

Live animal sales and SARS-CoV-2

Four markets in Wuhan, China, including the Huanan Seafood Wholesale Market, are known to sell a variety of live wild-captured or farmed mammal species. However, no testing data exist from animal species that were likely sold at the Huanan market in the months leading up to the COVID-19 pandemic. Now, Michael Worobey and colleagues from the University of Arizona have explored potential zoonotic transmissions due to live animal trading at the Huanan market.

Worobey and colleagues synthesized data from the World Health Organization COVID-19 case datasets, Chinese Center for Disease Prevention and Control datasets, environmental sampling from the Huanan market, population density data from Wuhan, geotagged Sina Weibo COVID-19 help seekers' location data and previously compiled data on wildlife sales at the Huanan market. They identified that plausible intermediate wildlife hosts including red foxes (*Vulpes vulpes*), hog badgers (*Arctonyx albogularis*) and common raccoon dogs (*Nyctereutes procyonoides*) were sold live at the Huanan market until November 2019. Using a spatial relative risk analysis, Worobey and co-authors identified a region in the southwest area of the market where live mammals were for sale, and inferred that that an additional five stalls were likely selling live or freshly butchered mammals or other unspecified meat products in

this section based on market floor plans, business registry data, and records of fines charged to three business owners for illegal sales of live animals.

Spatial pattern analyses of human symptom data indicated that all eight COVID-19 cases that were detected before 20 December 2019 were from the western side of the market where mammal species were sold. In the authors' related paper, phylodynamic rooting of the first severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) lineages (A and B) coupled with epidemic simulations indicated there were at least two separate cross-species transmission events into humans at the Huanan market, with the first zoonotic transmission involving lineage B viruses around mid-November 2019 (J. E. Pekar et al. *Science* **377**, 960–966; 2022).

Worobey and colleagues note that market workers were at particular risk of being infected with SARS-CoV-2. Apart from seafood, the Huanan market sells poultry and commodities, providing a hotspot where the food system meets other industries. Thus, Worobey and colleagues' findings highlight the importance of surveillance and testing to prevent future pandemics, which must include all human–animal interactions along the supply chain, even when they are not directly related to the food system.

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