

# Scientists look at links between HAP and lung infections including pneumonia

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Scientists at LSTM have come a step closer to understanding why people exposed to household air pollution (HAP) are at higher risk of lung infections such as pneumonia and tuberculosis.

Three billion people worldwide are exposed to HAP from the fuels they burn to cook, light and heat with at home. Frequently, charcoal, wood and food waste are burned and generate high concentrations of [smoke particles](#). This exposure is associated with increased risk of [pneumonia](#), particularly in low and [middle income countries](#) where [bacterial pneumonia](#) is the biggest cause of infant mortality. This risk is well known, but the reasons are not: results published in the *American Journal of Respiratory Cell and Molecular Biology* may explain why.

The research team, in Malawi, studied healthy volunteers who had frequent exposure to HAP. Using a telescope test, the team took samples of the immune cells from the lung airways. These "alveolar macrophages" are a major defence against infection and clean up the lung airways by ingesting inhaled particles and bacteria. Macrophage cells produce toxins which kill the bacteria they've taken up in a process called oxidative burst.

The study measured the smoke particle content of the [macrophage cells](#). More smoke exposure was associated with a weaker killing response. The authors conclude that even in healthy people, HAP can cause weaknesses in the immune function of the lung, which can lead to higher rates of pneumonia.

Dr Jamie Rylance is a respiratory specialist at Aintree University Hospital.. Previously a clinical research fellow at LSTM, he returns in August as Senior Clinical Lecturer. He was a joint first author on the paper and finds the results exciting: "Household [air pollution](#) is the 3rd most important risk factor for ill-health worldwide. You don't have to have lung disease to suffer the ill effects of these smoke particles. Our cell based research has shown that HAP exposure goes hand in hand with a reduced immune capacity to deal with [lung infection](#). Vulnerable groups such as women and children in low income countries are most likely to be affected."

During the study the team also worked with healthy non-smokers in Liverpool.. The researchers are now able to recreate the conditions in the lungs by using macrophages obtained from blood samples, and exposing them to smoke particles in the laboratory.

Provided by Liverpool School of Tropical Medicine

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