

## Aspergillosis

### Fungal Disease Series #4

Aspergillosis is an infection caused by a fungus called *Aspergillus*.

The *Aspergillus* mold lives in soil, plants and rotting material. It can also be found in the dust in your home, carpeting, heating and air conditioning ducts, certain foods including dried fish and in marijuana.

Because the number of people with weakened immune systems has been increasing over the years, aspergillosis, which occurs more frequently in this group, is now the leading cause of death due to invasive fungal infections in the United States.

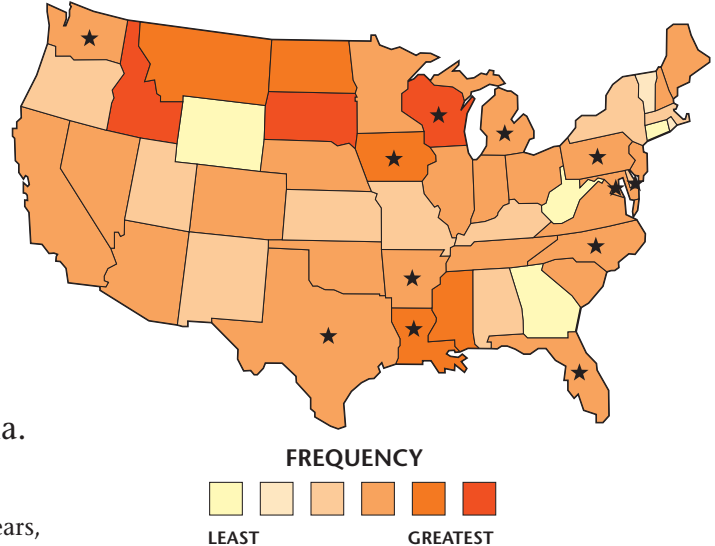
Not everyone who gets aspergillosis goes on to develop the severe form (*invasive aspergillosis*). The starred states on the map show where *invasive aspergillosis* is most common. The map also shows the states in the U.S. where aspergillosis is most frequently found. The darkest shaded states are those with the highest number of people with aspergillosis, and the lighter shaded states are those with the fewest.

### What causes Aspergillosis?

*Aspergillus* enters the body when you breathe in the fungal spores (“seeds”). This fungus is commonly found in your lungs and sinuses. If your immunity (the ability to “fight off” infections) is normal, the infection can be contained and may never cause an illness. However, a weak immune system or having a chronic lung disease allows the *Aspergillus* to grow, invade your lungs and spread throughout your body. This may happen if you:

- have a cancer such as leukemia or aplastic anemia;
- take chemotherapy or are on corticosteroids for a long time (for any reason);
- had an organ transplant (for example, kidney or lung);
- have advanced HIV infection; or
- have a chronic lung disease like asthma, emphysema, tuberculosis or cystic fibrosis.

States where aspergillus is found in the U.S. from 1865 to 2009.  
★ = reports of severe aspergillosis



### What are the different forms and symptoms of aspergillosis?

Everyone reacts to this fungus differently, depending on your immunity and other factors. Different forms and their symptoms include:

- **Hypersensitivity Pneumonitis**—an allergic reaction to the fungus in the lungs. Symptoms can last for weeks or months and include:
  - shortness of breath
  - coughing
- **Allergic Bronchopulmonary Aspergillosis (ABRA)**—an asthma-like illness. Symptoms do not improve with usual asthma treatment and include:
  - coughing
  - wheezing
  - shortness of breath
- **Invasive Aspergillosis**—a rapidly spreading and potentially life threatening illness. Symptoms include:
  - fever that does not get better with antibiotics
  - difficulty breathing
  - chest pain that is worse with deep breathing
  - dry cough
  - coughing up blood, which can be caused by a ball of fungus that forms in the lungs

In severe cases, additional symptoms include:

- swollen eye on one side
- bleeding from the nose
- difficulty talking
- paralysis of facial muscles
- ulcers inside the mouth or inside the chest wall

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- confusion, seizures or stroke-like symptoms, which could mean the infection has spread to the brain.

