# Climate change set to expand deadly Aspergillus fungi risk across northern hemisphere



New research predicts that climate change will significantly increase the spread of infection-causing fungi, particularly Aspergillus species, which are responsible for an estimated 2.5 million deaths annually. The findings, which are currently under peer review, suggest that as global temperatures rise, these fungi will expand their geographical range into areas of North America, Europe, and Asia, exposing populations that are currently unacquainted with these pathogens to heightened health risks.

Aspergillus fungi, known for their adaptability, are found in diverse environments including soil and water. While these organisms play integral roles in ecosystems, they can also pose severe health threats, particularly in immunocompromised individuals. Those with conditions such as asthma, cystic fibrosis, chronic obstructive pulmonary disease, or weakened immune systems—often due to cancer treatments or severe viral infections—are at the greatest risk. Norman van Rijn, a researcher from Manchester University, explained that when the immune system fails to eliminate the inhaled spores, the fungus begins to proliferate, with the potential to cause fatal infections. Aspergillosis, which predominantly affects the lungs, has mortality rates ranging from 20% to 40% and often goes undiagnosed due to its indistinct symptoms, which overlap with many common illnesses.

The study illuminates the concerning trajectory of Aspergillus flavus and Aspergillus fumigatus, two species projected to thrive in warming climates. While Aspergillus flavus is predicted to spread into northern regions—including parts of northern America and northern China—the ominous forecast suggests a potential range expansion of approximately 16% due to continued fossil fuel use. This species is notorious for its resistance to available antifungal treatments and its threat to food security, having been identified by the World Health Organization as a critical pathogen. Aspergillus fumigatus, which favours temperate climates, may see its spread increase by as much as 77.5% by 2100, putting millions, particularly in Europe, at risk.

Moreover, climate change is not solely about geographical shifts; it could also augment the thermal tolerances of these fungi, allowing them to thrive at higher temperatures within human hosts. Researchers have noted that extreme weather events—such as droughts, floods, and heatwaves—can displace and facilitate the spread of these pathogens, which correlates with observed spikes in fungal diseases following natural disasters. As Elaine Bignell, co-director of the MRC Centre for Medical Mycology at the University of Exeter, highlighted, the growing prevalence of these fungi presents a substantial public health challenge, emphasising the urgent need for research and awareness to combat the impending crisis.

Despite the critical implications of these findings, there is a troubling lack of data regarding the environmental prevalence of Aspergillus and the demographics of those infected. Justin Remais, a professor of environmental health sciences at UC Berkeley, is spearheading a study that uncovered over 20,000 aspergillosis cases in the United States from 2013 to 2023, revealing an annual increase of about 5%. This underscores a startling trend: fungal infections are becoming increasingly common, and many remain resistant to treatment. The healthcare community has historically focused more on bacterial and viral pathogens, leaving fungal diseases relatively obscure. Bignell emphasised the pressing need to reverse this trend, cautioning that anyone could potentially be affected in the future.

As global temperatures continue to rise, the threat posed by Aspergillus fungi is set to escalate, calling for immediate attention to research, diagnostics, and preventive measures in order to prepare for a future where fungal diseases could wreak havoc on public health worldwide.

## Reference Map:

* Paragraph 1 – [[1]](https://www.rnz.co.nz/news/world/562083/aspergillus-fungi-that-can-eat-you-from-the-inside-out-could-spread-as-the-world-heats-up), [[2]](https://www.ft.com/content/506f5a03-8520-40e1-aee3-a6e6427f68c0)
* Paragraph 2 – [[1]](https://www.rnz.co.nz/news/world/562083/aspergillus-fungi-that-can-eat-you-from-the-inside-out-could-spread-as-the-world-heats-up), [[2]](https://www.ft.com/content/506f5a03-8520-40e1-aee3-a6e6427f68c0), [[3]](https://www.manchester.ac.uk/about/news/climate-change-putting-millions-more-people-at-risk-from-infection-causing-fungi/)
* Paragraph 3 – [[3]](https://www.manchester.ac.uk/about/news/climate-change-putting-millions-more-people-at-risk-from-infection-causing-fungi/), [[4]](https://www.cdc.gov/fungal/about/climate-change-and-fungal-diseases.html), [[6]](https://www.ft.com/content/cb7803f4-4ca5-4eba-9c4e-3e95741c01c9)
* Paragraph 4 – [[5]](https://www.eea.europa.eu/en/analysis/publications/mycotoxin-exposure-in-a-changing-european-climate), [[6]](https://www.ft.com/content/cb7803f4-4ca5-4eba-9c4e-3e95741c01c9)
* Paragraph 5 – [[4]](https://www.cdc.gov/fungal/about/climate-change-and-fungal-diseases.html), [[6]](https://www.ft.com/content/cb7803f4-4ca5-4eba-9c4e-3e95741c01c9)

