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Amazon fires coincide with increased respiratory illnesses in indigenous populations



Smoke from fires set in the Amazon region is one of the key causes of respiratory hospitalisations of indigenous people, states a recent study conducted by Brazil's Instituto Socioambiental (ISA). This year, the fires, along with the spread of COVID-19, might mean further distress to the indigenous population who live in the region.

The study, which reviewed particulate matter (PM_{2.5}) concentration data from the Integrated Health-Related Environmental Information System and hospitalisation data from the Universal Health System's Hospital Information System, shows that the increase in admission to hospital in the indigenous population for respiratory infections, such as acute bronchitis, asthma, and pneumonia, coincides with the period of forest fires in the region. The study covers the years 2010–19.

Previous studies had already found that the clearing of land is responsible for more than 80% of the occurrences of fires in newly deforested areas and that these fires explain 80% of the increase in particulate matter in the atmosphere. According to researchers much of the smoke from these fires is formed of fine particulate matter—ie, PM_{2.5}. These particles are easily inhalable and penetrate deeply into the respiratory tract, reaching pulmonary alveoli and bronchioles.

"The analysis of the historical series from 2010 to 2019 demonstrates the strong association between the number of hot spots (fires) and the average concentration of PM_{2.5} for the months of August to October (Pearson's correlation coefficient=0.91), indicating the fires of this period as the main source of PM_{2.5} in the Amazon", states the ISA study.

81% of the municipalities analysed in the ISA study presented yearly concentrations of suspended particles higher than that deemed safe by the WHO; people younger than 5 years and those older than 49 years are the ones whose health is most affected by the polluted air. Antonio Oviedo, lead researcher of the ISA study, says the report shows that the mean rate of hospitalisations for respiratory problems of indigenous people older than 49 years, from August to October, was 1.32 (SD 0.31) per 1000 inhabitants in the period from 2010 to 2019, while the mean rate of hospitalisations of indigenous people younger than 5 years was 5.54 (1.34) per 1000 inhabitants for the same period.

"In August of 2019 alone", says Oviedo, "the rate of hospitalisations in people aged 49 years and older increased by 25%"—the highest increase of the historical series for that age group; children younger than 5 years had the second highest increase in 2019.

Carlos Coimbra, senior researcher of indigenous health at Fiocruz (Rio de Janeiro, Brazil) agrees with the ISA study findings, "More than half of the indigenous population being hospitalised are younger than 15 years".

For Coimbra, who has researched indigenous living conditions for the past few years, the health advances seen in the Brazilian population over the past 20 years does not extend to the native population. "No safe water sources, absence of public policies on disposal of solid waste, no food safety, and a scenario of chronic malnutrition and accentuated anaemia in children and obesity in adults, makes them more vulnerable to diseases and maladies", says Coimbra. "Nowadays", he adds, "there are 12–13 deaths

per 1000 people in the Brazilian population, while in indigenous communities, that rate is 40–50 per 1000 people."

In 2020, with the burning season well underway in the Amazon region, researchers are concerned that these indigenous populations might be at even greater risk due to the COVID-19 pandemic. "The fire might aggravate the current COVID-19 crisis in the Amazon, where infection rates are still high", says Oviedo. According to the ISA researcher, the death rate of indigenous peoples due to COVID-19 is 1.5 times higher than the national average.

"Burnings increase the inflammatory processes in the lungs, which become open doors for microorganisms to enter, such as the severe acute respiratory syndrome coronavirus 2", adds Coimbra. To make matters worse, many of the trees cut down in 2019 have not yet been burned, which could mean that in 2020, the fires could be more intense. "Most of the land cleared in 2020, and 45% of the forest cleared in 2019, has not been burned and serves as fuel for this year's fires", explains Oviedo.

Data also shows that the dry season is getting longer in the Amazon region, with rains that used to start at the end of October only appearing at the beginning of December. "This means that the fires might be extended, making people breath in these particulates for a longer period of time, further pressuring the health system in the area", adds Oviedo.

The study concludes that "the combined effect of the fires and the pandemic...increase the demand for health services associated with respiratory problems".

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For the ISA study in Portuguese see https://www.socioambiental.org/sites/blog.socioambiental.org/files/nsa/arquivos/incendios_e_internacoes_indigenas_isa.pdf#overlay-context=pt-br/noticias-socioambientais/fumaca-de-incendios-impulsiona-internacoes-de-indigenas-mostra-estudo

For the ISA study in English see <https://acervo.socioambiental.org/acervo/documentos/impacto-deforestation-related-fires-air-quality-and-indigenous-health-brazilian>

For the study on interactions between rainfall, deforestation, and fires see *Philos Trans R Soc Lond B Biol Sci* 2008; **363**: 1779–85

For the study on air quality and human health improvements from reductions in deforestation see *Nat Geosci* 2015; **8**: 768–71

For the WHO air quality guidelines see <https://www.euro.who.int/en/health-topics/environment-and-health/airquality/publications>

For the study on health of Indigenous populations see *BMC Public Health* 2013; **13**: 5