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Spatial analysis informs surveillance and control strategies of human and livestock anthrax in Lai Chau Province, Vietnam

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Anthrax is reported globally with varying disease intensity and seasonality among countries. Livestock anthrax vaccination protects vaccinated animals and subsequently prevents the disease in humans who have close contact with the livestock. In Vietnam, anthrax epidemiology and ecology remain understudied. We used historical data of human and livestock anthrax from 2004-2021 in Lai Chau province, to identify spatial hotspots of human and livestock anthrax, describe epidemiological characteristics, and compare livestock anthrax vaccine coverage to human and livestock disease incidence. Local Moran's I (LISA) using spatial Bayes smoothed cumulative incidence (per 10000) at the commune level for the whole study period, epidemiological descriptive statistics, livestock vaccine coverage data, and annual incidence rates (per 10000) at the provincial level were used. LISA identified a human anthrax hotspot (high-high) in the southeast, which did not overlap spatially with livestock anthrax hotspots in southeastern and northeastern communes. Most human cases were male, aged 15-59 years, handled sick animals, and/or consumed contaminated meat. Almost all cases were reported by grassroots health facilities (commune and district), with a delay of 6.3 days between exposure and case notification to the national surveillance system. 80% of human cases were reported from June-October. The increase in disease incidence occurred shortly after livestock anthrax vaccine coverage decreased. This study informs vaccination strategy and targeted surveillance and control measures in newly identified high-risk areas and seasons of anthrax.

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