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## Bibliography

1. <https://www.rnz.co.nz/news/world/562083/aspergillus-fungi-that-can-eat-you-from-the-inside-out-could-spread-as-the-world-heats-up> - Please view link - unable to able to access data
2. <https://www.ft.com/content/506f5a03-8520-40e1-aee3-a6e6427f68c0> - This article discusses how climate change is accelerating the global spread of dangerous fungal pathogens, particularly Aspergillus species. Rising temperatures are enabling Aspergillus fumigatus and Aspergillus flavus to expand into northern regions of Europe, Asia, and the Americas. These fungi pose serious health risks, especially to people with weakened immune systems. Aspergillosis, a lung disease caused by inhalation of Aspergillus spores, kills hundreds of thousands annually, with many cases going undiagnosed due to unfamiliarity and symptom overlap with other conditions. The article emphasizes the urgent need for increased research and public awareness, as fungal diseases are projected to become a growing health crisis under climate change.
3. <https://www.manchester.ac.uk/about/news/climate-change-putting-millions-more-people-at-risk-from-infection-causing-fungi/> - Researchers from The University of Manchester have forecast an increased risk of infection from fungi over the coming years, including a significant spread of some fungal pathogens across Europe, depending on global actions to mitigate climate change. Under a scenario of continued fossil fuel use, the spread of Aspergillus flavus could increase by about 16%, putting 1 million more people at risk of infection in Europe. Infections affect the respiratory system, and this fungus infects a broad range of agricultural crops. The predictions also show that the spread of another fungus, Aspergillus fumigatus, could increase by 77.5% and potentially expose 9 million people in Europe. This is a concerning trend due to a rise in antifungal resistance and a severe lack of diagnostics and treatment options for fungal infections.
4. <https://www.cdc.gov/fungal/about/climate-change-and-fungal-diseases.html> - The Centers for Disease Control and Prevention (CDC) highlights how climate change may increase the burden of fungal diseases worldwide. As global temperatures rise, fungi that were once limited to specific climates are now spreading to new geographic regions, exposing new populations to infections like aspergillosis and valley fever. Additionally, extreme weather events—such as floods and heatwaves—are contributing to environmental disruptions that favor fungal growth and human exposure. The article also discusses challenges in diagnosing and treating fungal diseases, noting that infections often go undetected due to non-specific symptoms and a lack of awareness among healthcare professionals. Moreover, treatment is difficult as antifungal drugs are limited and resistance is on the rise.
5. <https://www.eea.europa.eu/en/analysis/publications/mycotoxin-exposure-in-a-changing-european-climate> - This publication by the European Environment Agency examines how climate change affects mycotoxin exposure in Europe. Under a +2°C temperature-increase scenario, the study predicts that aflatoxin (AF) contamination in maize will increase, particularly in southern Europe. In a +5°C scenario, the contamination risk may decrease in southern regions due to extreme heat, but risks will widen geographically to include more northern European countries. For wheat, there are also increases in AF contamination, but these are higher in a +2°C temperature-increase scenario than a +5°C scenario. The study emphasizes that climate change will alter exposure patterns, resulting in people being exposed to different mycotoxins with varying health effects.
6. <https://www.ft.com/content/cb7803f4-4ca5-4eba-9c4e-3e95741c01c9> - This article explores how climate change is facilitating the expansion of fungal pathogens and increasing the incidence of fungal infections in human populations. As global temperatures rise, fungi that were once limited to specific climates are now spreading to new geographic regions, exposing new populations to infections like aspergillosis and valley fever. Additionally, extreme weather events—such as floods and heatwaves—are contributing to environmental disruptions that favor fungal growth and human exposure. The article also highlights the challenges in diagnosing and treating fungal diseases. Infections often go undetected due to non-specific symptoms and a lack of awareness among healthcare professionals. Moreover, treatment is difficult as antifungal drugs are limited and resistance is on the rise. The combination of climate-driven spread, increased human exposure from extreme weather, and healthcare limitations presents a growing public health dilemma.