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Amazon infrastructure poses biosecurity risks

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A research team collects samples in the field for epidemiological monitoring in es mon the central Amazon. PHOTO: FERRANTE *ET AL.*

Deforestation of Amazonian forests poses increased biosecurity risks at local, regional, and global scales (*1*). The recently announced Mercosur–European Union trade agreement is poised to exacerbate deforestation by accelerating Brazilian agribusiness expansion (*2*)—especially cattle ranching and soy production—into illegally occupied lands across southern and central Amazonia (*3*). This expansion is being actively enabled by the Brazilian government through the consolidation of the BR-319 highway (*3*), linking Porto Velho to Manus at the core of the Amazonian deforestation arc, and through its political support for potash mining (*4*) in an area of the municipality of Autazes historically occupied by the Mura Indigenous people (*5*). Beyond affecting deforestation, these projects will disrupt intact forests, soils, and hydrological systems, forcing new contact between humans, livestock, and previously isolated microbial communities (*6*).

Recent metagenomic analyses reveal that the central BR-319 corridor and areas proposed for potash extraction harbor unknown microbial assemblages enriched in genes associated with antibiotic resistance, high virulence, toxicity, and horizontal gene transfer (*6*). Disturbance of these reservoirs creates ecological conditions that facilitate pathogen spillover and genetic recombination with known human pathogens, amplifying global biosecurity risks (*1*, *6*).

Limited institutional capacity to detect, contain, and respond to emerging pathogens in Amazonia has already produced measurable international consequences (*1*). The Gamma variant of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) emerged in Manaus and rapidly crossed international borders (*7*). If consolidated, the BR-319 highway would connect one of the world's largest zoonotic reservoirs to international airports, substantially increasing the speed and scale at which new pathogens could disseminate globally (*1*, *6*). More recently, a new lineage of Oropouche virus originating from the BR-319 corridor has expanded beyond Brazil (*8*), with confirmed circulation in Central America and Europe (*9*, *10*). These cases demonstrate that pathogen leakage from Amazonia is not a hypothetical future risk but an ongoing process, with global public-health implications (*6*).

This evidence has been formally submitted to Brazil's Ministry of the Environment (*6*), where authorities are legally required to assess all technical documentation. The same obligations apply to the Amazonas state licensing authority for potash mining in Autazes. Our findings indicate that the consolidation of BR-319 and potash mining not only are linked to deforestation and climate instability but also create active pathways for pathogen emergence and global spread (*6*). In line with the One Health framework and the

precautionary principle (*11*), these projects warrant urgent reassessment, including by international trade partners.

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