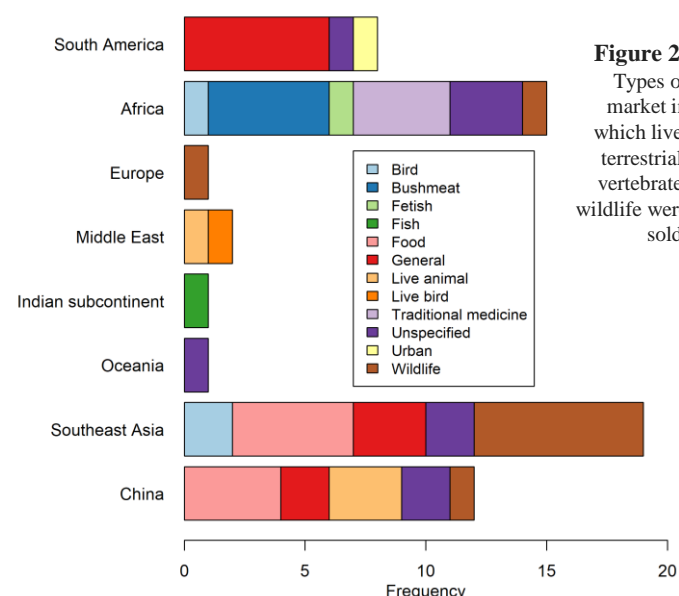


Figure 2: Types of market in which live, terrestrial, vertebrate, wildlife were sold.

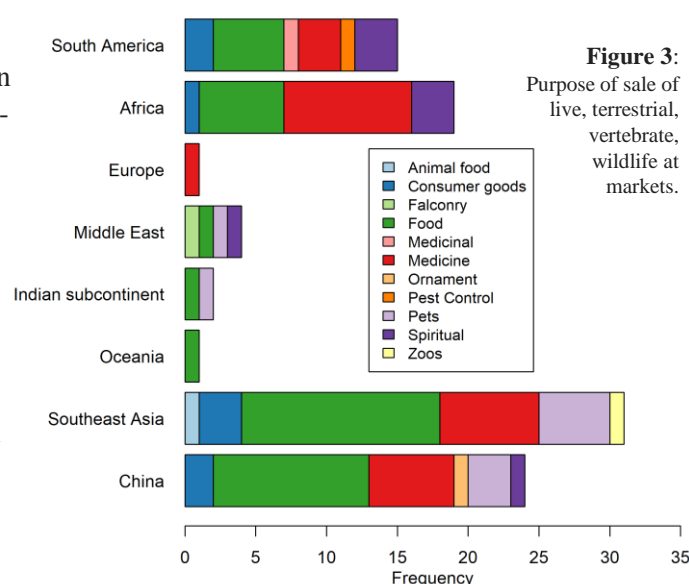


Figure 3: Purpose of sale of live, terrestrial, vertebrate, wildlife at markets.