## How is Aspergillosis diagnosed?

Aspergillosis generally starts out as a spot in your lung called a lung “nodule”. (This nodule can be mistaken for lung cancer or tuberculosis). When the fungus is just a nodule, you likely will not have symptoms. However, over time, the fungus may develop into pneumonia or a fungus ball.

Unfortunately, the only way to diagnose aspergillosis with certainty is by a tissue biopsy (sampling a piece of your lung). Other tests that can be done include examining your sputum (phlegm) or taking cultures from your airways (breathing tubes). Culture specimens can be collected by a bronchoscopy (see *Fiberoptic Bronchoscopy* at <http://patients.thoracic.org/information-series/en/resources/fiberoptic-bronchoscopy.pdf>). Unfortunately, these cultures sometimes miss the infection. There is also a test that identifies parts of the fungus in your blood, called the *serum galactomannan test*. However, this test is not 100% accurate. It may even miss a few cases, but a positive test increases the chance you have the infection, especially if you have risk factors for aspergillosis, and have what looks like aspergillosis on a chest X-ray or CT scan.

## How is aspergillosis treated?

If you develop symptoms of aspergillosis, you may need treatment with an anti-fungal drug for either a brief or a long time. The weaker your immunity and the worse your symptoms are, the more aggressive your health care provider will be in diagnosing and starting treatment. Anti-fungal drugs used to treat aspergillosis include: voriconazole, amphotericin B, caspofungin, itraconazole, and posaconazole. Because most of these drugs have side effects, they are not usually given unless your health care provider is sure that you have aspergillosis. If you have a history of aspergillosis, you may be asked to take anti-fungal drugs to prevent the infection from coming back, especially when your immune system is weak (such as if you are receiving a course of cancer chemotherapy). If you have an *aspergilloma*, you may need surgery to remove the fungus ball because drugs are not very effective in treating it. Surgery may also be recommended if your infection does not improve with drugs.

Treatment of *allergic bronchopulmonary aspergillosis* (ABPA) is aimed at preventing and treating flare-ups

and preventing damage to your lungs and other organs. Treatment for allergic reactions includes steroids and an anti-fungal drug like itraconazole, which are often taken for several months.

## Can aspergillosis be prevented?

It is difficult to avoid being exposed to *Aspergillus*. However, if your immune system is weak, you should take special precautions. For example, avoid dusty areas or at least wear a surgical mask (see also *ATS Disposable Respirators* at <http://patients.thoracic.org/information-series/en/resources/disposable-respirators.pdf>) when you are around dusty areas, and avoid gardening until your immune system improves.

Use of anti-fungal drugs to prevent aspergillosis is helpful, mainly if you are at high-risk (have a low white blood cell count, leukemia or a myelodysplastic syndrome, or if you have received a stem cell transplant).

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### Resources:

#### Centers for Disease Control and Prevention (CDC)

[http://www.cdc.gov/nczved/divisions/dfbmd/diseases/aspergillosis/#what\\_Aspergillus](http://www.cdc.gov/nczved/divisions/dfbmd/diseases/aspergillosis/#what_Aspergillus)

#### Mayo Clinic

<http://www.mayoclinic.com/health/aspergillosis/DS00950>

#### National Institute of Health (NIH)

<http://www.ncbi.nlm.nih.gov/pubmedhealth/PMH0002302>

## Rx Action Steps

See your health care provider if you notice any of these symptoms:

- ✓ A fever that will not go away, especially if you are also having shortness of breath and/or chest pain, and if your immunity is weak
- ✓ Chronic cough, especially if your sputum (phlegm) is blood-stained
- ✓ Sinusitis or frequent asthma flares that do not improve even when you take your usual asthma medicines

**Doctor's Office Telephone:**

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