

# Fungal Diseases and COVID-19

## Overview

COVID-19-associated fungal infections can lead to severe illness and death.<sup>1, 3, 4, 7, 8, 28, 29, 30</sup> Symptoms of certain fungal diseases can be similar to those of [COVID-19](#), including fever, cough, and shortness of breath.<sup>1, 31</sup> Some patients can have COVID-19 and a fungal infection at the same time. Laboratory testing is necessary to determine if a person has a fungal infection, COVID-19, or both.

COVID-19 likely increases the risk for fungal infections because of its effect on the immune system and because treatments for COVID-19 (like steroids and other drugs) can weaken the body's defenses against fungi.<sup>32</sup> The most commonly reported fungal infections in patients with COVID-19 include aspergillosis, invasive candidiasis, and mucormycosis (sometimes called by the misnomer "[black fungus](#) [↗](#)").<sup>1-6</sup> Fungal infections resistant to antifungal treatment have also been described in patients with severe COVID-19.<sup>19, 20</sup>

Awareness of the possibility of fungal co-infection with COVID-19 is essential to reduce delays in diagnosis and treatment in order to help prevent severe illness and death from these infections.

## COVID-19-associated pulmonary aspergillosis

Scientists are still learning about [aspergillosis](#) (infections caused by the fungus *Aspergillus*) in people with severe COVID-19. In the past, scientists thought aspergillosis occurred almost entirely in people with severely weakened immune systems. However, aspergillosis has been [increasingly reported](#) in patients without weakened immune systems but who have severe respiratory infections caused by viruses, including influenza. Several recent reports describe COVID-19-associated pulmonary aspergillosis (CAPA).<sup>1, 3, 6, 9, 10-14, 33</sup>

Available information indicates that CAPA:

- Usually occurs in patients with severe COVID-19 (e.g., patients on ventilators in ICUs)<sup>1, 6, 11-14</sup>
- Can be difficult to diagnose because patients often have non-specific symptoms and testing typically requires a specimen from deep in the lungs<sup>11, 14</sup>
- Can cause severe illness and death<sup>8, 9, 11-14</sup>

Clinicians should consider the possibility of aspergillosis in patients with severe COVID-19 who have worsening respiratory function or sepsis, even if they do not have classical [risk factors](#) for aspergillosis.<sup>16</sup> Testing for CAPA usually involves obtaining specimens from patients' lower respiratory tract, which are tested for *Aspergillus* galactomannan antigen and fungal culture. The [treatment of CAPA](#) includes antifungals like voriconazole, posaconazole, and isavuconazole. Therapeutic drug monitoring should be considered when using these antifungals in CAPA treatment.<sup>34, 35</sup>

## COVID-19-associated mucormycosis

Often called by the misnomer "[black fungus](#) [↗](#)," COVID-19-associated mucormycosis is a major public health problem in India.<sup>30, 36</sup> COVID-19-associated mucormycosis cases have also been seen outside of India, including in the United States, although much less commonly. Uncontrolled diabetes and overuse of steroids for COVID-19 treatment are important risk factors.<sup>28, 29, 37</sup>

Biomarkers for diagnosing invasive aspergillosis, such as beta-d-glucan and galactomannan, are typically negative in patients with mucormycosis. The [treatment for mucormycosis](#) frequently involves aggressive surgical intervention and treatment with antifungals, including amphotericin B, posaconazole, or isavuconazole. Voriconazole is not recommended for treating mucormycosis.<sup>27</sup> Providers should consider therapeutic drug monitoring during COVID-19-associated mucormycosis treatment.<sup>34, 35</sup>

The risk of COVID-19-associated mucormycosis may be decreased by encouraging vaccination against COVID-19, prescribing steroids for COVID-19 treatment based on [guidelines](#), and controlling the blood sugar of patients with diabetes who have COVID-19.<sup>28, 29</sup> Early diagnosis and treatment are key to improving outcomes for patients with COVID-19-associated mucormycosis. Clinicians should consider the possibility of mucormycosis in patients with COVID-19 even when patients lack classic risk factors for this disease.

## Increased spread of *Candida auris* during COVID-19 pandemic

*Candida auris* (*C. auris*) is an emerging fungus that can cause outbreaks of severe infections in healthcare facilities. In the United States, it has most commonly spread in long-term care facilities caring for people with severe medical conditions. However, since the start of the COVID-19 pandemic, outbreaks of *C. auris* have been reported in COVID-19 units of acute care hospitals.<sup>38</sup> These outbreaks may be related to changes in routine infection control practices during the COVID-19 pandemic, including limited availability of gloves and gowns, reuse or extended use of these items, and changes in cleaning and disinfection practices. Screening for *C. auris* colonization, an important part of containment efforts, has been more limited as healthcare facilities and health departments have been responding to COVID-19.

## Invasive candidiasis in patients with COVID-19

Patients hospitalized for COVID-19 are at risk for healthcare-associated infections (HAIs), including [candidemia](#), or bloodstream infections caused by *Candida*.<sup>7, 17-19</sup> Patients with COVID-19 who developed candidemia were less likely to have certain underlying conditions and procedures commonly associated with candidemia and more likely to have acute risk factors linked to COVID-19 care, including medicines that suppress the immune system.

## Fungal pneumonias can resemble COVID-19

Other fungal diseases, such as Valley fever ([coccidioidomycosis](#)), [histoplasmosis](#), and [blastomycosis](#), can cause fever, cough, and shortness of breath, similar to COVID-19 and bacterial pneumonias.<sup>21</sup> These fungi live in soil. People become infected by breathing in fungi present in the air. Clinicians should consider fungal pneumonias as a possible cause of respiratory illness, particularly if COVID-19 testing is negative. It is important to note that these fungal diseases can occur at the same time as COVID-19.<sup>22, 23</sup>

### Related Links

- [COVID-19](#)
- [Aspergillosis](#)
- [Candida auris](#)
- [Histoplasmosis](#)
- [Blastomycosis](#)
- [Coccidioidomycosis](#)
- [Mucormycosis](#)

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